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Getting Started

Getting Started

Welcome To TradingSolutions

Welcome to TradingSolutions! When you start the TradingSolutions program, a Welcome Dialog is displayed.

Included on the **Welcome Dialog** are the following options:

- **Welcome Video**
  This brief video introduces you to the interface and features of TradingSolutions. Additional videos are available in the software to teach you the basics of using each feature.

- **Step-by-Step Tutorials**
  The help documentation includes many step-by-step tutorials that introduce you to using the TradingSolutions interface, creating trading signals, and many advanced features.

This dialog is displayed when you first start TradingSolutions. You can also get back to it by selecting **Welcome Dialog** from the **Help** menu at the top of the TradingSolutions window.

For a list of other helpful suggestions for getting started by learning the basics, see Learning the Basics.

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Changes from Previous Versions

If you have used a previous version of TradingSolutions and would like an overview of the changes made since a previous version, you may wish to proceed to the Changes from Previous Versions section.

Online Documentation

The online documentation explains every aspect of using TradingSolutions. Start with Learning the Basics, or jump straight to the section where you need help by clicking on the appropriate link.

- **Learning the Basics**
  This section introduces you to the basics of using TradingSolutions. It can help you with some general concepts and point you in the right direction for more specific solutions.

- **Understanding TradingSolutions Concepts**
  TradingSolutions uses several concepts and technologies to help you make trading decisions. This section introduces you to these concepts so that you can get the most out of TradingSolutions functionality.

- **The TradingSolutions Solution Service**

  The Solution Service provides you with sample models, data, and commentary for a select group of stocks so that you can see TradingSolutions in action.

- **Step-by-Step Tutorials**

  The best way to learn how to use software is often to just start using it. This section presents several tutorials to help you work step-by-step through common tasks you will want to perform within TradingSolutions.

- **Using the TradingSolutions Interface**

  There are many different parts to the TradingSolutions interface and each serves a purpose. Learn the specifics of each part of the interface in this section.

- **Performing Technical Analysis with TradingSolutions**

  TradingSolutions can be used to perform several different kinds of technical analysis. This section presents different ways to use your data to develop market timing information.

- **Customizing the TradingSolutions Software**

  Many of the defaults and toolbars used in TradingSolutions can be customized. This section shows you how you can modify TradingSolutions to fit your own personal preferences.

- **Help with the Interface**

  Not sure how to work with a wizard or dialog? This section walks you through every wizard and dialog in TradingSolutions.

- **Answers to Common Questions**

  Have a specific question about how to do something or why TradingSolutions behaves the way it does? This section answers many of the common questions TradingSolutions users have asked.

- **Glossary**

  Not sure what a term in TradingSolutions means? This section provides the definitions for all of the neural network, genetic algorithm, and trading terms used in TradingSolutions.

Changes from Previous Versions

This section provides a brief overview of the major features that have been added to TradingSolutions since it was originally released. You can use this information to quickly become acquainted with the new features and their usage.

Note: For a complete list of the modifications made for each new version and build, see the ReadMe.txt" file located in the TradingSolutions directory.

Major Features added in Version 3.0

- **Optimization of Predictions Based on Trading Performance**
  Inputs and settings of predictions can now be optimized based on the trading performance of the predicted signal.

- **Optimization of Prediction Input Parameters**
  Indicators can now be specified as inputs to predictions, allowing genetic optimization to determine which set of inputs and input parameters create the best trading performance.

- **Optimization of Entry/Exit Systems and Committees**
  Parameters to entry/exit systems and committees can now be optimized. For more information, see Optimizing Signals and Predictions.

- **Optimization of Group Fields**
  Fields for subgroups can now be set to be optimized, allowing you to create optimized fields for entire groups of stocks through to creation of a single field.

  For more information about optimization, see Optimizing Signals and Predictions.

- **Entry/Exit System Stop Rules**
  Entry/exit systems can now include rules which exit when profit, loss, or length criteria are met.

- **Video Help System**
  Integrated video helps are now available from throughout the TradingSolutions interface.

Major Features added since initial release of Version 2.1

- **IQFeed Data Support**
  Real-Time data can now be streamed directly into TradingSolutions from IQFeed. In addition, historical end-of-day and intraday data can now be imported from IQFeed. For more information, see Importing Data from IQFeed.

- **Quotes Plus Data Support**
  Historical end-of-day data can now be imported from Quotes Plus. For more information, see Importing Data from Quotes Plus.

Features added in Version 2.1

- **Streaming Data Support**
  (Real-Time Level only)
  Real-Time data can now be streamed directly into TradingSolutions to produce signals and calculations in real time while the market is open. eSignal is the first data provider supported, but more will follow. For more information, see Streaming Intraday Data.

- **Programmable Alerts**
  (Real-Time Level only)
  Alerts can now be added to data series to issue messages when events occur, such as when the position of a signal changes. For more information, see Using Alerts to Highlight Events.

- **Asynchronous Processing**
  The TradingSolutions interface can now be used while the software is importing data, updating calculations, and improving predictions.

- **eSignal Data Support**

  TradingSolutions can now import intraday, daily, weekly, and monthly data directly from eSignal. For more information, see Importing Data from eSignal.

- **Messages and Alerts Window**

  A new Messages and Alerts Window displays a history of recent messages in a convenient checklist format. For more information, see The Messages and Alerts Window.

- **Task List Window**

  A new Task List Window displays the tasks that TradingSolutions is currently working on and allows you to access a detailed progress display for each task. For more information, see The Current Tasks Window.

- **Data Sources and Exchanges**

  Data can now be assigned to configurable Data Sources and Exchanges to indicate where to import a data series from and when the data is available. For more information, see Importing Data into TradingSolutions.

- **Improved Step-by-Step Tutorials**

  Over 200 screenshots and pictures have been added to the step-by-step tutorials along with improved insights to highlight important concepts and techniques. To view them now, see Step-by-Step Tutorials.

- **Configurable Sounds**

  Sounds can now be set for different types of messages and alerts. For more information, see Customizing Sounds.

Features added in Version 2.0

- **New Introductory Demos**

  The introductory demos have been improved to better explain how TradingSolutions can be used to produce successful trading signals.

- **TradingSolutions Solution Service**

  The Solution Service provides you with working sample models updated with daily data so that you can see TradingSolutions in action. For more information, see The TradingSolutions Solution Service.

- **Primary and Secondary Signals**

  Primary and secondary signals make it easier to select and analyze fields for trading. For more information, see Primary, Secondary, and Service Signals.

- **Information View**

  The Information View provides you with information about the current selection in the Portfolio View. For more information, see Tracking Data with the Information View.

- **Display Field Highlighting**

  Signals displayed as display fields in the Portfolio View are now highlighted when they require action. In addition, display fields that are based on data that may be out-of-date are more clearly labeled. For more information, see Using Display Fields.

- **Display Fields Simplified**

  The process of creating display fields has been simplified. For help with this new process, see the help for the Modify Group Dialog: Display page.

- **Signal Analysis Fields Simplified**

  The process of creating signal analysis fields has been simplified. For help with this new process, see the help for the Create Signal Analysis Fields Wizard.

- **Applying Trading Solutions Simplified**

  The process of applying a trading solution has been simplified. For help with this new process, see Using Trading Solutions to Create Fields.

  Note: This change was introduced in Version 1.2.1, Build 010614.

Features added in Version 1.2

- **Trading Styles**

  Trading styles help you to analyze and optimize your entry/exit signals based on the way you trade. In addition, they allow you to specify evaluation criteria to use during signal optimization. For more information, see Using Trading Styles.

- **Logarithmic Charting**

  The Chart View and equity curve can now be displayed as a logarithmic chart. For more information, see Adjusting Chart Ranges.

Features added for Version 1.1

- **Restorable Data Views**

  Data views allow you to save your current charts and spreadsheets to be displayed later. For more information, see Saving and Restoring Charts or Saving and Restoring Spreadsheets.

- **Improved Signal Analysis**

  The signal analysis pages have been improved with equity curves and risk analysis. For more information, see the help for Modify Field Dialog: Signal Analysis page.

- **Group Field Migration**

  Group fields can now be migrated to the underlying data for fine-tuning and optimization. For more information, see the help for the Modify Field Dialog: Overview page.

- **Horizontal and Vertical Chart Lines**

  New settings allow you to display horizontal and vertical lines under mouse in the Chart View. For more information, see Customizing Chart Options.

Learning the Basics

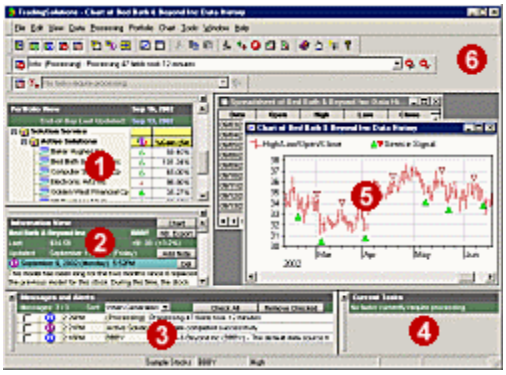
Learning the Basics

This section introduces you to the basics of using TradingSolutions. It can help you with some general concepts and point you in the right direction for more specific solutions.

The following topics are covered in this section.

- TradingSolutions At A Glance
- Learning To Use TradingSolutions
- Overview of Key Concepts
- Common Pitfalls
- Getting Help

TradingSolutions at a Glance



Here is a quick overview of the TradingSolutions interface and pointers to more information.

- **The Portfolio View**

  The Portfolio View shows you all of the data that you have imported into TradingSolutions. Most of the operations you perform in TradingSolutions begin by right-clicking on a stock or group of stocks in the Portfolio View. In addition, the Portfolio View can be customized to display current information, such as recommended positions and analyses.

  For help with the Portfolio View, see Managing Data with the Portfolio View.

- **The Information View**

  The Information View displays additional information about the stock or group of stocks currently selected in the Portfolio View. It can also be used to keep notes about stocks and positions.

  For help with the Information View, see Tracking Data with the Information View.

- **The Messages and Alerts Window**

  The Messages and Alerts Window displays feedback from the operations you perform in TradingSolutions. This includes confirmations, warnings, and alerts, all in an easy-to-use to-do list format.

  For help with the Messages and Alerts Window, see Working with Messages and Alerts.

- **The Current Tasks Window**

  The Current Tasks Window shows you the tasks that TradingSolutions is currently working on behind the scenes.

  For help with the Current Tasks Window, see Monitoring Processing.

- **Chart and Spreadsheet Views**

  Customizable charts and spreadsheets can be created to display the stocks and other data in TradingSolutions.

  For help with charts, see Displaying Data in a Chart.

  For help with spreadsheets, see Displaying Data in a Spreadsheet.

- **Menus and Toolbars**

  TradingSolutions uses common Windows interface conventions. If you have used other Windows programs, you are probably already familiar with many of the controls in TradingSolutions.

  For help with the main menu, see The TradingSolutions Main Menu.

  For help with the toolbars, see The TradingSolutions Toolbars.

This may seem like a lot of windows and sections to keep track of. However, the organized way in which the data is presented actually makes things very easy to find in TradingSolutions.

For a list of ways to get started learning TradingSolutions, continue to the next page.

Learning To Use TradingSolutions

TradingSolutions is a comprehensive software package that combines many principles of technical analysis, artificial intelligence, and interface design to help you to time the stock market and other financial instruments. As a result, the software has a lot of options, some of which can be confusing to a first-time user.

Here are some of the best ways to get started using TradingSolutions.

- **Introductory Demos**

  The animated introductory demos offer a quick and informative tour of how the software works along with some of its most-used features.

- **Step-by-Step Tutorials**

  After viewing the introductory demos, we recommend performing the step-by-step tutorials. These tutorials lead you step-by-step through almost every operation you will perform in TradingSolutions.

  Note: Each tutorial task includes a link for additional help and insights on the task being performed. If you are ever unsure why a step is being performed or how to complete a task, just click on this link for more information!

- **The Solution Service**

  To help you to learn the capabilities of TradingSolutions, NeuroDimension maintains a free Solution Service with examples of models for several U.S. stocks. By registering for the Solution Service and updating it after each trading day, you can see how these models would be traded and learn by example several techniques for creating successful models. Plus, the Solution Service includes daily commentary to highlight key points about how models are performing and things to watch for when using them for trading.

- **Learn By Doing**

  After trying the step-by-step tutorials and examining the Solution Service models, the best way to get started is to start creating your own models.

For more information on things to know and watch out for, read the Overview of Key Concepts and Common Pitfalls.

Overview of Key Concepts

Here is a quick overview of the key concepts that can be helpful to know when using TradingSolutions.

- **Use Fields To Perform Operations**

  Fields" are used to store values in TradingSolutions. They include the Open, High, Low, and Close prices of data you import, as well as any values you calculate based on these prices. They include entry/exit signals that tell you when to trade and signal analyses that tell you how these signals have been performing. Any time you want to perform a new operation in TradingSolutions, it will usually start with creating a new field.

- **Neural Networks Learn By Example**

  The most powerful feature in TradingSolutions is its neural network technology. Neural networks are basically mathematical models that map the relationship between a group of data and a desired" result. These relationships are learned" by presenting the models with previous examples of the data. The relationship can then be used to calculate what the result should be based on the current data.

- **The Optimal Signal Is The Best That Could Have Been**

  The optimal signal is an important concept in TradingSolutions. Given a set of historical data, it determines when the best times to buy and sell would have been by looking into the future following each given day. Since we can't look into the future for today, we can't use this approach to directly for trading. However, we can use it as the desired result of a neural network, allowing us to predict" the best action for today.

- **Let Signal Analysis Be Your Guide**

  You have probably heard the phrase past performance is no guarantee of future results". While this is always true with trading instruments and strategies, past performance is also your best barometer of a strategy's potential. If your goal is to make money, your first question should be would this approach have made me money?" You can use the in-depth signal analysis of your trading signals to determine this, along with checking the consistency and robustness of the trades for a variety of conditions.

The introductory demos and step-by-step tutorials are an excellent way to learn more about these key concepts. You can start either of them from the Welcome Dialog.

In addition to the key concepts, it can also be helpful to know about some of the Common Pitfalls.

Common Pitfalls

There are several common pitfalls that new users of TradingSolutions encounter. These can sometimes delay the learning process, so it helps to be aware of them before starting out.

- **Worrying About Which Options To Select**

  TradingSolutions is a very comprehensive software package with a lot of options that can be changed or modified. This large number of options sometimes causes confusion with new users who are unsure what settings to choose.

  Fortunately, the best settings are usually pre-selected for you. In most cases, the default selection for each option will usually give you the best results, especially when starting out. As you learn more about the software, you will learn which options you can modify to improve them even more.

- **Concentrating On Individual Stocks**

  An important thing to understand about technical analysis is that some stocks are much easier to work with than others. Because of this, it is possible to obtain very good results with some stocks quickly, while other stocks may not yield good results at all.

  If you have trouble getting good results with specific stocks, the problem may not be with your approach, but with the stock itself. The best results are often achieved by starting with groups of 20-100 stocks and refining the best performers from within the group, rather than working with stocks one at a time.

  Note: The stocks in the Solution Service are often a great place to start when trying new techniques. Many of these stocks were found to produce good results with several different approaches.

In addition to these common pitfalls, this help document also points out many things to be aware of when working with particular sections. If you ever feel lost or unsure how to proceed, just ask for help. For more information on getting help, see Getting Help.

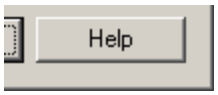
Getting Help

TradingSolutions includes an extensive interactive help library. If you ever feel lost or unsure of how to do a task with TradingSolutions, just ask for help. There are several ways to get help from within the program and several ways you can obtain help when you require additional assistance.

Accessing Help in TradingSolutions

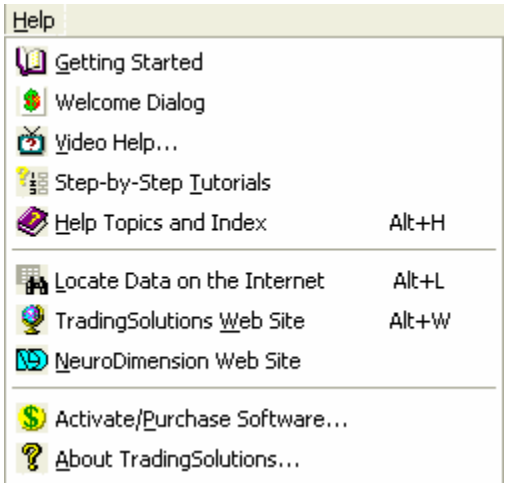
The help library in TradingSolutions can be accessed in several different ways. Each of these methods accesses the same help file, which is the document you are viewing now.

Dialog Helps



Every dialog in TradingSolutions has a **Help** button. If you are unsure how to perform a task with dialog or even why a dialog is being displayed, just press the **Help** button.

Help Menu

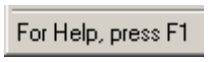


When you are not working with a specific dialog, you can access several types of help from the **Help** menu. These include online help documents, animated demos, and access to the TradingSolutions web site.

Toolbar Help Buttons

You can also use the Help buttons on the toolbar. The book tool brings up a list of online help topics. The helping hand tool displays the introductory demos. The 1-2-3 tool allows you to jump straight to the step-by-step tutorials. In addition, the question mark can be used to display information about TradingSolutions.

Press the F1 key for Help



At any time, you can get help with the currently displayed dialog or view by pressing the **F1** key on the keyboard.

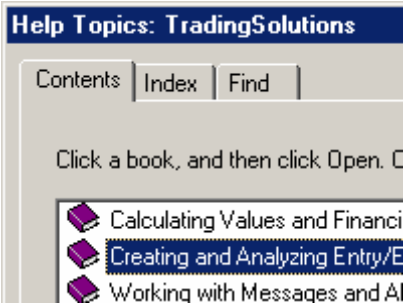
Video Help

Many dialogs and menus also feature Video Help on topics relevant to the actions being performed. Simply look for the words **Video Help**" or the Video Help icon, pictured above.

Locating Information in This Document

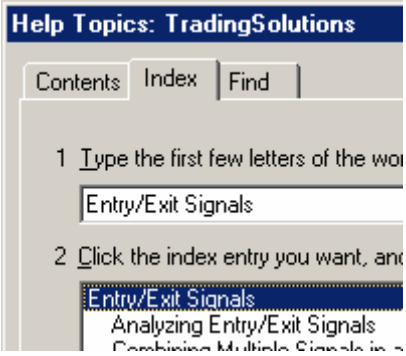
All of the methods described above lead to the same place – this help document. This document contains extensive information about the software and how it is used. This results in it containing a lot of information. Here are some easy ways to find the specific information you are looking for.

Table of Contents



The interactive help library is arranged into chapters that begin with the basics and then go into the details of many different aspects of the software. This is usually the easiest way to find out more about a topic. For example, if you want to know more about how signals are displayed or analyzed, you could look in the chapter Creating and Analyzing Entry/Exit Signals.

Comprehensive Index



The index is another useful way to find out more about topics in this help library. The index can quickly lead you to many of the most relevant discussions on particular topics. For example, looking up Entry/Exit Signals" in the index, will reveal links to many different related topics, from a glossary definition to writing Entry/Exit Systems to produce them.

Help Search Tool

The search tool is another great way to get help, especially when you aren't sure specifically what something is called or when you want to find more references than may be in the index.

Glossary

One of the chapters toward the end of this help document is a large A-Z glossary of the terms used in this software. Arranged in sections from A to Z, you can often use this chapter to get a quick definition of any term. Common terms also include links to key chapters that can help you to learn more about individual subjects.

NeuroDimension Technical Support

If you are not able to find what you are looking for in this document or are confused by the descriptions, we encourage you to contact NeuroDimension technical support. In addition to allowing us to answer you questions, it also helps us to learn the types of questions or problems people are having with the software so that we can improve things in the future.

E-mail Support

E-mail support is often the best way to ask detailed questions about the software, report problems you may be encountering, or make suggestions and requests for functionality you would like to see added. NeuroDimension strives to answer all e-mails within one business day, with most e-mails being answered much faster.

You can reach TradingSolutions technical support directly by sending e-mail to support@tradingsolutions.com .

Telephone Support

For times when you would rather ask a question directly over the phone, NeuroDimension also has a technical support phone line available for answering your questions about the software. The number is (352) 377-1542.

TradingSolutions telephone support is available 9:30-5:00 Eastern Time during normal business days.

Understanding TradingSolutions Concepts

Understanding TradingSolutions Concepts: Overview

TradingSolutions incorporates several types of concepts and technologies to help you make more informed financial trading decisions. This section introduces you to each of the major concepts used by TradingSolutions.

Note: It is not necessary to read this section in order to use TradingSolutions. However, understanding the concepts used in the program can help you to get the most out of the intermediate and advanced features.

The following topics are covered in this section.

- What is Technical Analysis?
- What are the differences between trading and investing?
- What is an Entry/Exit System?
- What is a Neural Network?
- What are Genetic Algorithms?
- Using Neural Networks and Genetic Algorithms for Technical Analysis

What is Technical Analysis?

Note: It is not necessary to read this section in order to use TradingSolutions. However, understanding the concepts used in the program can help you to get the most out of the intermediate and advanced features.

Technical Analysis involves using past stock prices, volume, and other related data to forecast future price movements. There are three basic premises that a technical analyst believes in. First, technical analysts believe that the price of a stock is driven by supply and demand. Stocks are not always worth the price that they are selling for. They often trade higher or lower based upon a large demand or a lack thereof. This ties into the second belief of the technical analyst: stocks move in trends that usually last for a detectable period of time. In other words, price movements are not simply random variations. The final belief of a technical analyst is that these detectable trends often repeat themselves. By detecting a repeating pattern in the early stages, a technical analyst is able to profit from the stock price movement if it behaves in the same manner that it did in the past.

There are two main types of technical analysis. The first type is based upon the recognition and interpretation of chart patterns. This type of technical analysis is more of an art than a science and can be very subjective since it relies on the technical analysts' judgment for determining whether a pattern exists or not. Common techniques utilized in this type of technical analysis involve drawing trendlines on the chart, interpreting a Japanese candlestick chart, and using other line studies such as Fibonacci Arcs, Gann Fans, etc. One major problem with this type of technical analysis is that it does not easily lend itself to historical backtesting. Because pattern recognition is subjective and since each pattern must be recognized manually by the analyst, historical backtesting is almost prohibitively laborious. See figure 1, below, for an example of how a trendline might be drawn on a recognized trend.

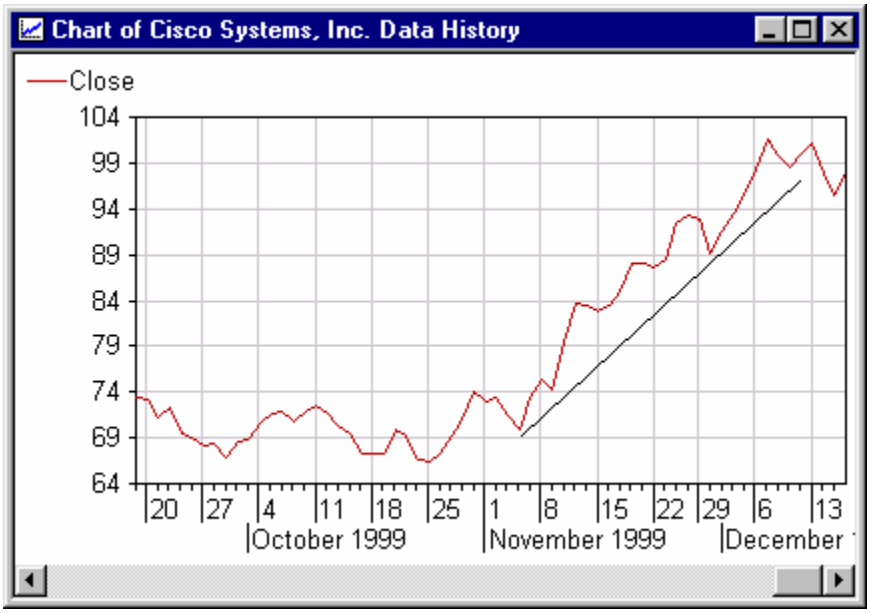


Figure 1: Demonstration of a Trend line. Notice the distinct upward trend in the CSCO chart from November 5th to December 13th. This type of trend can be exploited by purchasing the stock after the trend has lasted for so many days and selling the stock once the trend appears to be broken.

The second type of technical analysis uses mechanical indicators based on price, volume and other data to predict future price movements and/or to determine when to buy or sell. The data used to create an indicator can be technical (or even date-based fundamental) data taken from the stock being analyzed, a related stock or stocks, or from various general market data sources. This data is then applied to a mathematical formula to generate the indicator. Some indicators can be used directly to make trading decisions. Other indicators must first be processed by a series of rules to generate an entry/exit signal. The underlying formulas for many indicators are based upon moving averages, oscillators, etc. and use price data, volume data, and market data such as breadth as the inputs. Because this type of technical analysis is mechanical in nature and uses mathematical formulas, historical backtesting is possible. This allows the technical analyst to gain confidence in the indicators and any resulting entry/exit signals before actually trading. See figure 2, below, for an example of an indicator.

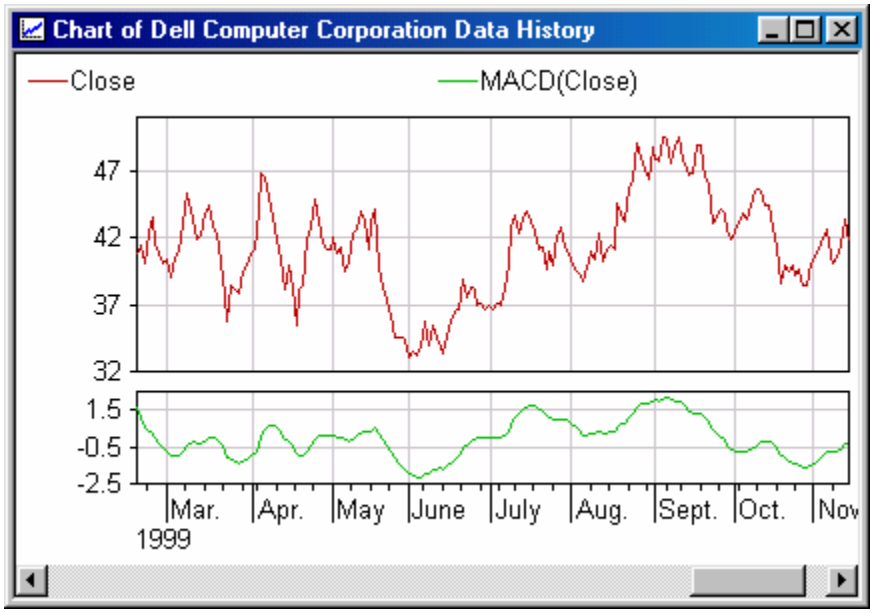


Figure 2: Demonstration of the classic Moving Average Convergence/Divergence (MACD) indicator. When the MACD is increasing, this indicates that prices are trending higher. Whereas a decreasing MACD indicates that prices are trending lower. The MACD is typically traded at the crossover points of its 9-day exponential moving average (not shown).

Neural networks have recently become a very popular technology for technical analysis. They most closely fall within the bounds of this second type of technical analysis. A neural network can be viewed as a very powerful and flexible formula" whose output can be used directly for making trading decisions or to produce entry/exit signals. However, the neural network goes far beyond a typical indicator, because it has the ability to learn from the data itself. This powerful tool for technical analysis is at the core of TradingSolutions and is discussed in detail in a later section.

Continue to the next section, What are the differences between trading and investing?, or return to the Overview for this chapter.

What are the differences between trading and investing?

Note: It is not necessary to read this section in order to use TradingSolutions. However, understanding the concepts used in the program can help you to get the most out of the intermediate and advanced features.

Investing traditionally refers to buying a stock or other financial instrument for a long period of time, typically over several years. Assessing good investment opportunities often makes use of fundamental information, such as earnings, but can also use technical analysis to detect long-term trends.

Trading typically refers to buying and selling stocks or other financial instruments for shorter periods of time, typicallly less than a few months. Assessing good trading opportunities typically makes use of trading systems or chart-based techniques to detect short-term patterns.

The main advantage of trading over investing is that it provides the ability to make money regardless of the overall direction of the market or the price of an individual stock.

Figure 1. Chart of Baxter Stock Prices during 1999. Notice that despite lots of movement between 57 and 77 over the course of the year, the stock price at the end of the year was very close to the price at the beginning of the year.

Traders try to buy the stock at each of the low points in the price and sell it at the high prices that follow it a few days or weeks later. This is also called a *long trade*. An additional tool that traders use is *short trading*. Short trades allow a trader to make money when a price is going down by borrowing shares of the stock from a broker at the high prices and replacing them a few days or weeks later with stock purchased at a lower price.

It is important to understand that it is not necessary to perform short trades in order to make a profit from trading, even in a down market. However, short trading will provide many more opportunities to produce profits.

Figure 2. Chart of percent gains for different approaches to trading Baxter in 1999. Buying the stock and holding it would have yielded a small loss. Buying the stock before each significant rise and selling it at the top would have yielded almost a 200% gain. Also shorting the stock before each significant drop would have yielded over a 600% gain.

Day trading is similar to this, except that time frames are even shorter. Day trading concentrates on the price movements within an individual day, with trades typically lasting less than an hour.

Continue to the next section, What is an Entry/Exit System?, or return to the Overview for this chapter.

What is an Entry/Exit System?

Note: It is not necessary to read this section in order to use TradingSolutions. However, understanding the concepts used in the program can help you to get the most out of the intermediate and advanced features.

An entry/exit system is a set of rules or conditions that specify when to buy or sell an investment. It is also referred to as a *trading system* in other literature. Upon applying an entry/exit system to a set of data, an entry/exit signal is generated. Entry/exit signals are indications of the best time to buy or sell a stock based on one or more factors in the market. They are also referred to as *buy/sell signals* or *trading signals* in other literature. These entry/exit signals can be backtested on historical data to determine the usefulness of the entry/exit system.

Here is a demonstration of a simple entry/exit system that only trades on the long side of the market:

Enter Long: CrossAbove (MACD (Close) , MACDSignal (Close))
Exit Long: CrossBelow (MACD (Close) , MACDSignal (Close))

An investment traded using this entry/exit system is purchased when the Moving Average Convergence/Divergence (MACD) indicator crosses above the MACDSignal indicator (the 9-day exponential moving average of the MACD) and sold when it crosses below.

Some entry/exit systems may produce better results for some stocks than for others. Also, for the same investment, different entry/exit systems often work better than others during different periods in history. The main goal of the technical analyst is to find the right entry/exit system for the right stock at the right time and know when to switch to a different entry/exit system when the current one starts to break down.

As mentioned in the previous section, a neural network can be used to generate an entry/exit signal directly, or its output(s) can be processed by an entry/exit system to produce an entry/exit signal. However, the nice thing about a neural network, when compared to a traditional entry/exit system, is that once the entry/exit system begins to break down, re-training on the new data that has been collected since the model was originally created will usually improve the results again.

Continue to the next section, What is a Neural Network?, or return to the Overview for this chapter.

What is a Neural Network?

Note: It is not necessary to read this section in order to use TradingSolutions. However, understanding the concepts used in the program can help you to get the most out of the intermediate and advanced features.

A neural network is a powerful data modeling tool that is able to capture and represent complex input/output relationships. The motivation for the development of neural network technology stemmed from the desire to develop an artificial system that could perform "intelligent" tasks similar to those performed by the human brain. Neural networks resemble the human brain in the following two ways:

1. A neural network acquires knowledge through learning.
2. A neural network's knowledge is stored within inter-neuron connection strengths known as synaptic weights.

The true power and advantage of neural networks lies in their ability to represent both linear **and non-linear** relationships and in their ability to learn these relationships directly from the data being modeled. Traditional linear models are simply inadequate when it comes to modeling data that contains non-linear characteristics.

The most common neural network model is the multilayer perceptron (MLP). This type of neural network is known as a supervised network because it requires a desired output in order to learn. The goal of this type of network is to create a model that correctly maps the input to the output using historical data so that the model can then be used to produce the output when the desired output is unknown. A graphical representation of an MLP is shown below.

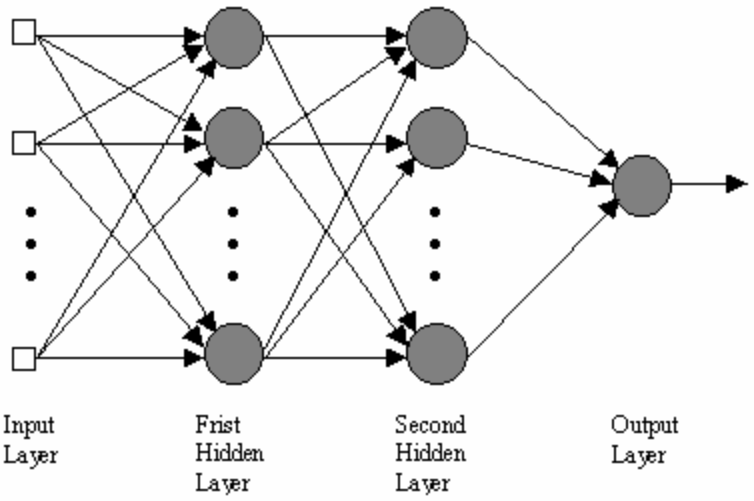


Figure 1: Block diagram of a two hidden layer multiplayer perceptron (MLP). The inputs are fed into the input layer and get multiplied by interconnection weights as they are passed from the input layer to the first hidden layer. Within the first hidden layer, they get summed then processed by a nonlinear function (usually the hyperbolic tangent). As the processed data leaves the first hidden layer, again it gets multiplied by interconnection weights, then summed and processed by the second hidden layer. Finally the data is multiplied by interconnection weights then processed one last time within the output layer to produce the neural network output.

The MLP and many other neural networks learn using an algorithm called backpropagation. With backpropagation, the input data is repeatedly presented to the neural network. With each presentation the output of the neural network is compared to the desired output and an error is computed. This error is then fed back (backpropagated) to the neural network and used to adjust the weights such that the error decreases with each iteration and the neural model gets closer and closer to producing the desired output. This process is known as training".

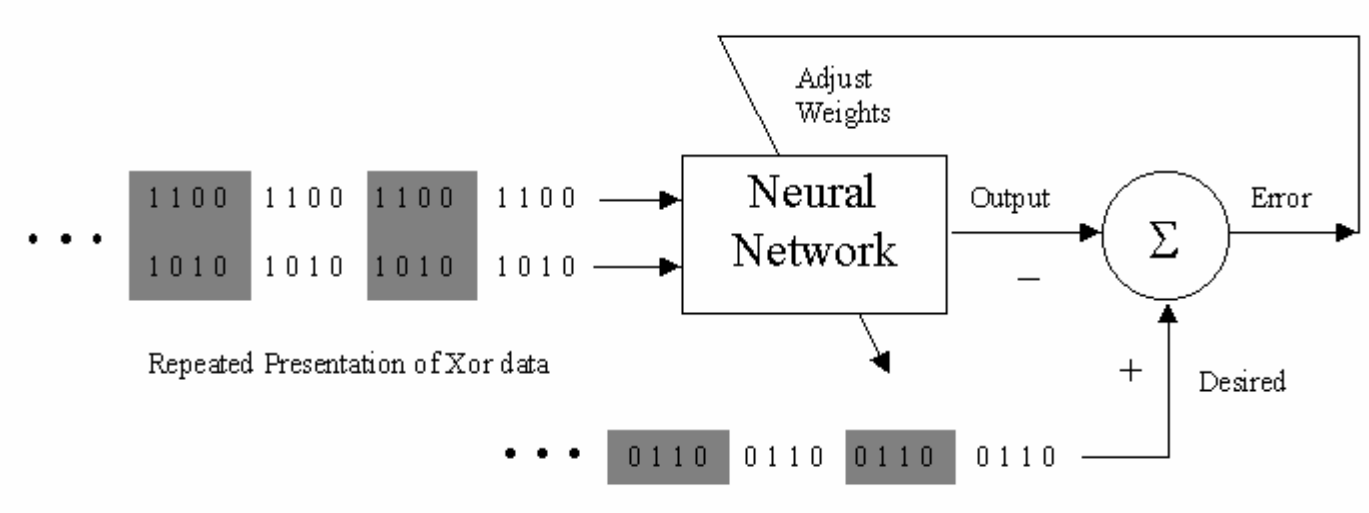


Figure 2: Demonstration of a neural network learning to model the exclusive-or (Xor) data. The Xor data is repeatedly presented to the neural network. With each presentation, the error between the network output and the desired output is computed and fed back to the neural network. The neural network uses this error to adjust its weights such that the error will be decreased. This sequence of events is usually repeated until an acceptable error has been reached or until the network no longer appears to be learning.

In addition to the multilayer perceptron and other industry-standard neural networks, TradingSolutions includes state-of-the-art time-lag recurrent networks. These dynamic networks are much better than static networks for modeling data that contains information over time, such as financial data. They have locally recurrent connections where they are able to retain past information. Furthermore, the amount of past information stored (memory depth) can be adapted by the neural network to find the optimum. These networks are trained using an extension of backpropagation known as backpropagation through time", where the errors are not only backpropagated to the neural network for the current instant, but are also backpropagated across time.

Continue to the next section, What are Genetic Algorithms?, or return to the Overview for this chapter.

What are Genetic Algorithms?

Note: It is not necessary to read this section in order to use TradingSolutions. However, understanding the concepts used in the program can help you to get the most out of the intermediate and advanced features.

Genetic algorithms are general-purpose search algorithms based upon the principles of evolution observed in nature. Even with today's high-powered computers, using an exhaustive search to find the optimal solution for even relatively small problems can be prohibitively expensive.

For many problems, genetic algorithms can often find good solutions (near-optimal) in around 100 generations. This can be many times faster than an exhaustive search. For example, a chromosome containing 32 binary genes would have 4,294,967,296 possible combinations (solutions) to evaluate when using an exhaustive search. If the same problem were to be solved with a genetic algorithm of population size 50, requiring 100 generations of evolution, the genetic algorithm would only need to evaluate 5000 possible solutions.

As mentioned previously, genetic algorithms are able to find optimal or near optimal solutions by using many of the principles of evolution that can be observed in nature. These include selection, crossover, and mutation. Below is an outline of how a genetic algorithm uses these principals to search for optimal solutions:

1. Create an initial population of chromosomes. Each chromosome is made up of a collection of genes (the parameters to be optimized) and represents a complete solution to the problem at hand. The gene values are usually initialized to random values within user-specified boundaries.

2. Evaluate each of the chromosomes in the initial population. A chromosome is evaluated by a fitness function to determine the quality of the solution. This fitness function is problem-specific and defines the genetic algorithm's objective for the current problem.

3. Select chromosomes that will have their information passed on to the next generation. The most common selection operator is roulette selection". This selection operator is based upon the evolutionary principle know as survival of the fittest", whereby a chromosome's probability of getting selected is proportional to its fitness. Thus, the good solutions are more likely to survive.

4. Crossover the selected chromosomes to produce new offspring chromosomes. This crossover occurs according to some user-defined probability (usually high) and results in new chromosomes having characteristics taken from both of the parent chromosomes. The most common crossover operator is one point crossover". This crossover operator picks a random point within the chromosomes, then switches the genes of the two chromosomes at this point to produce two new offspring. If an offspring takes the best parts from each of its parents, the result will likely be a better solution.

5. Mutate the genes of the offspring chromosomes. This mutation occurs according to some user-defined probability (usually low) and serves to introduce some variability into the gene pool. Without mutation, offspring chromosomes would be limited to only the genes available within the initial population. For real genes, one of the most common mutation operators simply adds a Gaussian distributed random value to the gene being mutated.

6. Repeat steps 3 through 5 until a new population of chromosomes has been created. Two chromosomes are selected, crossed-over, and mutated to produce two offspring until there are enough offspring to fill a population the same size as the last population.

7. Evaluate each of the chromosomes in the new population. Each of the chromosomes in the current population is evaluated by the fitness function, just as the initial population was evaluated in step 2.

8. Repeat steps 3 through 7 until some termination condition has been met. This termination condition can be based simply on the number of generations or it can be based upon more complex criteria such as the population convergence, fitness convergence, etc.

After the evolution of the initial population through many generations, the chromosomes (or solutions) within the final population will generally be much better as a whole than the chromosomes within the initial population. Also, the best chromosome in the final population will generally be near optimal if the genetic algorithm was run for enough generations.

Continue to the next section, Using Neural Networks and Genetic Algorithms for Technical Analysis, or return to the Overview for this chapter.

Using Neural Networks and Genetic Algorithms for Technical Analysis

Note: It is not necessary to read this section in order to use TradingSolutions. However, understanding the concepts used in the program can help you to get the most out of the intermediate and advanced features.

The previous topics have provided brief introductions to technical analysis, neural networks, and genetic algorithms. Now these concepts will be tied together to explain how neural networks and genetic algorithms can be used for technical analysis. In particular, four general methods will be discussed.

First, genetic algorithms could be used without neural networks to optimize constant inputs to entry/exit systems or calculate market timing signals. This allows general approaches to be fine-tuned to particular stocks or data.

Second, and probably most common, a neural network could be used to create a model for predicting the future price of a financial instrument, given the current and previous prices and other technical and/or fundamental data. The predicted price could then be used within an entry/exit system to produce a signal indicating when to buy or sell. The simplest entry/exit system would be: buy if the predicted price is greater than the current price and sell otherwise. Genetic algorithms could be used to optimize the neural networks inputs and parameters in order to produce the best model possible.

A third method would be to train a neural network to produce an entry/exit (buy/sell) signal. The desired entry/exit signal for the training phase could be produced by looking into the future to determine the optimum time to buy and sell given certain constraints and commission assumptions. The neural network could then be trained to produce this optimal signal using only current and historical data as inputs. Since the output of this type of neural model is an entry/exit signal, it can be used directly without the need for further processing by an entry/exit system. Again, genetic algorithms could be used to optimize the inputs and parameters to the neural network in addition to the entry/exit system thresholds.

Finally, a neural network could be used to create a model for predicting the performance of a stock for a certain period into the future. For example, the inputs to the model could be the current price, the percent gain over the last week, the percent gain over the last month, etc. and the desired output could be the percent gain for the next week. If this type of model was created for a number of stocks, such as the stocks in the S&P 500, these stocks could be sorted by the projected percent gain for the next week. The top ten could be purchased and held for that week then re-chosen again each week according to the models' projections. This is only one simple way in which this type of model could be used for trading. As with the previous two methods for using neural networks, the networks inputs and parameters could be optimized using genetic algorithms.

These are just some of the ways neural networks and genetic algorithms can be used for technical analysis. Many other possibilities exist. Because TradingSolutions allows you the flexibility to decide the inputs and outputs, you are essentially limited only by your imagination.

Return to the Overview for this chapter.

The TradingSolutions Solution Service

The TradingSolutions Solution Service: Overview

The TradingSolutions Solution Service is a service maintained by NeuroDimension (the creators of TradingSolutions). It provides you with sample models, data, and commentary for a select group of stocks so that you can see the software in action. The sample models also provide a valuable learning tool as examples for creating your own models.

The following topics are covered in this section:

- Signing Up for the Solution Service
- Tracking the Solution Service
- Stopping the Solution Service

Signing Up for the Solution Service

Using the TradingSolutions Solution Service on a computer requires that this TradingSolutions installation be registered with the Solution Service server. If you are running multiple installations of TradingSolutions, you will need to register each machine that you would like to receive Solution Service updates on.

Registering for the First Time

The first time you request an update from the Solution Service on a machine, you will be asked to register for the Solution Service via the Register for the Solution Service Wizard. This wizard will display the terms and conditions associated with Solution Service usage and request some registration information.

You can request and update from the Solution Service by pressing the **Update Solution Service** button, by selecting **Update Solution Service** from the **File** menu, or by selecting **Update Solution Service** from the context menu for a Solution Service group in the Portfolio View.

Note: Your computer must have access to the Internet in order to register for the Solution Service.

You can also register for the Solution Service without requesting an update by pressing the **Sign Up For Service…** button on the Configure Data Sources Dialog with the **Solution Service** data source selected.

Re-registering for the Solution Service

If you have previously registered for the Solution Service on this or another machine, you can typically reuse your registration information by selecting **I have already registered for the Solution Service** on the first page of the Register for the Solution Service Wizard.

Tracking the Solution Service

The TradingSolutions Solution Service is most useful when it is updated at the end of each trading day. This allows you to see the current actions recommended for each of the sample stocks and use that information for when analyzing the next day's trading. The service is typically updated by 7:30pm U.S. Eastern time.

Updating the Solution Service

The Solution Service can be updated by pressing the **Update Solution Service** button, by selecting **Update Solution Service** from the **File** menu, or by selecting **Update Solution Service** from the context menu for a Solution Service group in the Portfolio View.

Note: Your computer must have access to the Internet in order to update the Solution Service information on your computer.

The following information is updated in TradingSolutions when you update the Solution Service:

- **Stock Data**

  The data in each of the data series currently included in the Solution Service is updated to the most recent data. Typically, only new data will be imported. However, if a stock has not been updated for over a week, a stock has split, or an error in the data has been corrected, the entire data series may be updated.

  Note: If the data for the stocks in the Solution Service is updated from another source, the data associated with the Solution Service may not be imported. If this data does not match the data provided by the Solution Service, different results may occur.

- **Service Signal**

  Updating the data series associated with the stocks in the Solution Service will result in any calculations for those stocks to be updated. This includes the signals that are designated as the Service Signal for each stock.

  Note: See below for information on analyzing the Service Signal.

- **Solution Service Notes**

  NeuroDimension will occasionally provide commentary about the stocks and models included in the Solution Service. These notes will appear in the Information View for the Active Solutions group and the data series in that group.

- **Trading Solutions**

  In order to calculate the Service Signal, each stock in the Solution Service uses a trading solution. These solutions may be updated from time to time to provide better signals.

The following changes may also take place when you update the Solution Service:

- **Solution Service Groups**

  The first time the Solution Service is updated, a **Solution Service** group will be added to your portfolio with an **Active Solutions** subgroup. This Active Solutions subgroup will contain all of the stocks that are currently being tracked by the Solution Service. In addition, the Service Signal will be added as a display field to this group.

- **Previous Solutions**

  When stocks are no longer tracked by the Solution Service, they are moved to a secondary Solution Service subgroup, called **Previous Solutions**. If this subgroup does not exist, it will be created automatically.

Analyzing the Service Signal

The Service Signal is a special signal designation that allows TradingSolutions to mark one signal field as the signal being tracked by the Solution Service. It has the same capabilities as the Primary and Secondary signal designations, but can only be set by TradingSolutions and is only available for data series in the Active Solutions group.

You can have the Portfolio View display an analysis of simulated trading of the Service Signal. To do this, right-click on the Active Solutions group and select **Modify Display Fields…** from its the context menu. This will display the Modify Group Dialog: Display page.

The **Modify Group Dialog: Display** page includes a list of **Common Display Fields** that can be added, under which the **Service Signal** is listed. Expanding the Service Signal entry shows the following entries:

- Service Signal
  - Current Value of Signal
  - (Create an analysis of this signal…)

Note: If you have previously created analyses of the Service Signal, they will also be listed here.

To add a new analysis, select **(Create an analysis of this signal…)** and press the **Add to Display** button. This will display the Create Signal Analysis Fields Wizard. From there, you can create analyses of the Service Signal, including percent gain and percent of winning trades for a given time period.

For more information about special signal designations, see Primary, Secondary, and Service Signals.

For more information on analyzing signals, see Analyzing Entry/Exit Signals.

Stopping the Solution Service

If you are no longer interested in viewing the Solution Service in your portfolio, simply remove the Solution Service group from your Portfolio View. To do this, right-click on the Solution Service group and select **Remove Group** from the context menu. The Solution Service group and the stocks that it is tracking will be removed from your portfolio.

Note: If you have additional copies of the stocks in the Solution Service in your portfolio, those copies will not be deleted. Furthermore, the fields that were created by the Solution Service will be left behind to allow you to continue to use them.

If you would later like to resume tracking the Solution Service, simply press the **Update Solution Service** button or select **Update Solution Service** from the **File** menu. The Solution Service group will automatically be re-added and updated appropriately.

Step-by-Step Tutorials

Step-by-Step Tutorials: Overview

Learning the Basics
Using the Interface
Creating Trading Signals
Using Advanced Features

Welcome to the TradingSolutions tutorials!

These step-by-step tutorials will introduce you to many of the features of TradingSolutions.

The first tutorial shows you the basics to get you up and running quickly. The remaining tutorials take you through the details of using the TradingSolutions interface, creating trading signals, and using advanced features.

Note: The TradingSolutions tutorial text is intended to be viewed side-by-side with the TradingSolutions program. If this help is currently covering part of the TradingSolutions program window, you can resize the program appropriately by selecting **Resize Program for Help Panel** from the **Window** menu of TradingSolutions.

Note: The TradingSolutions help file and tutorials are also available as PDF documents that can be displayed or printed from the TradingSolutions web site. See http://www.tradingsolutions.com/downloads/documentation.html.

Begin the first tutorial now.

Learning the Basics

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Tutorial: Learning the Basics

Tutorial: Learning the Basics

Introduction
The TradingSolutions Interface
Understanding Fields
A Quick Example
The Solution Service

Welcome to the TradingSolutions tutorials!

Tutorial Task
Learn the basics of using TradingSolutions for swing trading.

This tutorial will provide you with the big picture of how you can use TradingSolutions for swing trading. It will show you how to generate a pre-created signal, analyze the performance, and track it for daily trading.

General Note about Day Trading
This tutorial addresses trading on a daily basis with end-of-day data. TradingSolutions Real-Time also supports streaming data real-time for day trading. In general, the concepts covered here apply equally to both types of trading.

Later tutorials will go into more detail and show you how to generate your own signals. **Don't worry if you don't completely understand something right now** – most basic questions are explained in the tutorial. After you have completed the tutorial, answers for advanced questions can be found elsewhere in the help.

Continue to the first task.

The TradingSolutions Interface

Or, return to the Overview for the tutorials chapter.

Tutorial: Learning the Basics

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The TradingSolutions Interface

Tutorial Task
Understand the basics of the TradingSolutions Interface

This brief tutorial task will give you quick tour around the TradingSolutions interface so you can perform the other tasks more easily.

Step-by-step Instructions

1. The main focus of the interface is the **Portfolio View**. It lists all of the stocks and data in your portfolio.
   - Data can be imported from Internet data services or from files on your computer. TradingSolutions can be used with stocks, futures, FOREX data; domestic or international – pretty much any data-based financial data.
   - The Portfolio View can be customized to split the data into groups and display current signals, analyses, and other data for each group.

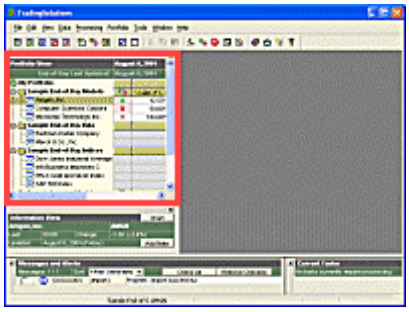

Figure 1. Location of the Portfolio View

2. Right-click on any of the stocks in the Portfolio View. This displays a **context menu** of options available for working with this stock.
   - Context menus are available for many different parts of TradingSolutions.

3. The icon in the Portfolio View indicates your **Primary Signal**. The Primary Signal is the signal you are most interested in for each stock. TradingSolutions displays signals as directional arrows and triangles. Here is a quick overview of the symbols.

   Enter Long
   Exit Short
   Hold, price may increase
   Hold
   Hold, price may decrease
   Exit Long
   Enter Short

   Note: If you forget what a symbol means, simply place you mouse over it and tip will appear.
   Note: For information about what long" and short" means, see the Notes.

4. You quickly view an analysis of any signal by right-clicking on it and selecting **Analyze Signal…** . You can also compare all of the signals for a single stock by right-clicking on it and selecting **Analyze Signals…**.

5. Beneath the Portfolio View, the **Information View** displays additional information for the currently selected stock or group in the Portfolio View.
   - You can use the Information View to keep notes about how a stock is trading.

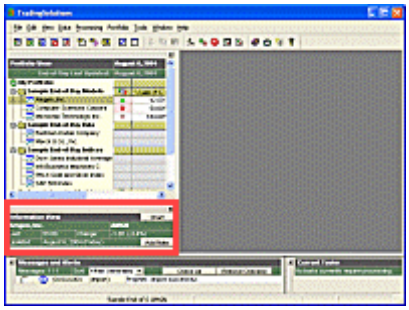

Figure 2. Location of the Information View

6. Along the bottom of the screen, the **Messages and Alerts** window displays information about activities that are happening in the background.
   - Messages are issued when the importing of data is completed, when an analysis is ready, and any other time information is available.
   - TradingSolutions Real-Time includes the ability to generate custom alerts which are displayed here.

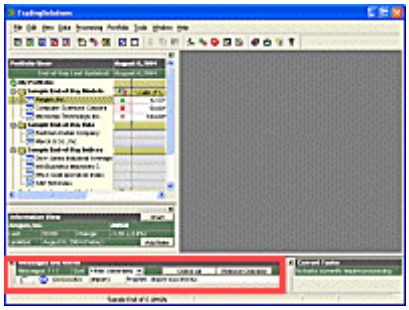

Figure 3. Location of the Messages and Alerts Window

7. To the right of the Messages and Alerts window, the **Current Tasks** window displays an overview of the tasks that TradingSolutions is currently working on.
   - After updating your portfolio with lots of new data, you can see TradingSolutions updating all of you calculations and signals.

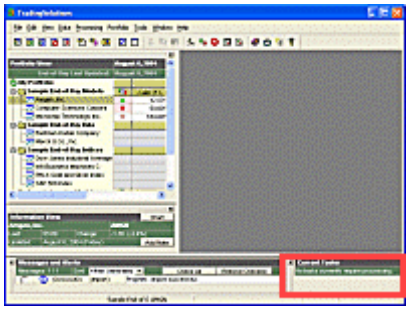

Figure 4. Location of the Current Tasks Window

8. The gray area in the middle of the interface is where you can display charts and spreadsheets of your data.
   - Click on a stock in the Portfolio View. Then, press the **Chart** button in Information View. This will display the default chart for a stock.
   - You can also display custom charts and spreadsheets for any data by right-clicking on it in the Portfolio View and selecting **Display in Chart…** or **Display in Spreadsheet…**.

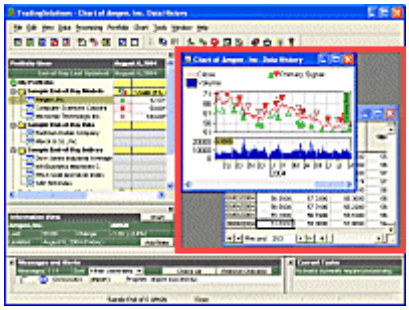

Figure 5. Location of charts and spreadsheets.

Congratulations!

Now that you have had a tour of the interface, continue on to the next task for an understanding of how TradingSolutions calculates and stores values.

⇨ **Continue to the next task.**

Understanding Fields

Tutorial: Learning the Basics

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Understanding Fields

> **Tutorial Task**
> Understand TradingSolutions fields by viewing them in a spreadsheet and learning how to create different types of fields.

A field is a price, indicator, or other value for a piece of data. TradingSolutions stores all of its values in columns similar to a spreadsheet. Let's see a collection of fields and learn how you can create your own.

Step-by-step Instructions

1. Right-click on the stock **Amgen** in the Portfolio View and select **Display in Spreadsheet…**. This will display the **Display Spreadsheet Dialog**.

   Note: If Amgen is not available in your portfolio, you can use any stock for this example.

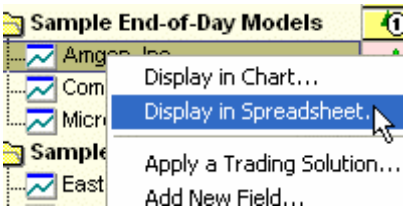

Figure 1. Selecting Add New Field…"

2. Click on **Select new fields to display**. This will present a list of fields that have been created for this stock.

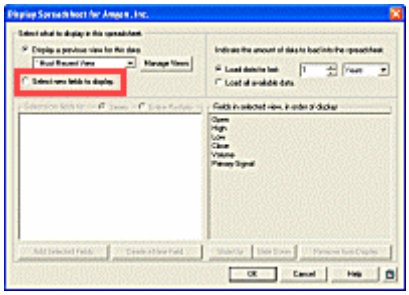

Figure 2. Location of Select new fields to display".

3. Let's display all of the fields that have been imported or created for Amgen. Select Amgen, Inc." from the top of the list of fields, then press **Add Selected Fields**. The list of currently selected fields should now look like this.

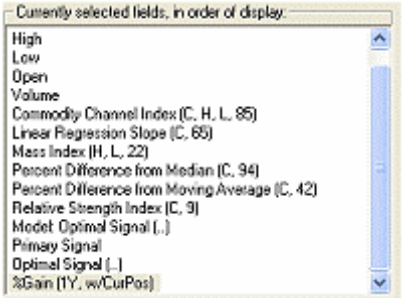

Figure 3. List of all fields added.

4. Press **OK**. This will display the selected fields in a spreadsheet.

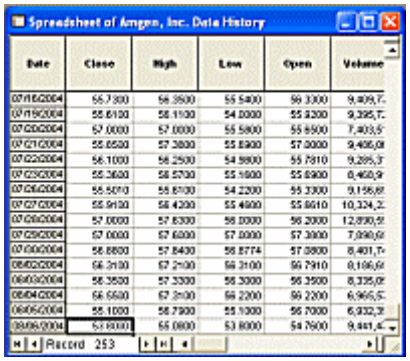

Figure 4. Sample spreadsheet.

5. Notice how each field that we selected has a column in the spreadsheet. This includes imported price and volume data, calculations, signals, and signal analyses.

   Note: You can view additional areas of the spreadsheet using the scrollbars on the bottom and right sides of the spreadsheet window.

6. Locate the **Primary Signal** field. This is typically the field you are most interested in. The current value is the recommendation of what position you should be in for this stock. You can see the value for the current day in the Portfolio View for Amgen.

7. The majority of the other fields currently defined for Amgen were used to calculate or analyze this field. Let's see what kinds of fields can be created. Right-click on Amgen in the Portfolio View and select **Add New Field…**. This will display the **Create a Field Wizard**.

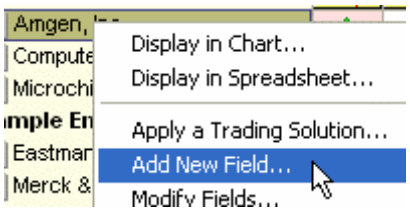

Figure 5. Selecting Add New Field…"

8. As can be seen from this wizard, there are several different types of fields available. You can quickly see that for almost any value you would want to calculate in TradingSolutions, you would do so by creating a field.

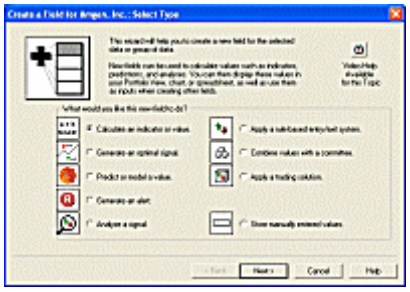

Figure 6. The Create a Field Wizard.

9. If you would like additional information about the individual types press the **Help** button. You can return to this tutorial page by pressing the **Back** button at the top of this window.

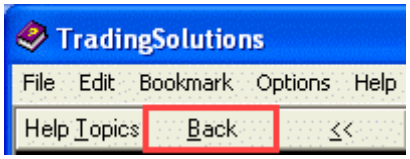

Figure 7. Location of Back button to return to tutorial from help.

10. Press the **Video Help** button in the upper right-hand corner of this dialog. Context-specific video helps are available from many context menus and wherever you see this icon.

Figure 8. Video Help button.

11. Look at the video help topics that are available. Feel free to view the video topics now or revisit them later. When you are finished, press the **Close** button.

12. Press **Cancel** to exit this wizard, or experiment with creating different types of fields before continuing on to the next task.

Congratulations, you should now have a good idea of what a field is and how it fits into the big picture. In the next task, we will see a quick example of how to create a trading signal based on multiple fields in a single step.

⇨ **Continue to the next task.**

A Quick Example

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A Quick Example

> **Tutorial Task**
> Apply a trading solution" to create a signal for a stock.

In addition to data with signals already created, the sample TradingSolutions portfolio also includes sample stock data that does not currently have any signals. Let's look at a quick way that you can experiment with creating your own signals using a trading solution".

Note: Later tutorials go into more detail about this and other ways to create new signals.

Trading solutions are bundled methods for creating signals. They are typically used to recreate good results found with a particular stock. However, they can also be used to try methods that were successful on one stock on new data.

Step-by-step Instructions

1. Right-click on any stock in the Sample End-of-Day Data group and select **Apply a Trading Solution…**. This will display the **Apply a Trading Solution Wizard**.

   Note: If your portfolio no longer has this group and you would like to try this task using the sample portfolio, see the Notes.

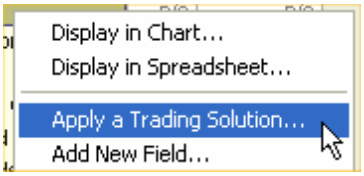

Figure 1. Selecting Apply a Trading Solution…"

2. Review the introduction to the **Apply a Trading Solution Wizard** and press the **Next** button.

   Note: Wizards are dialogs that present their information in step-by-step format. The **Next** button allows you to advance through the steps.

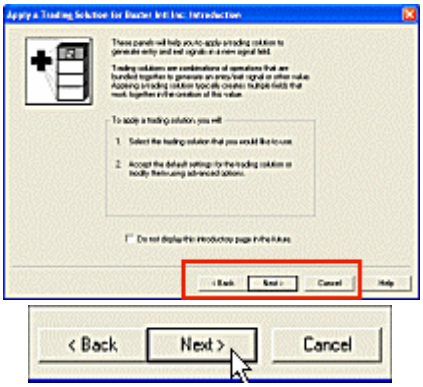

Figure 2. Pressing the Next button to advance.

3. On the **Select Trading Solution** page, select Sample End-of-Day Model Solutions" from the Trading Solutions Groups" list.

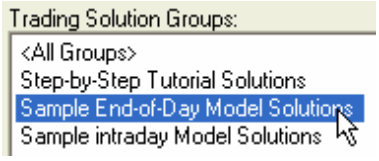

Figure 3. Selecting Sample End-of-Day Model Solutions".

4. Select a sample model from the right-hand window.

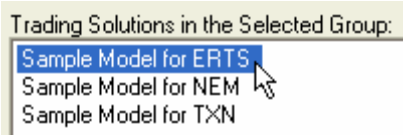

Figure 4. Selecting a sample model.

Note: The sample models listed here may differ those available in the software.

5. Press the **Next** button. TradingSolutions will perform some brief processing.

6. On the **Create Fields** page, review the information on the page and press the **Finish** button.

   Note: The **Next** button on the last page of a wizard changes to a **Finish** button to indicate that this is the last step.

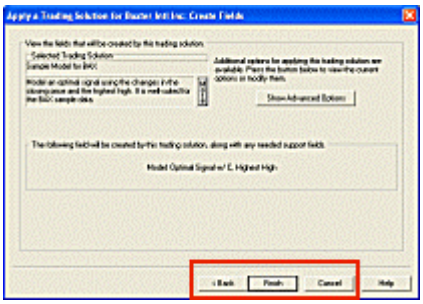

Figure 5. Pressing the Finish button to complete the wizard.

7. Let TradingSolutions perform the requested tasks. TradingSolutions displays a **Status Dialog** to let you know when it is updating things. When it is finished, the Status Dialog will disappear.

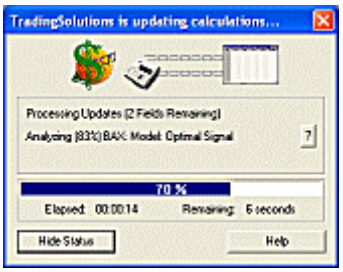

Figure 6. Example of a Status Dialog.

Note: This task may take a few minutes. This is because the neural network model contained in the trading solution is being optimized to work with the data of a new stock.

8. After processing has completed, you will have a new tradable signal for this stock based on a technique that worked on another stock. Later tutorials will go into creating signals in other ways and how you can analyze and use this signal. Here is an overview of what you could do next:

   - The first signal for a stock will automatically be set to your Primary Signal for that stock. The Sample End-of-Day Data group in the sample portfolio is set up to automatically display the current value of the Primary Signal in the Portfolio View under the icon.

- You can use this value for trading. The value of this signal is updated automatically each time you import new data.
- You can analyze the performance of the signals for a stock and select a new Primary Signal by right-clicking on the stock and selecting **Analyze Signals…**.
- You can visually see how this signal would have traded by adding it to a chart.

Congratulations!

You have created your own signal by applying a trading solution. Now let's see another easy way to get started with TradingSolutions.

⇨ **Continue to the next task.**

The Solution Service

Tutorial: Learning the Basics

Tutorial Task
Use the Solution Service to see sample signals updated on a daily basis.

You can see TradingSolutions in action by registering for the **free** Solution Service. The Solution Service provides you with current signals for several stocks and data that is updated after each trading day. This allows you to use these signals on a daily basis and learn by example how to generate your own winning signals.

Note: If you do not want to register for the free Solution Service at this time, proceed to the bottom of this page to advance to the next tutorial.

Step-by-step Instructions

1. Press the **Update Solution Service** button on the toolbar. This will display the **Register for the Solution Service Wizard**.

   Note: If you previously registered for the Solution Service, the **Update Solution Service Dialog** will be displayed instead of the **Register for the Solution Service Wizard**. In this case, jump ahead to step 6.

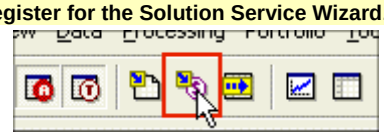

Figure 1. Location of Update Solution Service" button.

2. Review the introduction to the **Register for the Solution Service Wizard** and press the **Next** button.

Figure 2. The Register for the Solution Service Wizard, Introduction page.

3. On the **Terms and Conditions** page, review the Terms and Conditions and check the **I accept these terms and conditions** box, then press **Next**.

4. On the **Enter Information** page, enter your registration information and press **Finish**.

5. After a brief delay, a message should appear indicating Registration Successful". Press **OK**. This completes the registration process and displays the **Update Solution Service** Dialog to begin your update.

   Note: If you receive a message indicating an error, see the Notes for help with common errors.

   Note: If TradingSolutions was not able to register you for the Solution Service, a different message will be displayed, along with suggestions for remedying the problem.

   Note: If you are not able to register for the Solution Service at this time, you can still proceed with the other tutorials using the link at the bottom of this page.

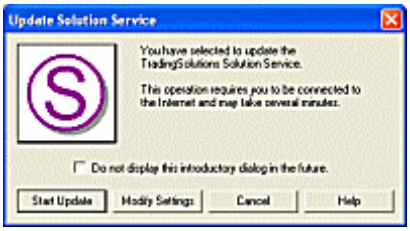

Figure 3. The Update Solution Service Dialog.

6. On the **Update Solution Service** Dialog, press the **Start Update** button.

7. A final message welcoming you to the Solution Service will be displayed. Press the **Yes** button to continue.

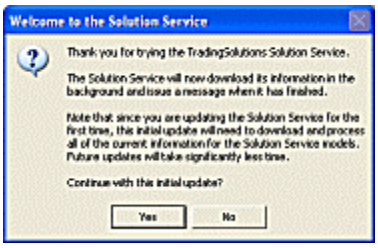

Figure 4. Additional welcome message.

8. TradingSolutions will contact the Solution Service server to download the required data, models, and commentary. A Status Dialog will be displayed while this information is downloaded.

   Note: If you decide not to update the Solution Service at this time or encounter an error, you can still proceed with the other tutorials using the link at the bottom of this page.

9. After the download is complete, a message will appear in the **Messages and Alerts Window** indicating **The update completed successfully.**" TradingSolutions will then work on updating its calculations based on the information it downloaded. A new Status Dialog will be displayed while these calculations are being completed.

   Note: If you receive a message indicating an error, see the Notes for help with common errors.

   Note: Additional messages may be displayed indicating **The default data source has been updated to the Solution Service**" for some stocks. This is an indication that stocks that were already in your portfolio will have data imported by future updates to the Solution Service.

10. When the processing has completed, the Status Dialog will disappear and a message will appear in the Messages and Alerts Window indicating how many fields were processed and the total amount of time it took.

11. Examine the Portfolio View. Updating the Solution Service caused the following changes to take place.

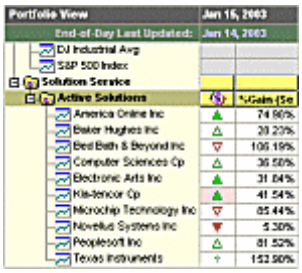

Figure 5. The Portfolio View after a Solution Service update.

- The **End-of-Day Last Updated**" date is updated to a recent date, typically the most recent trading day.
- An **Active Solutions**" group is added beneath the Solution Service" group.
- The Active Solutions" group is selected automatically.
- Each stock in the Active Solutions" group has a signal and %Gain displayed after the calculations are completed.
- The signals and analyses for any sample stocks you have primary signals for may change to reflect the values for the current date. The values of other sample stocks will turn gray if they have not been updated.

  Note: It may be necessary to scroll the Portfolio View down to see the entire Active Solutions" group.

  Note: If you do not see a signal and an analysis column next to the stock names, you may need to expand the width of the Portfolio View by dragging on the right-hand edge of that window.

12. Examine the Information View. Since the update selected the Active Solutions" group in the Portfolio View, the Information View is now displaying information about this group.

Figure 6. The Information View after a Solution Service update.

Note: If you selected another group or stock in the Portfolio View after the update was started, you can re-select the Active Solutions" group by clicking on it.

13. The Information View includes a section for notes about the selected group or stock. With the Active Solutions" group still selected, view some of the notes for the Active Solutions" group.

Note: You can use the scrollbar on the Information View to scroll through the notes. If an individual note is larger than the Information View window, the entire note may not display. In this case, it may necessary to resize the Information View to view the entire note. You can do this by dragging on the top or side of the Information View.

14. Click on a stock in the Active Solutions" group in the Portfolio View. This will select this stock and the Information View will change to display information about the new selection.

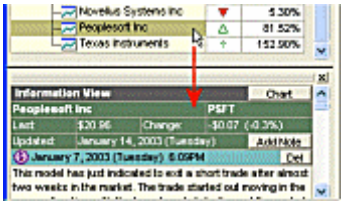

Figure 7. Clicking on a stock updates the Information View.

15. View some of the notes about the currently selected stock. Click on other stocks to read their notes.

16. Let's view an analysis of one of the Solution Service signals. Right-click on a signal for a stock in the Active Solutions" group and select Analyze Signal…".

Figure 8. Selecting Analyze Signal…" from context menu.

17. This will display the **Modify Field Dialog** opened to the **Signal Analysis** page. This is the same dialog we looked at in the previous task. When you are finished with this dialog, press the **OK** button.

18. You can update the data for the stocks in the Active Solutions" group after each trading day pressing the **Update Solution Service** button. This updates the signals for each stock to show you how to trade at the open of the next day.

Note: When a new signal results in needing to change position, the signal will be highlighted with a pink background.

Note: The Solution Service is typically updated after each trading day by 7:30pm U.S. Eastern time.

Congratulations!

You now have an overview of the TradingSolutions interface, a basic understanding of how TradingSolutions calculates and stores values, a method for creating new signals, and several up-to-date examples you can use, even from the evaluation version.

The next tutorials provide you with more detail about each of these steps and introduce you to experimenting with your own methods for creating signals.

Continue to the next tutorial.

Using the Interface

Tutorial: Learning the Basics: Notes

Displaying a Context Menu

To right-click" on something, position your mouse over it and click the right-most button on your mouse. This action will display a context menu", which is a list of actions you can perform with the object you clicked on.

Understanding Signals

TradingSolutions displays signals as directional arrows and triangles. Here is a quick overview of the symbols that are used here.

- Enter Long
- Exit Short
- Hold, price may increase
- Hold
- Hold, price may decrease
- Exit Long
- Enter Short

Longing" a stock is the same as buying it. In a sense, you are betting that the price of the stock will increase while you have a long position. In other words, buy low, sell high".

Shorting" a stock is slightly more complicated. You are borrowing shares of the stock from your broker and selling those borrowed shares. At a later date, you close this position by buying shares and giving them to your broker to replace the shares you borrowed.

When shorting a stock, you are betting that the price of the stock will decrease. This changes the order of the axiom to sell high, buy low".

When an Enter" (filled in triangle) appears, you should begin or currently be in the indicated position. Later, when an Exit" (hollow triangle) appears, you should exit that position. You should also exit a position when an enter appears in the opposite direction.

Note: When a new signal results in needing to change position, the signal will be highlighted with a pink background.

Hold" signals simply mean that you should hold whatever position you currently have. Stay in the market if you are already in there, or stay out of the market if you are currently out. The size of the anticipated movement is either unknown or predicted to not be worth trading against.

Note: When streaming data with TradingSolutions Real-Time, these signals are signals are updated continuously as new information becomes available.

Changing to the Sample Portfolio

If your portfolio does not appear to contain the stocks or solutions being referenced by this tutorial, you may be migrating from a previous version or you may have already done some work in TradingSolutions. In either case, it will typically be easier to follow the tutorials using the original sample portfolio.

TradingSolutions stores all of its data and calculations in a folder called a Work directory. You can have multiple Work directories on a single computer, accessing one at a time.

To change to a new Work directory, do the following:

1. Select **Change Work Directory…** from the **File** menu.
2. On the **Browse For Folder** dialog, select a location on your computer to add a new Work directory and press the **New Folder** button. Change the name to something meaningful, such as Tutorial Work".
3. Press the **OK** button with this folder selected.
4. A message will appear indicating This appears to be a new Work directory" and asking if you would "like to have the sample data pre-loaded into your new portfolio". Press the **Yes** button.

You can return to your previous Work directory using the **Change Work Directory…** menu item again, this time selecting your previous Work directory and pressing **OK**.

Resolving Errors Contacting the Solution Service

There are a few minor problems that can occur when signing up for the Solution Service. Most of them can be resolved easily. However, if you encounter a problem that you cannot resolve yourself, feel free to contact NeuroDimension technical support for help.

- **The Solution Service server could not be contacted.**

  This typically happens for one of two reasons. Either something is preventing TradingSolutions from contacting the server or the server is momentarily unavailable.

  TradingSolutions uses your Internet connection to contact the Solution Service server. Make sure your Internet connection is working by trying to display a webpage. Also, if you run any firewall" software, you may need to set it to allow TradingSolutions to contact the Internet.

  If you appear to be able to get to the Internet without a problem, wait a few minutes and try again. If you still get this message, contact NeuroDimension technical support for assistance.

- **You are having trouble signing up for the Solution Service again.**

  If you previously signed up for the Solution Service and would like to try it again, simply select **I have already registered for the Solution Service** when you begin the sign up process. If you don't remember the password that was assigned to you signed up the first time, you can have it sent to you by pressing the **Remind Me** button after entering your e-mail address.

Tutorial: Using the Interface

Tutorial: Using the Interface

Introduction
Importing Data
Displaying Charts
Displaying Spreadsheets
Analyzing Signals
Modifying the Portfolio View

Welcome to the second TradingSolutions tutorial!

Tutorial Task
Learn how to interact with the TradingSolutions interface.

This tutorial will take you step-by-step through different sections of the TradingSolutions interface so that you can around more easily as you use the software.

Note: The TradingSolutions tutorial text is intended to be viewed side-by-side with the TradingSolutions program. If this help is currently covering part of the TradingSolutions program window, you can resize the program appropriately by selecting **Resize Program for Help Panel** from the **Window** menu of TradingSolutions.

Continue to the first task.

Importing Data

Or, return to the Overview for the tutorials chapter.

Tutorial: Using the Interface

Introduction
Importing Data
Displaying Charts
Displaying Spreadsheets
Analyzing Signals
Modifying the Portfolio View

Importing Data

> ⓘ **Tutorial Task**
> Import historical data from a file.

The first step to working with TradingSolutions is to import historical data into the program. Historical data is a collection of previous prices or values of data. The import action brings that data into TradingSolutions so that you can work with it. This tutorial task will show you how can import data from a file.

Here are some notes about this task:

- The evaluation version of TradingSolutions is limited to importing sample data included with the program, sample data from the TradingSolutions website, and data for the Solution Service.
- TradingSolutions can be used with almost any date-based financial data. This includes historical price information for stocks, futures, FOREX, mutual funds and other instruments, both domestic and international.
- The majority of TradingSolutions users subscribe to a data service, such as Prophet or eSignal. Data from data services can be imported directly using a similar method. See the Video Help for more information.

Step-by-step Instructions

1. Let's import additional data into the Sample End-of-Day Data group. Right-click on this group and select **Import Data…**. This will open the **Import Data Wizard**.

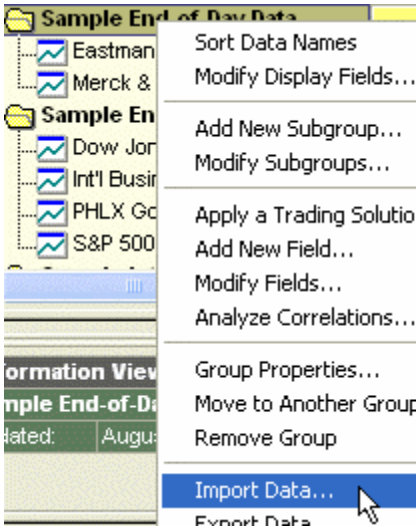

Figure 1. Selecting Import Data.

2. Select **Import data from files on your computer.**

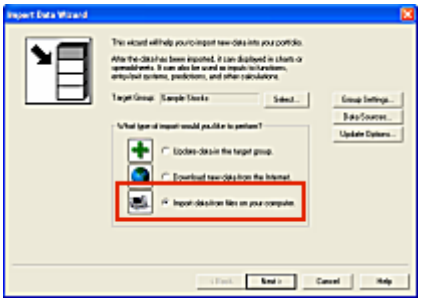

Figure 2. Selecting the type of import in the Import Data Wizard.

3. Press the **Next** button.

4. From the **Select Files** page, press the **Select New Files…** button. This will display a file selection dialog labeled **Select Files with Data to Import**.

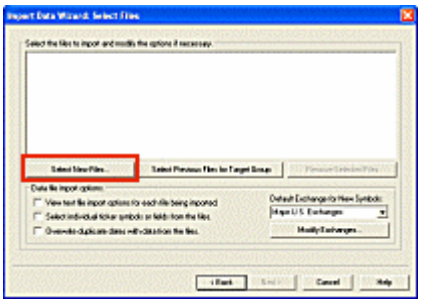

Figure 3. Location of the Select New Files…" button.

5. Use the file selection dialog labeled **Select Files with Data to Import** to select the WY.txt" file from the Sample Data" directory. Press the **Open** button to use this file and return to the **Select Files** page.

   Note: If you need help doing this, see the Notes.

6. The selected file will now appear on the **Select Files** page. Press **Next** to continue.

7. The **Start Import** page displays the symbols that will be imported. Press **Finish** to start the import.

8. TradingSolutions will display a **Status Dialog** while it is importing the data. When it is finished, the Status Dialog will disappear.

9. When the import has completed, a message will be displayed in the **Messages and Alerts Window**.

   The message should read: "**WY.txt – The import was successful.**"

   Note: If you are repeating this tutorial, you may see the message No new data was imported." By default, TradingSolutions will only import data that is not already in your portfolio. Since you have already imported all of the data in this file, there is no new data to import.

10. WY is the stock symbol for Weyerhaeuser. Examine the Portfolio View and verify that Weyerhaeuser Company" has been added to the Sample End-of-Day Data" group.

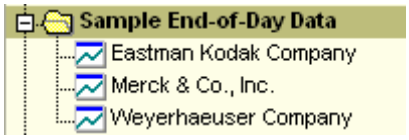

Figure 4. Weyerhaeuser" in Sample End-of-Day Data" group.

Continue to the next task.

Displaying Charts

Tutorial: Using the Interface

Introduction
Importing Data
Displaying Charts
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Displaying Charts

> **Tutorial Task**
> Learn how to display and manipulate charts.

Charts are the most common way for people to view historical data. This task will show you common ways to display charts and manipulate them once they are displayed.

Step-by-step Instructions

1. Click on **Amgen** in the Portfolio View to select it.

   Note: You can perform this task with any stock. However, it should have calculations and a Primary Signal defined for it.

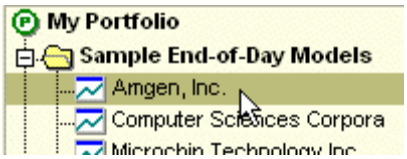

Figure 1. Selecting Amgen.

2. Press the **Chart** button in the Information View. This will display the default chart.

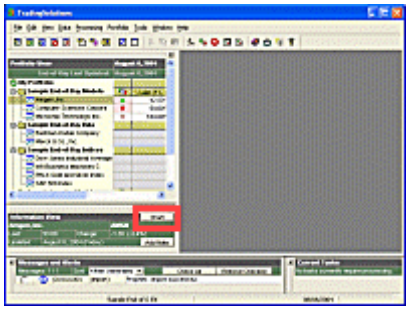

Figure 2. Location of the Chart button.

3. The default chart will display the closing price, the Primary Signal, and the volume.

   Note: To change the fields included in the default chart, select **Options** from the **Tools** menu. Then, select the **Charting** tab.

   Note: The meaning of the signal symbols was covered in a previous tutorial. For a review of what these symbols mean, see the Notes.

Figure 3. The default chart for Amgen.

4. Let's add an indicator to the chart. Right-click on the chart and select **Add/Change Fields in Chart…**. This will display the **Display Chart Dialog**.

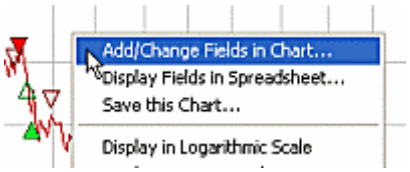

Figure 4. Selecting Add/Change Fields in Chart"

5. Expand the **Calculations** category and select **Mass Index (H,L,22)**, but do not add it yet.

   Note: If you are using another stock or cannot locate this field, you can use any calculation for this example.

6. Most indicators have values which are in different range from the underlying prices. Because of this, you will typically want to display them in their own sub-chart. To do this, select **Display added field in a new sub-chart.**

Figure 5. Location of Display added field in a new sub-chart."

7. Press **Add Selected Fields**. The Mass Index will now be listed in the currently selected fields.

8. Press **OK**. The chart will be updated to display the Mass Index in a sub-chart beneath the other fields.

Figure 6. Chart with Mass Index added.

9. Let's change the chart to display only the last three months of data. Right-click on the **date axis** to see a context-menu specific to date actions.

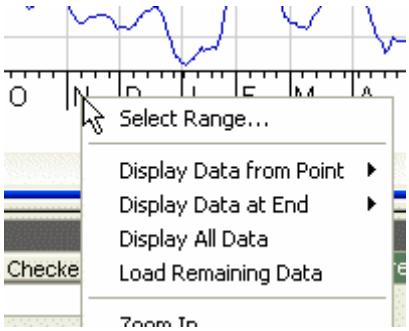

Figure 7. Context menu for date axis.

10. Click on **Display Data at End**, then select **Last Quarter** from the submenu.

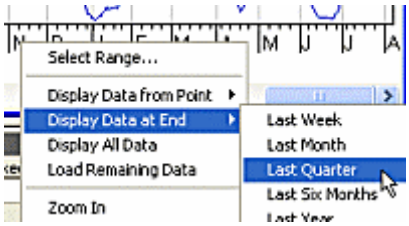

Figure 8. Selecting to display the last quarter.

11. Let's return to the previous chart size. Right-click on the chart and select **Undo Last Scaling**.

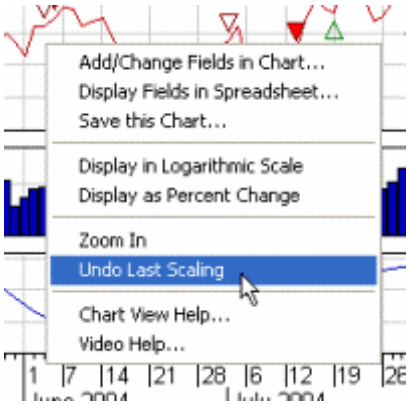

Figure 9. Selecting Undo Last Scaling".

12. You can also zoom-in on a section of the chart. Drag your mouse across a section of the chart with the left mouse button held down.

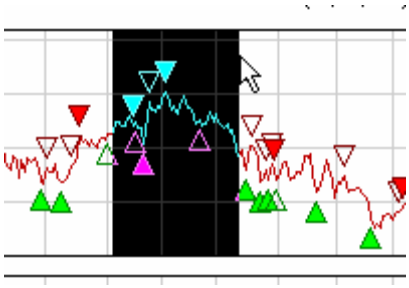

Figure 10. Selecting a chart region to zoom.

13. Close this chart window by clicking on the ☒ in the upper right corner of the chart window.

> Note: Do not click the ☒ in the upper right corner of the program at this time. That would close the entire program.

14. For one final example, let's see how you can display custom charts. Right-click on **Amgen** in the Portfolio View and select **Display in Chart…**. This will display the **Display Chart Dialog.**

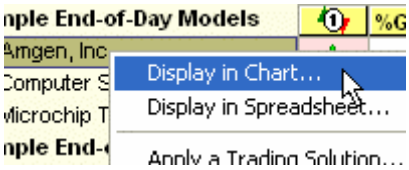

Figure 11. Selecting Display in Chart".

15. The **Display Chart Dialog** is the same dialog that we used to change the chart we had open. By default, the most recent chart is selected. Let's display a new chart. Click on **Select new fields to display.**

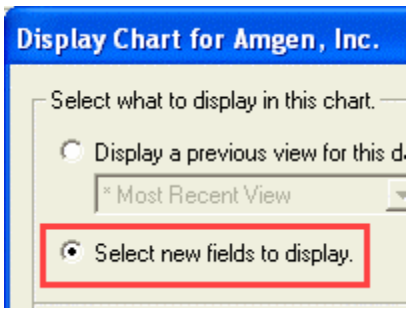

Figure 12. Selecting Select new fields to display".

16. Let's display a High/Low/Open/Close chart. Expand **Composite Charts**, then double-click on **High/Low/Open/Close Chart**.

Note: Double-clicking an entry in a list will perform a default action on it. In this case, it will add it to the selected fields.

Figure 13. Double-clicking on High/Low/Open/Close Chart".

17. By default, only a portion of the data is loaded into the chart. For this example, select **Load all available data** in the upper-right corner.

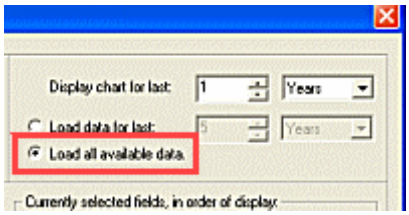

Figure 14. Location of Load all available data."

18. Press **OK**. The new chart will be displayed.

19. Display all of the loaded data by right-clicking on the date axis and selecting **Display All Data…**.

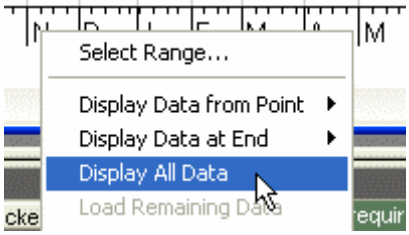

Figure 15. Selecting Display All Data"

20. For additional help, select **Chart View Help** or **Video Help** from any of the context menus for the chart.

21. When you are done experimenting with the charts, close this window by clicking on the ☒ in the upper right corner of the chart window.

Congratulations!

You should now have a good idea how to display and interact with charts in TradingSolutions. The next tutorial will show you a few differences when displaying data in a spreadsheet.

⇨ **Continue to the next task.**

Displaying Spreadsheets

Tutorial: Using the Interface

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Displaying Spreadsheets

> ⓘ **Tutorial Task**
> Learn how to display and manipulate spreadsheets

Spreadsheets are useful for seeing the data behind the charts. While charts can be useful for seeing the big picture, spreadsheets quickly show the actual numbers involved.

Displaying spreadsheets is very similar to displaying charts and was touched on in an earlier tutorial, so this task will only highlight a few features.

Step-by-step Instructions

1. Right-click on **Amgen** in the Portfolio View and select **Display in Spreadsheet…**.

Figure 1. Selecting Display in Spreadsheet."

2. If you performed the previous tutorial, various fields are probably currently selected. Let's change to the default selections by selecting *** Default Spreadsheet**.

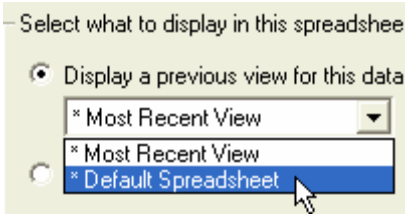

Figure 2. Selecting * Default Spreadsheet".

3. Press **OK**. This will display the spreadsheet.

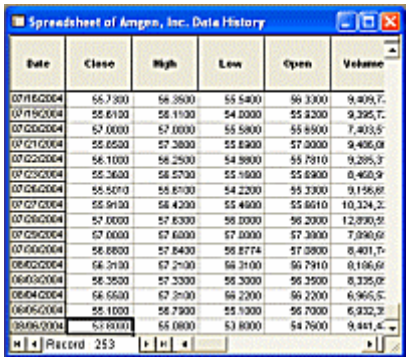

Figure 3. Sample spreadsheet.

4. Let's add a new calculation to the spreadsheet. Right-click on the header and select **Add/Change Fields in Spreadsheet**. This will re-display the **Display Spreadsheet Dialog** we just saw.

Figure 4. Selecting Add/Change Fields…"

5. Select **Create a New Field…**.

Note: Creating new fields will be covered in detail in the next tutorial. This tutorial will go through these steps quickly to illustrate the effect of this on the spreadsheet.

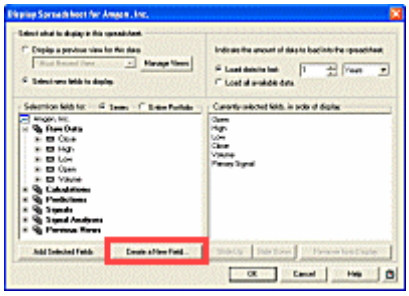

Figure 5. Location of Create a New Field".

6. Press **Next** to advance into the **Calculate a Value Wizard**. Then, press **Next** to pass the **Introduction** page.

7. On the **Select Function** page, in the **Function Group** list, select **Series Averaging Functions**.

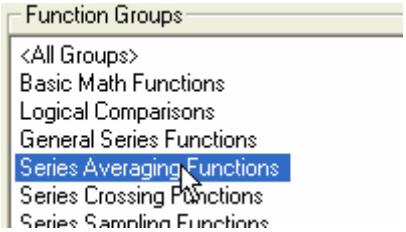

Figure 6. Selecting Series Averaging Functions"

8. In the **Functions in the Selected Group** list, select **Moving Average**.

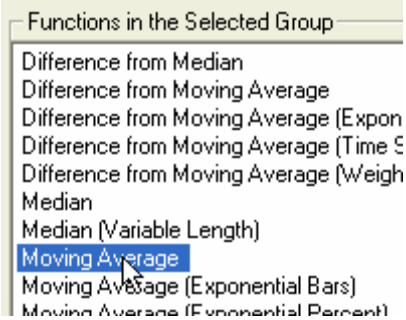

Figure 7. Selecting Moving Average"

9. Press **Next**.

10. On the **Select Inputs** page, select **Volume** from the list of fields.

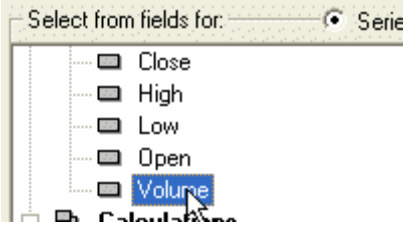

Figure 8. Selecting Volume" for spreadsheet.

11. Press **Next**, then press **Finish** to create the **Moving Average (V, 10)** field.

12. This new field will automatically be added to the list of fields being displayed.

    Note: You may have noticed the similarities between the **Display Chart Dialog** and the **Display Spreadsheet Dialog**. This same technique could be used to add new indicators to charts.

13. Press **OK** to view the updated spreadsheet.

14. Scroll to the right end of the spreadsheet to see the added field.

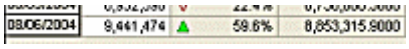

Figure 9. Last row of Amgen data series.

15. Raw data in spreadsheets can be modified directly. This allows you to examine what if" scenarios, as well as update incorrect figures. Let's see how the Volume field affects the other fields that are displayed. Right-click on the last **Volume** cell and select **Copy Value** to preserve the current value.

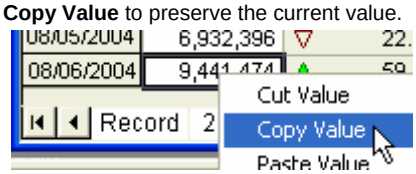

Figure 10. Copying Volume cell.

16. With that cell selected, type **0** and press the **Enter** key.

17. TradingSolutions will confirm you want to modify a value in the spreadsheet. Press **Yes**.

    Note: Only the first modification to a spreadsheet window requires confirmation.

18. The **Moving Average (V, 10)** decreased as expected. The value of the **Primary Signal** also decreased from an enter long signal (above 50%) to an exit short signal (below 50%). This is because the current Primary Signal for Amgen uses Volume in its calculation.

Figure 11. Last row after Volume changed to 0.

19. Right-click on the cell and select **Paste Value** to restore the previous value.

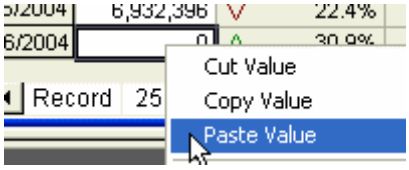

Figure 12. Pasting the previous value back in the cell.

Congratulations!

You have learned how to display a spreadsheet, add a new field to a spreadsheet or chart, and how to modify values. The next task will teach you the basics of analyzing signals.

Continue to the next task.

Analyzing Signals

Tutorial: Using the Interface

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Analyzing Signals

> ⓘ **Tutorial Task**
> Learn the basics of analyzing trading signals in TradingSolutions.

The primary reason many people have for using TradingSolutions is the ease with which trading signals can be created and analyzed. Let's see how we can analyze existing trading signals to determine if they are worth trading.

> ⓘ **Important Note about Signal Analysis**
> Deciding whether to trade using a signal is a subjective process that depends largely on your individual profit goals and tolerance for risk. However, there are several tools TradingSolutions places at your disposal to make it easier to decide.
>
> This tutorial will introduce you to these tools and provide you with some basic things to look at when evaluating signals.

Step-by-step Instructions

1. You can create multiple signals for each stock. Right-click on **Amgen** and select **Analyze Signals…**. This will display the **Entry/Exit Signals** page for this stock.

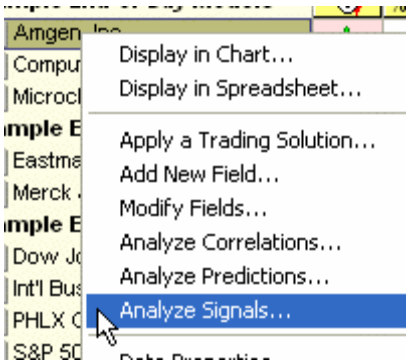
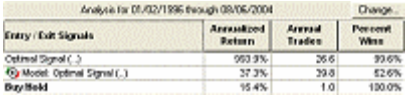


Figure 1. Selecting Analyze Signals…"

2. From this page, you can compare the **Annualized Return**, **Annual Trades**, and **Percent Wins** of all of the signals created for this stock over a given date range.

   General things to look for here:

   - The **Annualized Return** should be positive – the higher, the better.
   - The **Annual Trades** should typically be higher than 10. Smaller numbers indicate the signal is trading less than once per month. This can be because the signal is being selective about its trades, but is more often because the signal is staying in positions more than a few weeks.
   - The **Percent Wins** should typically be higher than 50% and preferably be 70% or higher. Some signals can produce good results with lower numbers, but these signals may be riskier since they can require enduring lots of losing trades while waiting for larger winners.



Entry / Exit Signals	Annualized Return	Annual Trades	Percent Wins
Optimal Signal (...)	993.3%	26.6	93.6%
Model: Optimal Signal (...)	37.3%	39.8	52.6%
Buy/Hold	15.4%	1.0	100.0%

Figure 2. Signal analysis grid for data series.

3. The **Buy/Hold** line indicates the results of buying the stock at the start of the analysis and holding it through the end. This is the same as investing in the stock for the entire period of time.

   General things to look for here:

   - The **Annualized Return** of your signal should typically be better than that of **Buy/Hold**. Lower values can still be produced by good signals, but only if they take less risks with short well-timed trades.

4. You can obtain a detailed analysis of any signal. Select **Model: Optimal Signal (..)** and press **Analyze…**. This will display the **Signal Analysis** page for the signal field.

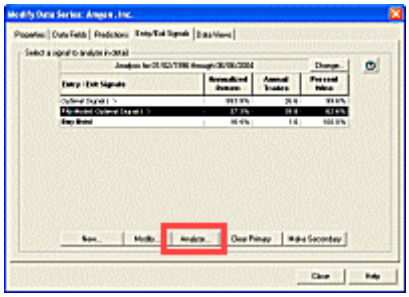


Figure 3. Location of Analyze" button.

5. The **Overview** page includes an **Equity Curve**. This is a graph of the amount of equity that this signal produced versus buy and hold. Select the **Equity Curve** tab to display a more detailed view.

   General things to look for here:

   - The **Equity By Bar** should increase throughout the entire period of the analysis.
   - Special attention should be paid to the size and number of decreases in this chart. These are times when you would be losing money while trading with this signal.

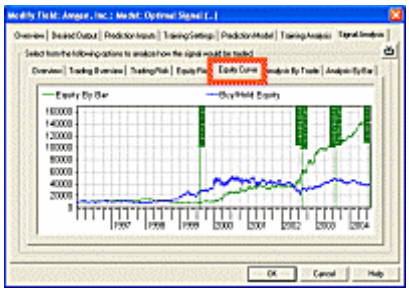


Figure 4. Location of Equity Curve" tab and results.

6. By default the signal analysis re-invests any profits, which can result in a logarithmically increasing amount of equity. Right-click on the chart and select **Display in Logarithmic Scale**.

   General things to look for here:

   - In the logarithmic scale, the **Equity By Bar** should increase fairly linearly. Note that this may not happen until the middle of the analysis range, but it should be fairly constant once it starts.
   - Advanced users may want to look at the interaction between the Equity By Bar and the **Buy/Hold Equity**. This may provide information about what markets during which this signal is more effective.

   Note: The current logarithmic scale setting is preserved, so if you have already performed this tutorial, this setting may already be selected.

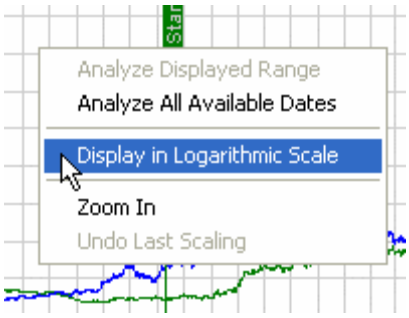


Figure 5. Selecting Display in Logarithmic Scale".

7. Select the **Analysis By Trade** tab. This displays an analysis of each trade this signal would have indicated. Scroll to the bottom of this analysis to see the most recent trades.

   General things to look for here:

   - Check the **Gain/Loss** column for the size and frequency of recent losses. When evaluating a signal, decide if you would be comfortable with any losses relative to the size and frequency of the winners.

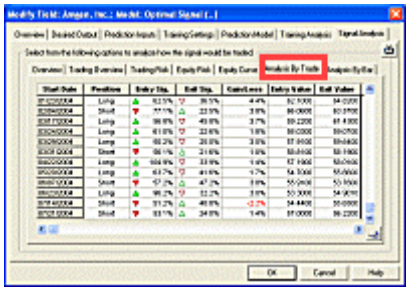


Figure 6. Location of Analysis By Trade" tab and results.

8. Select the **Overview** tab. Included in the overview are the date range and trading style used for the analysis. The range is probably set to all of the data that is available. Let's change it to just analyze recent data. Press the **Change…** button.

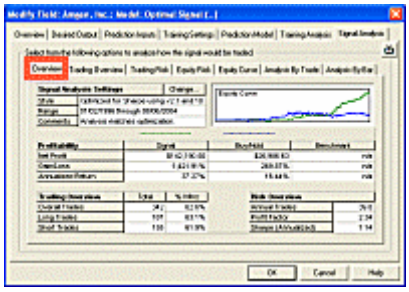


Figure 7. Location of Overview" tab and results.

Signal Analysis Settings	Change...
Style	Optimized for Sharpe using v2.1 and 10
Range	01/02/1996 through 08/06/2004
Comments	Analysis matches optimization.

Figure 8. Location of Change" button.

9. When optimized signals are created, TradingSolutions automatically sets aside the most recent data for testing. This date range is the most important to analyze since it is most like any new data. To analyze this range for this field, press **Copy Optimization Range from Field…**.

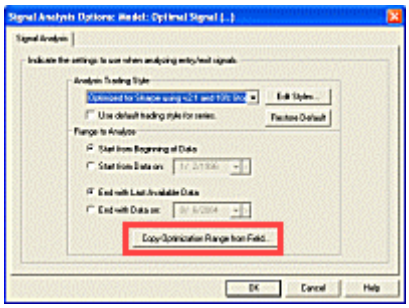


Figure 9. Location of Copy Optimization Range from Field" button.

10. The defaults for the **Copy Optimization Range from Field Dialog** will be to use the **Accuracy Testing Set Only** for **Model: Optimal Signal (..)**. This is what we want to analyze, so press **OK**.

11. On the **Signal Analysis Options Dialog,** press **OK** to analyze the newly selected date range.

    Look at the same things you looked for in the entire date range, specifically:

    - Look at the **Gain/Loss** and compare it to **Buy/Hold**.
    - Look at the **Trading Overview** for the total number of trades and percent wins.
    - Look at the **Equity Curve** to verify it is increasing fairly consistently.

12. Look through the other pages of the Signal Analysis. If you would like additional information about any of the other values press the **Help** button. You can return to this tutorial page by pressing the **Back** button at the top of this window.

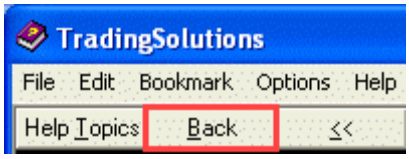


Figure 10. Location of Back" button to return to tutorial from help.

13. Press **OK** to return to the list of all signals for this stock.

14. Here are some additional notes about this page:

    - The date range for this combined analysis is listed at the top of this page. Notice that a **Change…** button is available to change the date range associated with this comparison.
    - When you locate the signal that you would most like to trade for this stock, make it your Primary Signal by selecting it and pressing **Make Primary**. This will make it easier to display and analyze in the Portfolio View.
    - If you would like to watch another signal in addition to your Primary Signal, you can do this by making it your **Secondary Signal**.
    - **Optimal Signals** cannot be used for trading. The usage of optimal signals will be explained in a later tutorial.

15. Press **Close** when you are finished with the analysis of all signals for a stock.

16. One additional thing to look at is the signal in a chart. This gives you a visual sense of how often the signal trades and under what conditions. You can quickly view a chart of the Primary Signal by pressing the **Chart** button in the **Information View**.

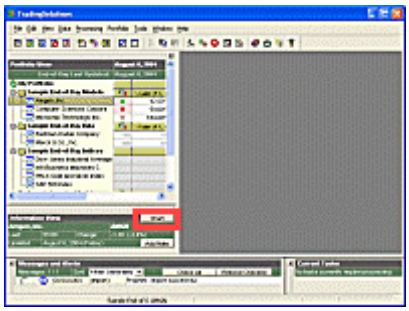


Figure 11. Location of Chart" button.

Congratulations!

You have learned some of the basic things to look for when analyzing trading signals. Specifically, is it likely to make you money on a fairly consistent basis. The next task will show how you can add signal analysis fields and other information to your Portfolio View so you can keep track of the performance of the signals you are trading.

⇨ **Continue to the next task.**

Modifying the Portfolio View

Tutorial: Using the Interface

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Modifying the Portfolio View

> **Tutorial Task**
> Display signals and custom signal analyses in the Portfolio View.

The Portfolio View is the focal point of the TradingSolutions interface. By default, the Portfolio View of the sample TradingSolutions portfolio includes a display of the Primary Signal and the percent gain of that signal over the past year. Let's see how these fields and others can be added to the display.

Step-by-step Instructions

1. Let's remove the current display fields for **Sample End-of-Day Models.** Right-click on each display field for this group and select **Remove Display Field**.

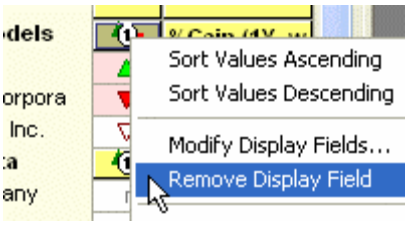

Figure 1. Selecting Remove Display Field".

2. Now let's see how these fields were added. Right-click on **Sample End-of-Day Models** and select **Modify Display Fields**. This will display the **Display** page for this group.

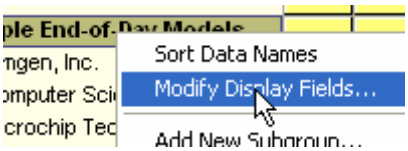

Figure 2. Selecting Modify Display Fields".

3. First, let's add the Primary Signal (). From under **Common Display Fields**, expand **Primary Signal**. Then, select **Current Value of Signal** and press **Add to Display**. This will add it to the **Current Display**.

> Note: The Primary Signal is the signal you are most interested in trading for each stock. Displaying its current value in the Portfolio View allows you to determine what position you should be in based on this signal.

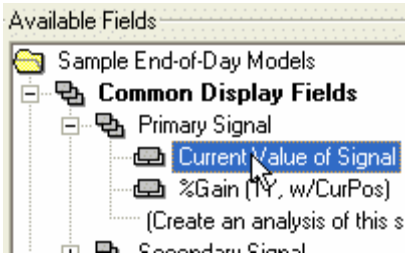

Figure 3. Selecting Current Value of Signal".

4. Now, let's add an analysis of the percent gain of the signal over the past year. Select **(Create an analysis of this signal…)** and press **Add to Display**. This will display the **Create Signal Analysis Fields Wizard**.

Note: An analysis of this type already exists for this group. However, let's see how it can be created in general.

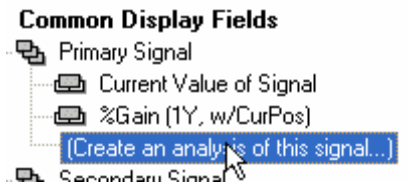

Figure 4. Selecting (Create an analysis of this signal…)".

5. On the **Introduction** page, press **Next**.

6. On the **Trading Parameters** page, confirm the following values are selected:
   - **Entry/Exit Signal** is set to **Primary Signal**.
   - **Trading Style** is set to **Trading style used for default analysis of signal**.
   - **Analysis Range** is set to **Most recent one year (adjusted)**.

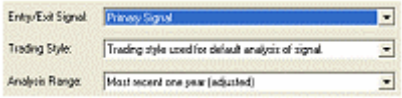

Figure 5. Trading parameters defaults.

7. Now, let's select the field or fields we want to create for this analysis. In this case, we want to store the percent gain. Under **Select Analysis Fields To Create**, select **Percent Gain**, then press **Add Selection**.

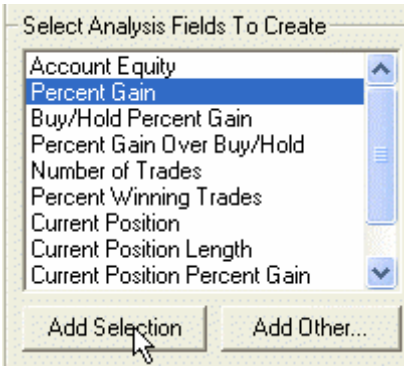

Figure 6. Adding Percent Gain".

Note: Since an analysis field of this type already exists for this group, it may be named with a #2.

8. Press **Finish** to create this field and add it to the display list.

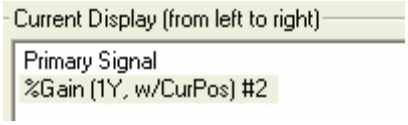

Figure 7. Fields in current display.

9. View the other types of fields that can be added to the display.
   - **Common Data** includes prices and volume fields.
   - **Data Information** includes values such as the start and end date of the imported data.
   - **Streaming Tick Information** includes **Tick**, **Bid**, and **Ask** prices, sizes, and times for real time streaming data.
   - **Other Display Fields** includes any calculations or other fields.

Figure 8. Other display fields.

10. Press **Close** to view the added display fields.

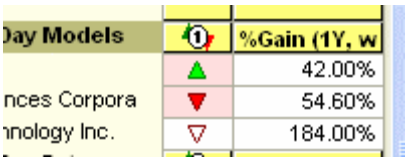

Figure 9. The added display fields.

Congratulations!

You have learned how to display fields in the Portfolio View.

This concludes the tutorial on using the interface. You should now understand the basics of importing data, displaying charts, displaying spreadsheets, analyzing signals, and displaying fields in the Portfolio View.

If you need additional help with these topics, please view the Video Help or see the help documentation. You may also want to repeat any or all of these tutorial tasks.

⇨ **Continue to the next tutorial.**

Creating Trading Signals

Tutorial: Using the Interface: Notes

Selecting a File

Here's how you select the WY.txt" file from the Sample Data" directory. First, verify you are looking in the Sample Data" directory. Near the top of the dialog, there should be a box labeled **Look in:**. The first time you import data into TradingSolutions, this box should say Sample Data".

Note: If this box says TradingSolutions", locate the folder labeled Sample Data" and double-click on it.

Now, locate the WY.txt" file in the Samples directory and click it. Its name will appear in the **File name:** box. After you have done this, press the **Open** button to use this file.

Note: You can also use a file by double-clicking on it.

Understanding Signals

TradingSolutions displays signals as directional arrows and triangles. Here is a quick overview of the symbols that are used here.

- Enter Long
- Exit Short
- Hold, price may increase
- Hold
- Hold, price may decrease
- Exit Long
- Enter Short

Longing" a stock is the same as buying it. In a sense, you are betting that the price of the stock will increase while you have a long position. In other words, buy low, sell high".

Shorting" a stock is slightly more complicated. You are borrowing shares of the stock from your broker and selling those borrowed shares. At a later date, you close this position by buying shares and giving them to your broker to replace the shares you borrowed.

When shorting a stock, you are betting that the price of the stock will decrease. This changes the order of the axiom to sell high, buy low".

When an Enter" (filled in triangle) appears, you should begin or currently be in the indicated position. Later, when an Exit" (hollow triangle) appears, you should exit that position. You should also exit a position when an enter appears in the opposite direction.

Note: When a new signal results in needing to change position, the signal will be highlighted with a pink background.

Hold" signals simply mean that you should hold whatever position you currently have. Stay in the market if you are already in there, or stay out of the market if you are currently out. The size of the anticipated movement is either unknown or predicted to not be worth trading against.

Note: When streaming data with TradingSolutions Real-Time, these signals are signals are updated continuously as new information becomes available.

Changing to the Sample Portfolio

If your portfolio does not appear to contain the stocks or solutions being referenced by this tutorial, you may be migrating from a previous version or you may have already done some work in TradingSolutions. In either case, it will typically be easier to follow the tutorials using the original sample portfolio.

TradingSolutions stores all of its data and calculations in a folder called a Work directory. You can have multiple Work directories on a single computer, accessing one at a time.

To change to a new Work directory, do the following:

5. Select **Change Work Directory…** from the **File** menu.

6. On the **Browse For Folder** dialog, select a location on your computer to add a new Work directory and press the **New Folder** button. Change the name to something meaningful, such as Tutorial Work".
7. Press the **OK** button with this folder selected.
8. A message will appear indicating This appears to be a new Work directory" and asking if you would "like to have the sample data pre-loaded into your new portfolio". Press the **Yes** button.

You can return to your previous Work directory using the **Change Work Directory…** menu item again, this time selecting your previous Work directory and pressing **OK**.

Tutorial: Creating Trading Signals

Tutorial: Creating Trading Signals

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Welcome to the third TradingSolutions tutorial!

TradingSolutions can be viewed as a technical analysis toolbox that allows you to create and evaluate your own entry/exit signals for trading. This tutorial will introduce you to multiple methods you can use to create trading signals. Each of these methods is a valid approach. The most common methods are presented first to aid in understanding.

General Note about TradingSolutions
TradingSolutions can also work with entry/exit signals created by other people. Many TradingSolutions users start out using the Solution Service and other pre-made signals. Then, as they grow more comfortable with the software, they begin creating their own signals.

Important Note about Tutorial Data
If this is your first time using TradingSolutions, we strongly recommend using the sample data provided with TradingSolutions for the tutorials. This will alleviate confusion by ensuring your results match what is described in the tutorial steps.

Note: The TradingSolutions tutorial text is intended to be viewed side-by-side with the TradingSolutions program. If this help is currently covering part of the TradingSolutions program window, you can resize the program appropriately by selecting **Resize Program for Help Panel** from the **Window** menu of TradingSolutions.

Continue to the first task.

Applying a Trading Solution

Or, return to the Overview for the tutorials chapter.

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Applying a Trading Solution

> **Tutorial Task**
> Apply a trading solution" to create a signal for a stock.

The easiest way to create a trading signal for a stock is to apply a trading solution". Trading solutions are collections of fields required to recreate a specific signal or technique. They are created based on an existing trading signal, either from your portfolio or from another portfolio.

Applying a trading solution to the stock it was created with will cause it to recreate the same signal for that stock. Applying a trading solution to a new stock will cause it to perform any optimizations or training used to create the original signal so that it is now optimized for the new stock.

This tutorial will show you how to create a trading signal by applying an existing trading solution to a new stock. Later tutorials will show you how to create your own trading solutions.

Note: This task is similar to the **Quick Example** task in the first tutorial. It is repeated here in more detail to emphasize this as a way to create signals.

Step-by-step Instructions

1. Right-click on **Eastman Kodak Company** in the Sample End-of-Day Data group and select **Apply a Trading Solution…**. This will display the **Apply a Trading Solution Wizard**.

   Note: If your portfolio no longer has this group and you would like to try this task using the sample portfolio, see the Notes.

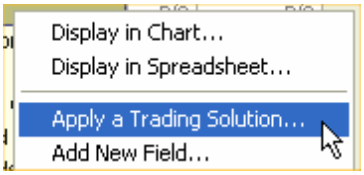

Figure 1. Selecting Apply a Trading Solution…"

2. Review the introduction to the **Apply a Trading Solution Wizard** and press the **Next** button.

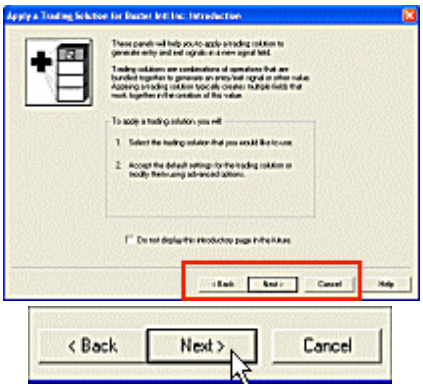

Figure 2. Pressing the Next button to advance.

3. On the **Select Trading Solution** page, select **Sample End-of-Day Model Solutions** from the **Trading Solutions Groups** list.

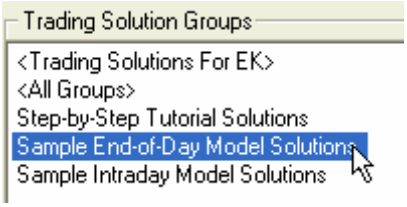

Figure 3. Selecting Sample End-of-Day Model Solutions".

4. Select **Sample Model for AMGN**.

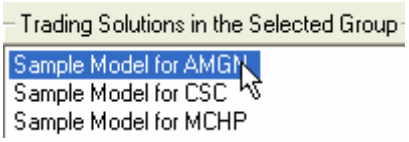

Figure 4. Selecting Sample Model for AMGN".

5. View the description of the selected solution. Press the **More** button next to the description to display a complete description. When you are finished with this additional information, press **Done**.

   Note: If you do not see a description beneath the list of trading solutions, make sure the **Display Descriptions** box is checked.

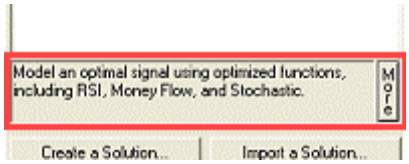

Figure 5. Location of description and More button.

6. Press the **Next** button. TradingSolutions will perform some brief processing.

7. On the **Create Fields** page, review the information and press the **Finish** button.

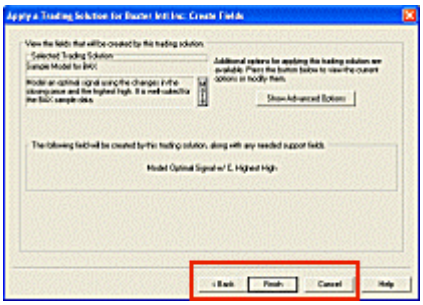

Figure 6. Pressing the Finish button to complete the wizard.

8. Let TradingSolutions perform the requested tasks. Optimizing a new signal can take several minutes. For information on monitoring this processing, see the Notes.

9. After processing has completed, you will have a new signal for this stock which can be used for trading. For information on how to analyze signal or use it for trading, see the Notes.

Congratulations!

You have learned how to apply a trading solution to recreate a technique. Now, let's learn how to perform various methods of creating signals directly in TradingSolutions.

⇨ **Continue to the next task.**

Predicting the Optimal Signal

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Add an Input to a Prediction

> ⓘ **Tutorial Task**
> Predict the current value of an optimal signal.

The most common way to create a signal in TradingSolutions is to model the optimal signal. In essence, this is predicting the correct position to be in to take advantage of the anticipated short-term variations in the prices.

Neural networks work by training" a mathematical model to take a group of known input" data and transform it as best as possible into a desired output". In this case, we would like to take what we know about the market and predict what position we should be in. Therefore, our desired output is the position we should be in throughout the history of the stock.

To determine what position we should have been, TradingSolutions creates an optimal signal". It does this by looking forward at each point in the history of the stock to determine what position would have produced the best profit within a given set of guidelines.

Step-by-step Instructions
Part 1: Create an Optimal Signal

First, let's create the optimal signal.

1. Right-click on **Merck & Co., Inc.** and select **Add New Field…**. This will display the **Create a Field Wizard**.

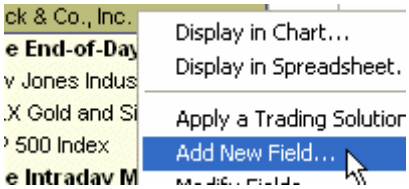

Figure 1. Selecting Add New Field…".

2. Select **Generate an optimal signal** and press **Next**.

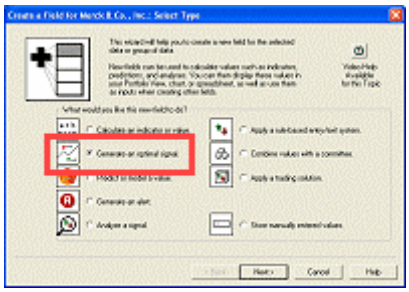

Figure 2. Location of Generate an optimal signal".

3. Review the introduction to the **Generate an Optimal Signal Wizard** and press the **Next** button.

4. TradingSolutions uses several parameters to determine what type of profit opportunities to look for. For now, accept the default values by pressing **Next**.

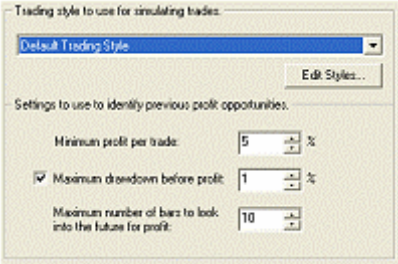

Figure 3. Parameters for optimal signal.

5. Press **Finish**. TradingSolutions will perform some brief processing and the optimal signal will be ready to use.

   Note: You only need to create one optimal signal for each stock. The exception to this would be if you are experimenting with other parameters to the optimal signal.

Step-by-step Instructions
Part 2: Predict the Optimal Signal

Now, let's predict the current value of the optimal signal.

6. Right-click on **Merck & Co., Inc.** and select **Add New Field…** again.

7. Select **Predict or model a value**.

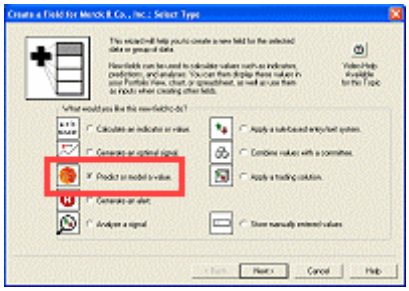

Figure 4. Location of Predict or model a value".

8. Review the introduction to the **Predict a Value Wizard** and press the **Next** button to advance to the **Select Desired Outputs** page.

9. Set the **Value to Predict** to **Optimal Signal (Default Trading Style)**.

   Note: Optimal signals with other names and parameters may be also created for this stock if you applied trading solutions to this stock. For this example, select the optimal signal with the name listed here.

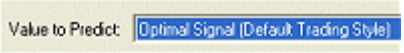

Figure 5. Setting Value to Predict".

10. Press **Next** to advance to the **Select Inputs** page.

11. Now we indicate what information is available to the neural network for predicting the desired output. This can be any of the following:

    - Raw price data for this stock
    - Pre-calculated indicators or other fields for this stock
    - Raw price data or indicators for another data series, such as an index.
    - Optimizable functions, which are typically indicators you want to try multiple values for.

12. Let's add all of the raw data. Using **Select from fields in this data series**, select **Raw Data**. Then, press **Add Selected Input**.

    Note: If you have previously applied a trading solution to this stock, it may be necessary to scroll up to see Raw Data" above the Close field.

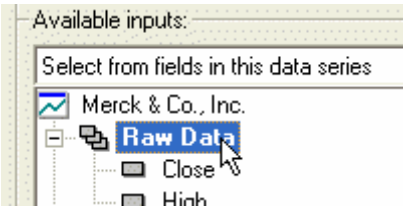

Figure 6. Selecting Raw Data".

13. Let's add an optimized percent difference between the closing price and its moving average. Change **Select from fields in this data series** to **Select from optimizable functions**.

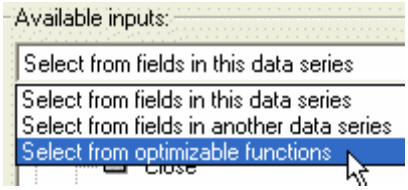

Figure 7. Selecting Select from optimizable functions".

14. Expand **Series Averaging Functions**, scroll down and select **Percent Difference from Moving Average**. Then, press **Add Selected Input**.

    Note: There may be several similarly named functions in this list. Select the first one. Function names which are longer than the list box can be seen by scrolling the mouse over the abbreviated listings.

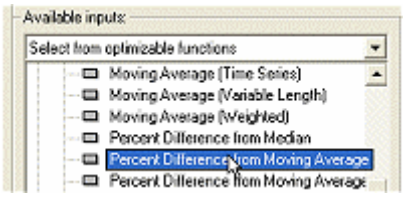

Figure 8. Selecting Percent Difference from Moving Average".

15. Press **Next** to advance to the **Select Options** page.

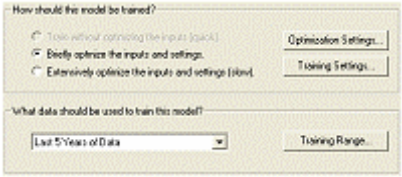

Figure 9. Options for creating prediction.

16. By default, TradingSolutions will optimize the selected inputs and neural network settings to find the best results using the last five years of data. Accept these values by pressing **Next**.

17. On the **Create Prediction** page, press **Finish**. TradingSolutions will begin optimizing the prediction.

18. Let TradingSolutions perform the requested tasks. Optimizing a new signal can take several minutes. For information on monitoring this processing, see the Notes.

19. After processing has completed, you will have a new signal for this stock which can be used for trading. For information on how to analyze signal or use it for trading, see the Notes.

Congratulations!

You have learned the basics of creating a model of the optimal signal. In most cases, you will want to select additional functions or pre-calculated indicators as inputs to provide more information. For more information on this, see the Video Help and help documentation.

Applying a trading solution performed many of these steps for us. Once you find a set of inputs that works well, you will probably want to create a trading solution based on that approach so that you do not need to select each input again.

⇨ **Continue to the next task.**

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Applying an Entry/Exit System

> **Tutorial Task**
> Apply an entry/exit system and optimize its parameters.

Another way to create a signal in TradingSolutions is using a rule-based entry/exit system. This is the method typically used in traditional technical analysis. Signals are generated based on rules. These rules can be as simple or as complex as desired. And, the underlying parameters to these rules can be optimized for individual stocks.

TradingSolutions includes several basic entry/exit systems based on single indicators. The results from these basic systems typically will not be as good as those from a prediction of the model of the optimal signal. However, they provide good examples of how you can create more complex entry/exit systems.

For this example, let's enter long when a short-term moving average crosses above a long-term moving average and enter short when the opposite happens.

Step-by-step Instructions

1. Right-click on **Merck & Co., Inc.** and select **Add New Field…**. This will display the **Create a Field Wizard**.

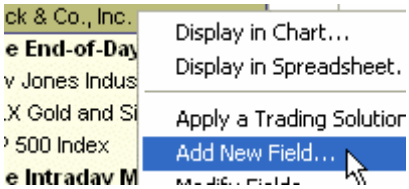

Figure 1. Selecting Add New Field…".

2. Select **Apply a rule-based entry/exit system** and press **Next**.

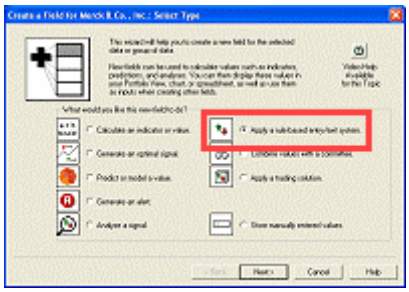

Figure 2. Location of Apply a rule-based entry/exit system."

3. Review the introduction to the **Apply an Entry/Exit System Wizard** and press the **Next** button to advance to the **Select Entry/Exit System** page.

4. By default, all groups of entry/exit systems will be selected. Select **Moving Average System** from under **Entry/Exit Systems in the Selected Group**.

   Note: There may be several similarly named systems in this list. Select the first one.

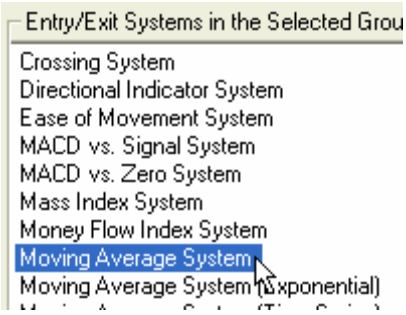

Figure 3. Selecting Moving Average System".

5. View the description of the selected system. Press the **More** button next to the description to display a complete description. When you are finished with this additional information, press **Done**.

   Note: If you do not see a description beneath the list of trading solutions, make sure the **Display Descriptions** box is checked.

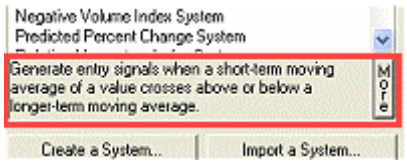

Figure 5. Location of description and More button.

6. Press **Next** to advance to the **Select Inputs** page.

7. By default, this system will use the **Close** field for prices and optimize the periods of the two moving averages to find the best results. Press **Next** to keep these defaults.

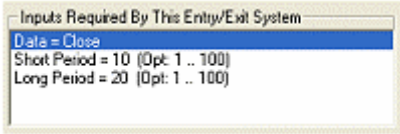

Figure 6. Default inputs to selected system.

8. On the **Select Name** page, press **Finish**. TradingSolutions will begin optimizing the system.

9. Let TradingSolutions perform the requested tasks. Optimizing a new signal can take several minutes. For information on monitoring this processing, see the Notes.

10. After processing has completed, you will have a new signal for this stock which can be used for trading. For information on how to analyze signal or use it for trading, see the Notes.

Congratulations!

You have learned how to apply a basic entry/exit system and have it optimized to provide the best results for a stock.

Advanced tutorials will introduce you to creating your own entry/exit systems. However, the application of this basic system should show you the basics of how this works.

The next tutorial combines predictions and entry/exit systems into a more traditional approach to using neural networks in financial trading.

Continue to the next task.

Working with Multiple Stocks

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Working with Multiple Stocks

> **Tutorial Task**
> Locate profitable models by working with a group of stocks.

New users of TradingSolutions sometimes concentrate on one or two stocks or data series that they feel familiar with. While TradingSolutions will work with almost any date-based financial data, some securities are easier to find profitable signals for than others.

Because of this, a better approach to developing new signals can often be to try new approaches on entire groups of stocks instead of one single stock. This increases the probability that a profitable signal will be found with only a small number of additional steps.

This approach can be performed on groups of any size. However, it is recommended that portfolios and groups be kept to 100 stocks or less to improve processing.

Step-by-step Instructions
Part 1: Apply a Trading Solution to a Group

1. Right-click on the Sample End-of-Day Data group and select Apply a Trading Solution. This will display the Apply a Trading Solution Wizard.

   Note: If your portfolio no longer has this group and you would like to try this task using the sample portfolio, see the Notes.

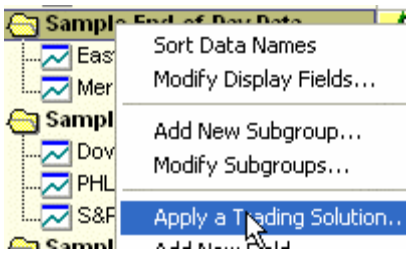

Figure 1. Selecting Apply a Trading Solution."

2. Review the introduction to the **Apply a Trading Solution Wizard** and press the **Next** button.

   Note: The remaining steps for applying a trading solution to a group are the same as they were for applying it to a data series.

3. On the **Select Trading Solution** page, select **Sample End-of-Day Model Solutions** from the **Trading Solutions Groups** list.

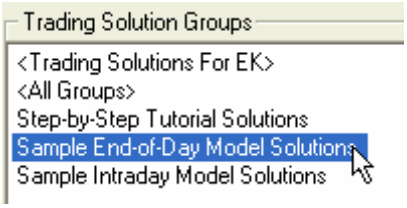

Figure 3. Selecting Sample End-of-Day Model Solutions".

4. Select **Sample Model for CSC**.

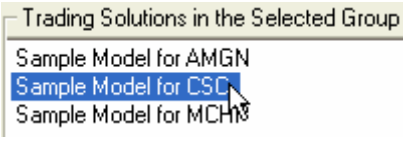

Figure 4. Selecting Sample Model for CSC".

5. Press the **Next** button. After some brief processing, the wizard will advance to the **Create Fields** page.

6. Note the name of the field that will be created by this solution. Depending on the experiments you performed previously, the field being created will probably be named **Model: Optimal Signal (..) #2** or something similar.

7. Press the **Finish** button.

   Note: The fields associated with the trading solution will be optimized for each stock individually.

8. TradingSolutions will now begin performing the requested tasks. The overall processing of these tasks will typically take longer than the previous steps since the process is being repeated for multiple stocks. For information on monitoring this processing, see the Notes.

Step-by-step Instructions
Part 2: Comparing Results for a Group Field

9. Create an analysis of how the signal traded for each stock. Right-click on the **Sample End-of-Day Data** group and select **Add New Field**. This will display the **Create a Field Wizard**.

   Note: These steps can be performed while TradingSolutions is processing the previous tasks.

10. Select **Analyze a signal** and press **Next**.

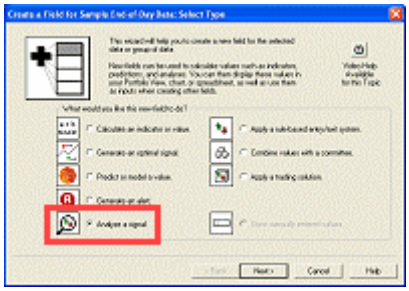

Figure 5. Location of Analyze a signal".

11. Review the introduction to the **Create Signal Analysis Fields Wizard** and press the **Next** button.

12. On the **Trading Parameters** page, change the Entry/Exit Signal being analyzed to the newly created field.

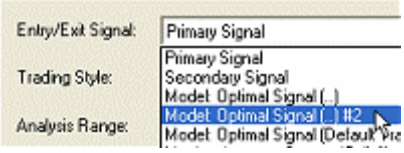

Figure 6. Selecting the newly created field for analysis.

13. Under **Select Analysis Fields To Create**, select **Percent Gain**, then press **Add Selection**.

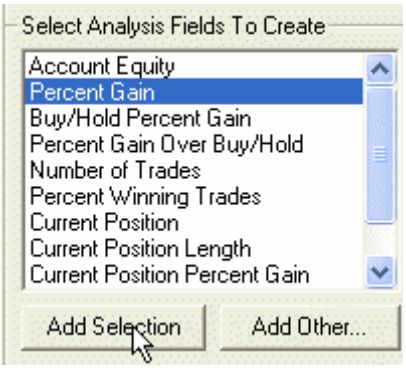

Figure 7. Adding Percent Gain".

14. Note the name of the field being created and press **Finish**.

15. Now, add this analysis to the Portfolio View. Right-click on the **Sample End-of-Day Data** group and select **Modify Display Fields**.

16. Expand **Other Display Fields** and **Signal Analyses**. Then, select the new signal analysis field and press **Add to Display**.

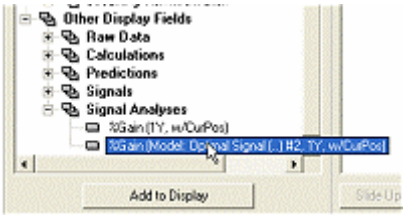

Figure 8. Selecting the signal analysis field.

17. Press **Close**.

18. If the new display field is located off the screen, scroll the Portfolio View to the right until you can see the new field.

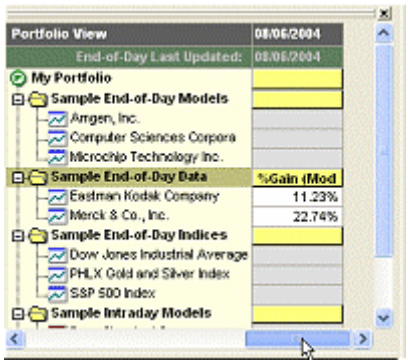

Figure 9. Scrolling the Portfolio View.

19. Right-click on the header for the new display field and select **Sort Values Descending**.

Figure 10. Selecting Sort Values Descending".

20. You now have a sorted list of potential candidates to trade based on this approach. Any stocks that produced favorable returns using this method can be analyzed further to determine if they are worth trading.

    Note: For a group of two or three stocks, sorting the results is not necessary. However, for groups of 10 or more stocks, this can aid in quickly determining the best candidates.

21. When you are done with the additional field, you can remove it from the display by right-clicking on the header and selecting **Remove Display Field**.

    Note: This action will not delete the created field, just remove it from the display. To delete the field, select **Modify Fields** for the group, select the field, and press the **Delete** button.

    Note: If you do not remove the field and want to restore the original sort, right-clock on the group and select **Sort Data Names**.

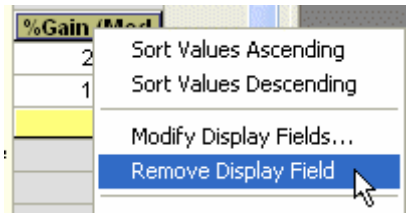

Figure 11. Selecting Remove Display Field".

Congratulations!

You have learned how to create signals and other fields for entire groups of stocks. You have also learned how this process can be used to locate new trading opportunities.

It is important to understand that almost any type of field that you can create for an individual stock, you can create for an entire group.

⇨ **Continue to the next task.**

What To Do Next

Tutorial: Creating Trading Signals

Introduction
Applying a Trading Solution
Predicting the Optimal Signal
Applying an Entry/Exit System
Working with Multiple Stocks
What To Do Next

Congratulations!

Congratulations, you should now have a basic understanding of several methods for creating trading signals in TradingSolutions. These include:

- **Applying Existing Trading Solutions**
- **Predicting the Optimal Signal**
- **Applying an Entry/Exit System**
- **Working with Multiple Stocks**

Also, from the tutorial on **Using the Interface**, you should have a basic understanding of the following topics:

- **Importing Data**
- **Displaying Charts**
- **Displaying Spreadsheets**
- **Analyzing Signals**
- **Modifying the Portfolio View**

More information on all of these topics is available in both the Video Help and help documentation. You may also want to repeat specific tutorials if you ever need to review specific topics.

What To Do Next

With this wide range of tools, you may still be wondering how to approach creating profitable models (and making money) with TradingSolutions. Here are some suggestions as to how to continue.

1. Begin by following the Solution Service. The signals and commentary provided with the Solution Service provide an excellent starting point for seeing how models can be used on a day-to-day basis.

   Note: Remember, the Solution Service is updated each evening to provide you with information about what you could trade at the next open.

2. Look at previously created models for examples of financial indicators people are using to create profitable models.

   Note: Good sources of existing models are the Solution Service, the TradingSolutions web site, and TradingSolutions users groups.

3. Instead of concentrating on individual stocks, try applying approaches to entire groups of stocks and working on improving the models that show some potential.

   Example: Try importing the S&P 100 or NASDAQ 100 into a group and apply trading solutions to the entire group. Use the Primary Signal and display fields to identify the best performers and concentrate on trading or improving those.

   Note: Don't get frustrated if you can't model an individual stock. If you are having trouble creating profitable models for a particular stock, that stock may be very difficult to model.

4. Don't discount your own knowledge of trading when selecting inputs for models. If you have previous experience in technical analysis, what financial indicators would your normally look at? When you look at a chart of the price and the optimal signal, what information might lead you to trade around when the optimal signal trades?

   Note: Magazines and websites can be excellent sources of additional information concerning technical analysis and financial indicators.

5. Use correlation analysis to identify potential inputs for your models. Correlation analysis will be introduced in the Advanced Features tutorials.

⇨ **Continue to the next tutorial.**

Using Advanced Features

Tutorial: Creating Trading Signals: Notes

Monitoring Processing

TradingSolutions displays a **Status Dialog** to let you know when it is processing. When it is finished, the Status Dialog will disappear.

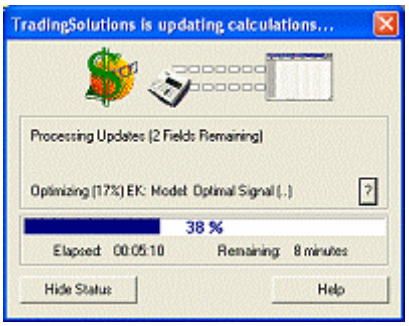

Figure 1. Example of a Status Dialog.

While TradingSolutions is working on a specific task, you can see additional detail about what it is working on by pressing the **?** button next to the task. This will display an additional **Status Dialog**.

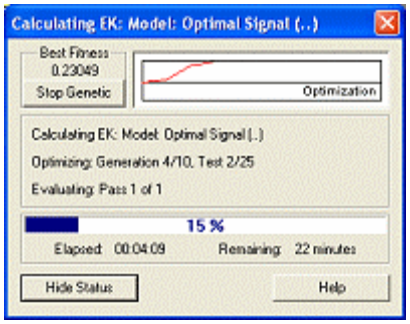

Figure 2. Example of a detail Status Dialog.

Working with Created Signals

Here is an overview of what you can do with the signals you create using the methods in this tutorial. Each of these topics is covered in the **Using the Interface** tutorial.

- When the processing of a new signal is completed, a message will appear in the **Messages and Alerts Window** indicating an analysis of the new field is ready. You can jump straight to this analysis by double-clicking on this message.
- You can compare a new signal to other signals for a stock and optionally assign it to be your Primary Signal by right-clicking on the stock and selecting **Analyze Signals…**.
- You can visually see how the new signal would have traded by adding it to a chart.
- You can display the new signal in your Portfolio View for trading. The easiest way to do this is to make it your Primary Signal. Then, add the Primary Signal to your display fields if it is not already there.

Changing to the Sample Portfolio

If your portfolio does not appear to contain the stocks or solutions being referenced by this tutorial, you may be migrating from a previous version or you may have already done some work in TradingSolutions. In either case, it will typically be easier to follow the tutorials using the original sample portfolio.

TradingSolutions stores all of its data and calculations in a folder called a Work directory. You can have multiple Work directories on a single computer, accessing one at a time.

To change to a new Work directory, do the following:

1. Select **Change Work Directory…** from the **File** menu.

2. On the **Browse For Folder** dialog, select a location on your computer to add a new Work directory and press the **New Folder** button. Change the name to something meaningful, such as Tutorial Work".
3. Press the **OK** button with this folder selected.
4. A message will appear indicating This appears to be a new Work directory" and asking if you would "like to have the sample data pre-loaded into your new portfolio". Press the **Yes** button.

You can return to your previous Work directory using the **Change Work Directory…** menu item again, this time selecting your previous Work directory and pressing **OK**.

Tutorial: Using Advanced Features

Tutorial: Using Advanced Features

Introduction
Creating Trading Solutions
Writing Custom Functions
Writing Custom Entry/Exit Systems
Predicting Future Prices
Using Correlation Analysis

Welcome to the final TradingSolutions tutorial!

This tutorial will take you step-by-step through some of the advanced features in TradingSolutions. This tutorial assumes that you understand the concepts presented in the previous tutorials. It does not require any of that work to be present.

Note: The TradingSolutions tutorial text is intended to be viewed side-by-side with the TradingSolutions program. If the TradingSolutions program window is not currently displayed next to this help text, you can resize it appropriately by selecting **Resize Program for Help Panel** from the **Window** menu of TradingSolutions.

Continue to the next task.

Creating Trading Solutions

Or, return to the Overview for the tutorials chapter.

Tutorial: Using Advanced Features

Introduction
Creating Trading Solutions
Writing Custom Functions
Writing Custom Entry/Exit Systems
Predicting Future Prices
Using Correlation Analysis

Creating Trading Solutions

> **Tutorial Task**
> Create a trading solution and export it.

In previous tutorials, you learned how you could apply a trading solution to recreate all of the fields necessary to reproduce a trading signal. Now, let's learn how you can create your own trading solutions.

Step-by-step Instructions
Part 1: Create a Trading Solution

1. Press the **Define Trading Solutions** button in the toolbar.

Figure 1. Pressing Define Trading Solutions".

Note: If you cannot locate this button, you can also select this option from the **Processing** menu.

2. Create a group for your trading solutions so you can keep them separate from those included with the software. Press the **New…** button beneath the list of **Trading Solution** Groups.

Note: If you have already created a new group, simply select it from the list of groups and proceed to step 4.

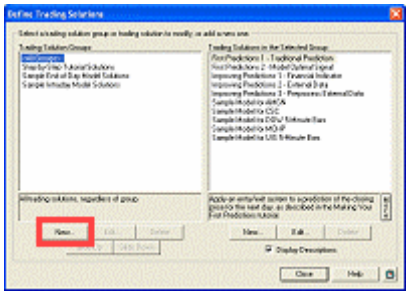

Figure 2. Location of New…" button for creating a new group.

3. Accept the default name of **My Trading Solutions** by pressing **OK**.

4. Create a new trading solution in the selected group by pressing the **New…** button beneath the list of **Trading Solutions in the Selected Group**.

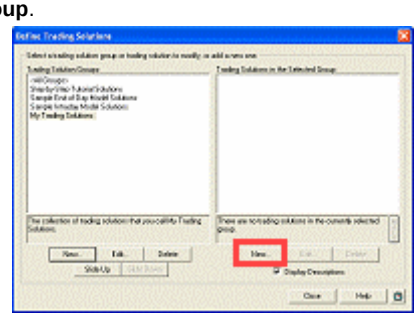

Figure 3. Location of New…" button for creating a new solution.

5. Enter a name for your solution. For example, call this one **My Solution**".

Figure 4. Entering a name for the new solution.

6. Press the **Next** button.

7. You can use any field as the basis for your trading solution. For example, let's base this solution on the Primary Signal we are currently using for Amgen. Locate **Amgen** in the **Sample End-of-Day Models** group and select the **<Primary Signal>** field.

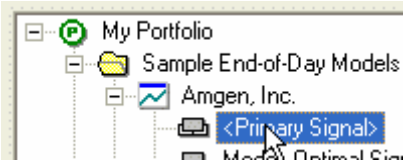

Figure 5. Selecting the Primary Signal for Amgen.

8. Press the **Next** button. TradingSolutions will perform some brief processing.

9. On the **Verify Inputs** panel, press **Finish**.

10. Press **Close**. You can now apply this new trading solution to any data or group, the same as any trading solution included with the software.

Step-by-step Instructions
Part 2: Export the Trading Solution

There may be times when you want to export trading solutions for use in other portfolios or to share with other users. Here is how you can do this.

11. Select **Export Trading Solution…** from the **File** menu.

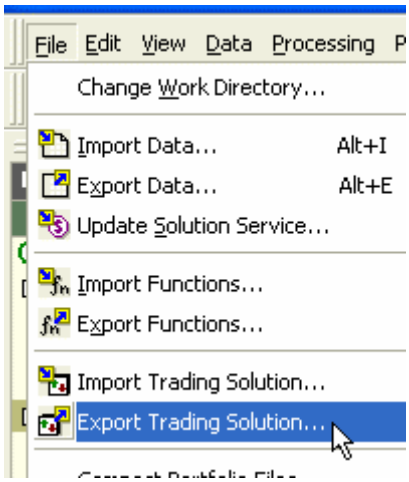

Figure 6. Selecting Export Trading Solution…"

12. Select **My Solution** from the list of **Trading Solutions in the Selected Group**.

13. Press **OK**.

14. Select a name and location for the file, then press **Save**.

> Note: By default, the file will be named based on the name of the trading solution and placed in the **Sample Solutions** directory, or whichever directory you worked with last.
>
> Note: Trading solution files have the extension .tss".

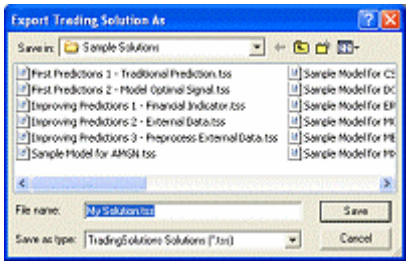

Figure 7. The file save dialog.

15. You can now import this trading solution file into another portfolio or send it to another TradingSolutions user for them to import. To import a trading solution, select **Import Trading Solution…** from the **File** menu.

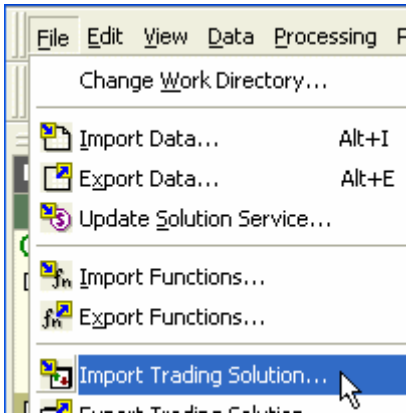

Figure 8. Selecting Import Trading Solution…".

Congratulations!

You have learned how to create a trading solution, which you can use to recreate previously created fields. You have also learned how you can export a trading solution for use in another portfolio or for sending to another TradingSolutions user.

⇨ **Continue to the next task.**

Writing Custom Functions

Tutorial: Using Advanced Features

Introduction
Creating Trading Solutions
Writing Custom Functions
Writing Custom Entry/Exit Systems
Predicting Future Prices
Using Correlation Analysis

Writing Custom Functions

> **Tutorial Task**
> Learn to write a custom function.

TradingSolutions includes over 250 built-in functions and technical indicators. However, there may be times when you want to use your own custom formulas. Examples of this would be when you have a new indicator you would like to try or when you want to combine several steps into one formula.

For this example, let's create a simple moving average. While this function is already included in TradingSolutions, the equation provides us with a straightforward example of how formula entry works.

A moving average is an average of the most recent values for each point in time. To calculate an average, you simply take the sum of the recent values and divide it by the number of values being included.

The resultant formula will look like this:

Div (Sum (Data, Period), Period)

Step-by-step Instructions

1. Press the **Define Functions** button in the toolbar.

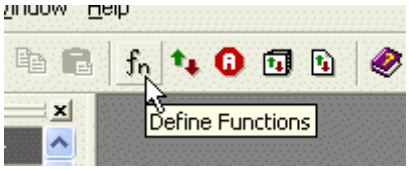

Figure 1. Pressing Define Functions".

Note: If you cannot locate this button, you can also select this option from the **Processing** menu.

2. Create a group for your functions so you can keep them separate from those included with the software. Press the **New…** button beneath the list of **Trading Solution** Groups.

Note: If you have already created a new group, simply select it from the list of groups and proceed to step 4.

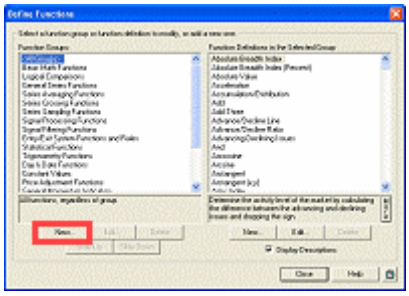

Figure 2. Location of New…" button for creating a new group.

3. Accept the default name of **My Functions** by pressing **OK**.

4. Create a new function in the selected group by pressing the **New…** button beneath the list of **Function Definitions in the Selected Group**.

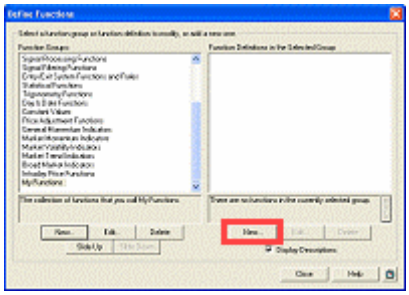

Figure 3. Location of New…" button for creating a new function.

5. Enter a **Display Name** for your function of **My Moving Average** and a **Short Name** of **MyMA**.

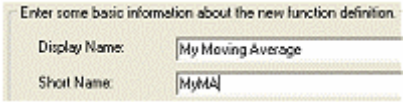

Figure 4. Entering the names for the function.

6. Enter a brief description, such as **My function for a tutorial exercise.**".

Figure 5. Entering a description.

7. Press the **Next** button.

8. TradingSolutions formulas are entered from the outside in, so the first thing we want to put in our equation is the Divide function. Select **Basic Math Functions** from the **Function Group** list.

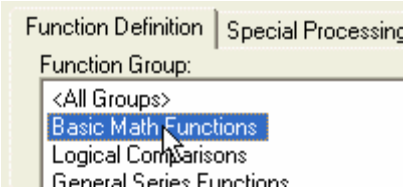

Figure 6. Selecting the Basic Math Functions" group.

9. Select the **Divide** function from the **Function Definitions in this Function Group**.

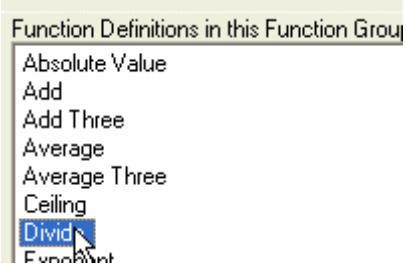

Figure 7. Selecting the Divide" function.

10. Press **Insert into Formula**. This will result in the formula at the top of the wizard looking like this.

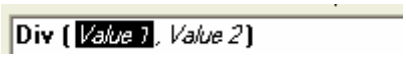

Figure 8. Formula after Divide inserted.

11. Now insert a function to provide a sum of recent values. Select the **Function Definition** tab.

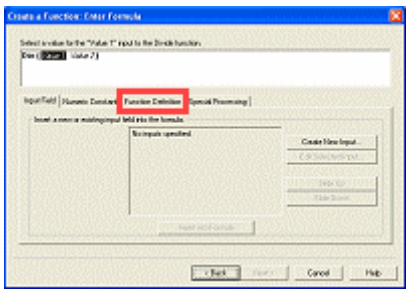

Figure 9. Location of Function Definition" tab.

12. Don't worry if you don't know what group a function is in. With **<All Groups>** selected, scroll down through the alphabetical list of functions and select the **Summation** function.

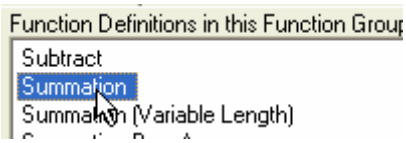

Figure 10. Selecting the Summation" function.

13. Press **Insert into Formula**. This will result in the formula at the top of the wizard looking like this.

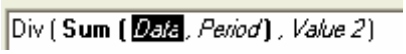

Figure 11. Formula after Summation inserted.

14. We will specify the value to take the moving average of when we go to use the function. On the **Input Field** sub-page, press **Create New Input….**

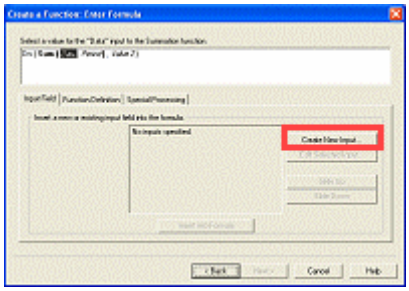

Figure 12. Location of Create New Input" button.

15. Accept the default values of naming this input Data" and providing it as a data series. Press **OK**.

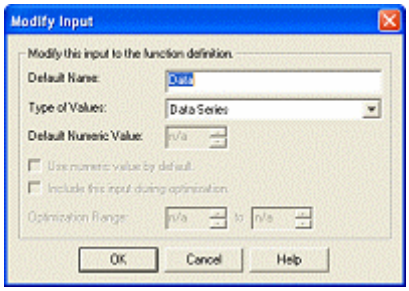

Figure 13. The Modify Input dialog.

16. Press **Create New Input…** and press **OK** again to repeat these steps and create a **Period** input.

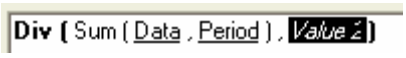

Figure 14. Formula after both inputs added.

17. Now, to calculate a moving average, we want to divide the sum by the period. Select **Period** from the list of inputs.

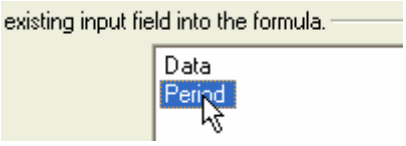

Figure 15. Selecting the Period" input.

18. Press **Insert into Formula**. This will result in the formula at the top of the wizard looking like this.

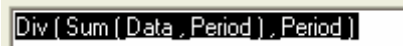

Figure 16. Formula after Period inserted.

19. Press the **Next** button.
20. On the **Verify Inputs** page, press **Finish** to create your function.
21. Press **Close**. You can now use this new function directly as an indicator, as an optimizable input to predictions, or anywhere else you would use an existing function.

Congratulations!

You have learned the basics of writing custom functions in TradingSolutions. These same principles of formula entry can be used to write custom entry/exit systems and alerts, as well. In the next tutorial, we'll see a slightly more complex example that builds on these principles.

⇨ **Continue to the next task.**

Writing Custom Entry/Exit Systems

Tutorial: Using Advanced Features

Introduction
Creating Trading Solutions
Writing Custom Functions
Writing Custom Entry/Exit Systems
Predicting Future Prices
Using Correlation Analysis

Writing Custom Entry/Exit Systems

> **Tutorial Task**
> Learn to write a custom entry/exit system by modifying an existing one.

TradingSolutions includes several basic entry/exit systems. These sample entry/exit systems are based on single indicators to provide examples both of how entry/exit systems work and how various indicators can be used for market timing. They can work well in specific market conditions, but often break down for long periods of time.

Entry/exit systems used for trading are often more complex. They involve several different rules working in conjunction to produce signals that work well in a variety of market conditions.

For this example, let's take an existing entry/exit system and add an additional rule to it. Specifically, let's start with the Moving Average System, which enters the market when a short-term moving average crosses over a long-term moving average. Then, let's add rules that force it to exit (stop) in cases where losses exceed a certain amount.

Step-by-step Instructions

1. Press the **Define Entry/Exit Systems** button in the toolbar.

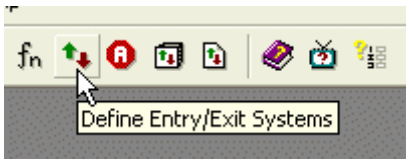

Figure 1. Pressing Define Entry/Exit Systems".

Note: If you cannot locate this button, you can also select this option from the **Processing** menu.

2. Create a group for your functions so you can keep them separate from those included with the software. Press the **New…** button beneath the list of **Trading Solution** Groups.

Note: If you have already created a new group, simply select it from the list of groups and proceed to step 4.

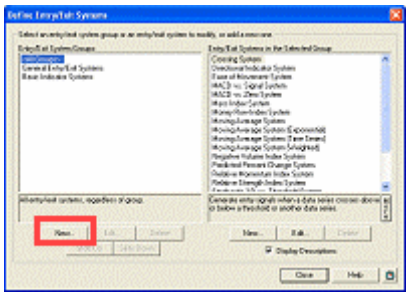

Figure 2. Location of New…" button for creating a new group.

3. Accept the default name of **My Entry/Exit Systems** by pressing **OK**.

4. Create a new function in the selected group by pressing the **New…** button beneath the list of **Entry/Exit Systems in the Selected Group**.

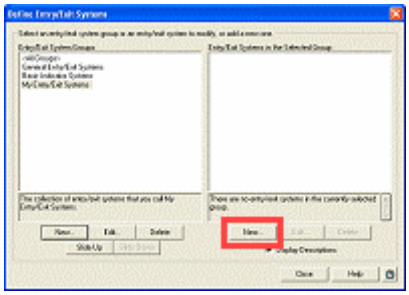

Figure 3. Location of New…" button for creating a new entry/exit system.

5. Enter a **Display Name** for your function of **MA System with Stop on Loss**.

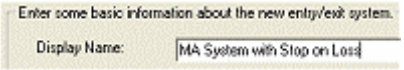

Figure 4. Entering a name for the new system.

6. Press **Copy another Entry/Exit System…**.

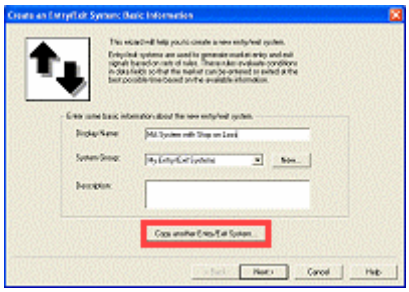

Figure 5. Location of Copy another Entry/Exit System…"

7. Select **Moving Average System** from the list of **Entry/Exit Systems in the Selected Group**.

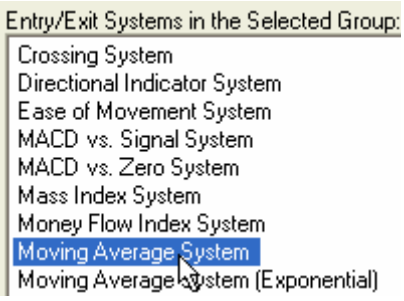

Figure 6. Selecting Moving Average System".

8. Press the **OK** button to perform the copy.

9. Press **Next** to advance to the **Enter Rules** page.

10. If we were creating a new Entry/Exit System, these rules would be empty. However, since we copied another system, rules are already defined for Enter Long and Enter Short.

11. Now, let's add our exit rules. Select the **Exit Long** tab.

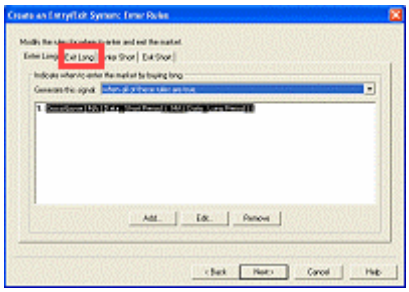

Figure 7. Location of Exit Long" tab.

12. Press the **Add…** button to add a new rule for when to exit long.

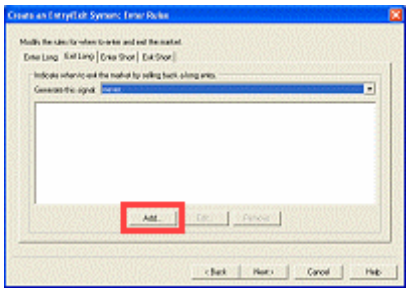

Figure 8. Location of Add" button.

13. Entering entry/exit system rules is exactly the same as entering formulas for custom functions. In this case, select the **Entry/Exit System Functions** group.

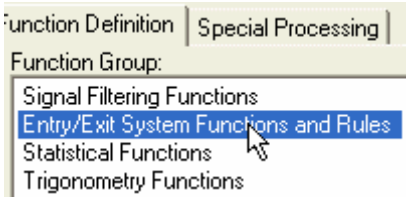

Figure 9. Selecting Entry/Exit System Functions and Rules".

14. Select **Rule: Exit On Percent Loss** and press **Insert into Formula**.

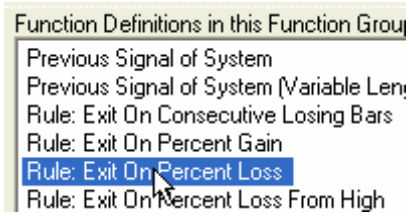

Figure 10. Selecting Rule: Exit On Percent Loss".

15. This function requires the opening and closing price. This information will need to be provided when the entry/exit system is applied. We will need to create inputs to do this. Press **Create New Input…**.

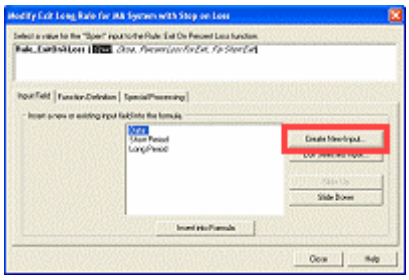

Figure 11. Location of Create New Input…"

16. Accept the default values of naming this input Open" and providing it as a data series. Press **OK**.

17. Press **Create New Input…** and press **OK** again to repeat these steps and create a **Close** input.

18. This function also needs to know what loss percentage to exit at. Let's provide this information when the entry/exit system is applied and allow it to be optimized. Press **Create New Input…**.

19. The default values for this input set the default to a 5% loss which can be optimized to any value from 0 to 100%. Accept these defaults by pressing **OK**.

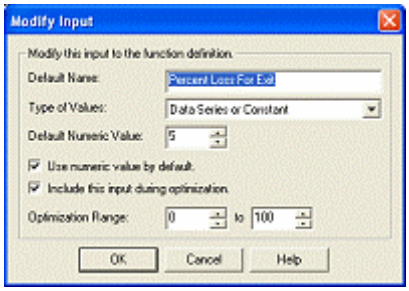

Figure 12. The Modify Input dialog for Percent Loss For Exit".

20. The final input to this function indicates whether it is being used for a long or a short exit. In this case, it's a long exit, so let's set it to zero, indicating false". Press the **Numeric Constant** tab.

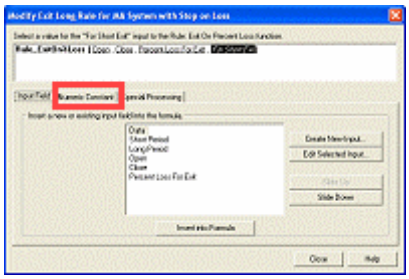

Figure 13. Location of the Numeric Constant" tab.

21. The default value for this parameter is 0. Press **Insert into Formula** to use this.

22. Our exit long rule is now completed. Press **Close**.

23. We should now enter a similar rule for exiting short. Press the **Exit Short** tab.

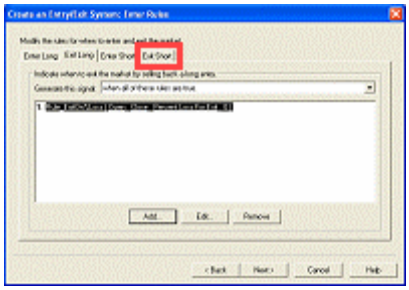

Figure 13. Location of the Exit Short" tab.

24. Press the **Add…** button to start a new rule.

25. Select **Rule: Exit On Percent Loss** from the **Entry/Exit System Functions** group and press **Insert into Formula**.

26. We can reuse the inputs we have already created to use with this function. Press **Insert into Formula** for the **Open** value, the **Close** value, and the **Percent Loss For Exit** value.

27. We will want to set the **For Short Exit** value to a value other than zero, indicating "true". Select the **Numeric Constant** tab.

28. Enter **1** and press **Insert into Formula**.

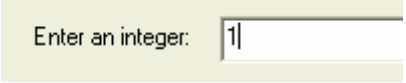

Figure 14. Entering a constant of 1

29. Our exit short rule is now completed. Press **Close**.

30. With our rules completed, press the **Next** button to continue in the wizard.

31. The **Verify Inputs** shows us all of the inputs required by our system. If desired, the order of these inputs can be modified by sliding them up or down in the overall order. Feel free to experiment with this, then press **Next**.

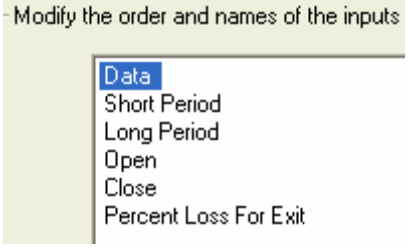

Figure 15. List of inputs in the order they are specified.

32. Since we copied an existing entry/exit system, the notes associated with that system were also copied. Later, we may want to update these notes to include the new inputs and functionality we have added. However, for now, press **Finish** to save our changes.

33. Press **Close**. You can now apply this new entry/exit system to any data or group, the same as any entry/exit system included with the software.

Congratulations!

You have learned the basics of writing custom entry/exit systems by taking an existing entry/exit system and adding new rules to it.

⇨ **Continue to the next task.**

Predicting Future Prices

Tutorial: Using Advanced Features

Introduction
Creating Trading Solutions
Writing Custom Functions
Writing Custom Entry/Exit Systems
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Using Correlation Analysis

Predicting Future Prices

> **Tutorial Task**
> Predict the next closing price and generate a trading signal based on that prediction.

When people think of using neural networks and predictions on financial data, they typically think of predicting prices. The theory is that if you can create a reasonably accurate prediction of future prices, you can use that information to determine whether you should be in or out of the market.

The problem with this approach is that financial price information is inherently noisy. There are so many different influences on the prices that predicting the next price or even the direction of the next price can be difficult to do.

Most predictions in TradingSolutions are of the optimal signal. This is essentially predicting what would be the best action to take for the current market conditions. However, it is also possible to predict prices in TradingSolutions and use that information for trading. Let's see how this can be done.

> Note: This particular example works well with the Weyerhaeuser (WY) sample data that we imported in the **Using the Interface** tutorial. If that data is not available, any data can be used.

Step-by-step Instructions
Part 1. Predict Tomorrow's Close

1. Right-click on **Weyerhaeuser** in the Portfolio View and select **Add New Field…**.

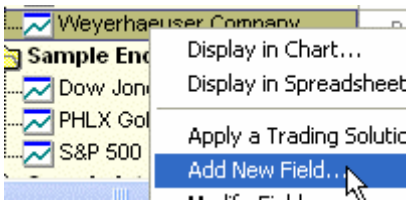

Figure 1. Selecting Add New Field…"

2. Select **Predict or model a value** and press the **Next** button.

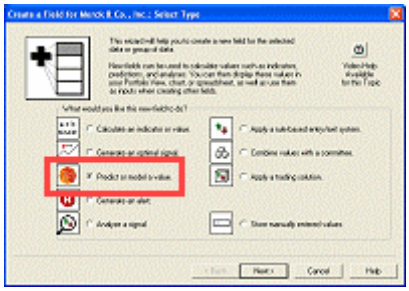

Figure 2. Location of Predict or model a value".

3. Review the introduction to the **Predict a Value Wizard** and press the **Next** button to advance to the **Select Desired Outputs** page.

4. Set the **Value to Predict** to **Close**.

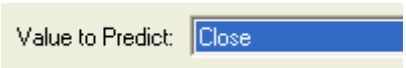

Figure 3. Setting Value to Predict" to Close".

5. **Samples in Advance** will automatically update to **1**, meaning that the value of the Close field one bar in the future will be predicted. The **Preprocessing** will automatically set to **Percent Change** so that the values are kept in a fairly constant range.

6. Press **Next** to continue.

7. For this example, let's use only the prices and volume as inputs. Select **Raw Data** and press **Add Selected Input**.

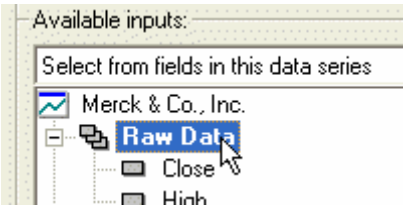

Figure 4. Selecting Raw Data".

8. Press **Next** to advance to the **Select Options** page.

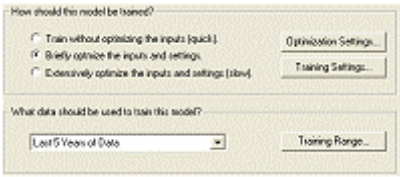

Figure 5. Options for creating prediction.

9. By default, TradingSolutions will optimize the selected inputs and neural network settings to find the best results using the last five years of data. Accept these values by pressing **Next**.

10. On the **Create Prediction** page, press **Finish**. TradingSolutions will begin optimizing the prediction.

Step-by-step Instructions
Part 2. Trade Based on Price Prediction

After TradingSolutions has completed optimizing the prediction, you may want to view it in a chart. Typically, price predictions will appear to lag the price by the number of days in the prediction.

When predictions do not have adequate information to work from, they will tend to predict near the mean (average) value. In this case, since we are predicting the percent change in the closing price, that mean value is 0, meaning no change.

This is not to say that no useful information has been predicted. Some directional information can often be derived from even minor price predictions. Let's see how you can use a simple entry/exit system to determine when to trade based on this information.

11. Right-click on **Weyerhaeuser** in the Portfolio View and select **Add New Field…**.

12. Select **Apply a rule-based entry/exit system** and press **Next**.

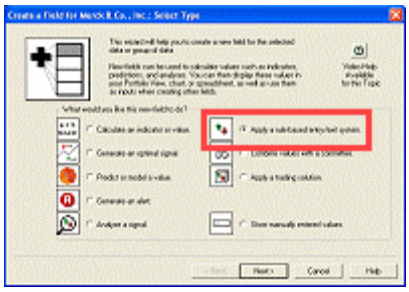

Figure 6. Location of Apply a rule-based entry/exit system."

13. Review the introduction to the **Apply an Entry/Exit System Wizard** and press the **Next** button to advance to the **Select Entry/Exit System** page.

14. By default, all groups of entry/exit systems will be selected. Select the **General Entry/Exit Systems** group, then select the **Predicted Percent Change System** and press **Next**.

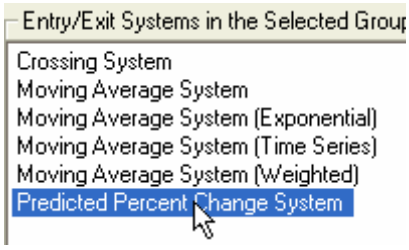

Figure 7. Selecting Predicted Percent Change System".

15. For the **Predicted Value** input, select **Predict: Close in 1 sample**.

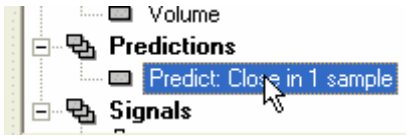

Figure 8. Selecting Predict: Close in 1 sample".

16. Press the **Next** button. This will select the new value for the input and advance to the next step.

17. On the **Select Name** page, press **Finish**. TradingSolutions will automatically optimize the entry/exit system settings to extract the best signal from the price prediction.

18. After processing has completed, you will have a new signal for this stock which can be used for trading.

Congratulations!

You have learned the basics of predicting prices with TradingSolutions. As with predicting the optimal signal, the selection of inputs will have a lot to do with how successful your individual signals are.

You have also learned how to use a basic entry/exit system to extract directional information from the prediction and use it for trading.

⇨ **Continue to the next task.**

Use Correlation Analysis

Tutorial: Using Advanced Features

Introduction
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Using Correlation Analysis

Using Correlation Analysis

> ⓘ **Tutorial Task**
> Run correlation analysis and create a prediction based on the highest correlated inputs.

The Correlation Analysis Wizard helps you identify which inputs may provide leading information about values you are trying to predict. It does this by analyzing the relative correlation between selected prices and indicators with the desired output.

The main limitation of this is that Correlation Analysis identifies potential inputs based only on correlation. Other values may contain valuable information that is not linear in nature or is only relevant at certain times. Because of this, correlation analysis should not be viewed as the only source for potential inputs.

Let's see an example of how Correlation Analysis can be used to create a price prediction.

Step-by-step Instructions
Part 1. Run Correlation Analysis Wizard

Let's begin by seeing if any of the index data in the sample portfolio could provide information about how Amgen will trade.

1. Right-click on **Amgen** in the Portfolio View and select **Analyze Correlations…**.

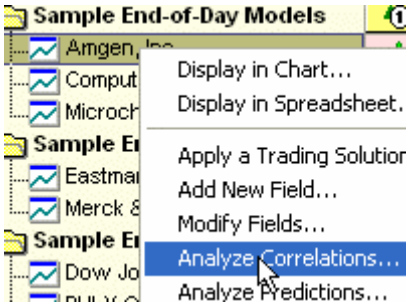


Figure 1. Selecting Analyze Correlations…"

2. On the **Select a Field to Analyze Dialog**, the **Close** field will be selected by default. Press **OK** to accept this.

3. The **Correlation Analysis Wizard** will default to **Determine if other fields may be good inputs for predicting this field**. Press **Next** to continue.

4. Let's see if there is any correlation between this value and the closing prices of our sample indices. Select **Sample End-of-Day Indices**.

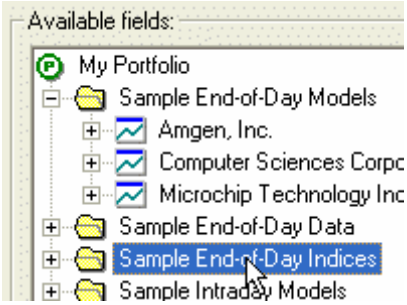


Figure 2. Selecting Sample End-of-Day Indices"

5. Press **Add Selected Fields…**. TradingSolutions will ask if we only want to select a single field name from the selected data series. Let's limit our search to just the Close field. Press **Yes**.

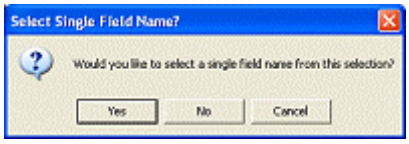


Figure 3. The Select Single Field Name?" message.

6. On the **Select a Field Name to Add Dialog**, the **Close** field will be selected by default. Press **OK** to accept this.

7. The percent change in the closing prices of the sample indices should now be listed in the currently selected fields.

Figure 4. The selected fields after indices have been added.

8. Press **Next** to advance to the **Analysis Options** page.

9. By default, TradingSolutions will analyze the correlations for the values it would use in training a prediction. To perform the analysis, press **Finish**.

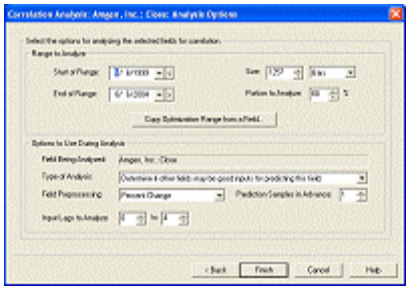


Figure 5. The Analysis Options" page.

10. After some brief processing, TradingSolutions will display a sorted list of the highest correlations.

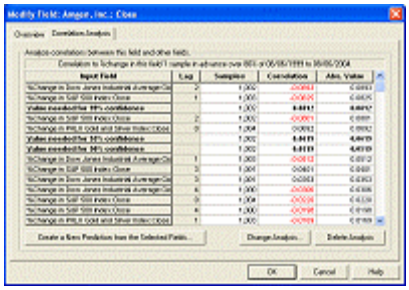


Figure 6. Correlation Analysis results.

11. The row indicating **99% confidence** indicates the correlation that would be necessary to be 99% statistically confident that the values are inter-related as opposed matching by random chance.

Figure 7. The 99% confidence row.

Step-by-step Instructions
Part 2. Create a Prediction

Using the correlation analysis report, we can create a prediction based on the highest correlated values.

12. Select the top four correlated input fields by click on the top entry, holding down the **Shift** key, and clicking on the fourth entry (which is on the fifth row).

Note: Negative correlations are just as informative as positive correlations. It simply indicates that the values are moving in opposite directions rather than the same direction.

Figure 8. Selecting the input fields to use in the prediction.

13. Press the button labeled **Create a New Prediction from the Selected Fields…**.

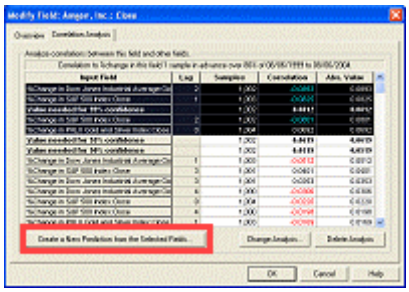


Figure 9. Location of Create a New Prediction…" button.

14. Review the introduction to the **Predict a Value Wizard** and press the **Next** button to advance to the **Select Desired Outputs** page.

15. The wizard will automatically be pre-configured to use the values from the Correlation Analysis Wizard. For example, on the **Select Desired Outputs** page, the **Close** field is automatically selected. Press **Next**.

16. On the **Select Inputs** page, the selected index values are automatically selected. Other inputs could also be added at this time. For example, let's add the closing price of this stock by clicking on **Add Selected Input**.

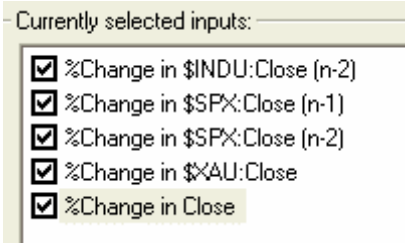


Figure 10. Prediction inputs after Amgen Close is added.

17. Let's keep the remainder of the settings. Press **Next**, then **Next** again, then **Finish** to create the prediction.

18. TradingSolutions will being optimizing the prediction. Exit out of the Correlation Results by pressing **OK**.

19. When TradingSolutions is done processing, you can use it the same as any other price prediction. This includes using it in an entry/exit system to determine when to buy and sell.

Congratulations!

You have learned the basics of creating a correlation analysis and using the highly correlated inputs as inputs to a prediction.

This approach can also be used to find inputs for predictions of the optimal signal. However, since the value of the optimal signal is abstracted from the change in the price, it may be more difficult to find highly correlated inputs.

Tutorial 3: Using Advanced Features: Notes

There are currently no additional notes for this section.

Using The TradingSolutions Interface

Using the TradingSolutions Interface: Overview

The TradingSolutions interface is divided into many different windows, dialogs, and wizards. This section provides information on how to perform various tasks with the interface. Help for specific controls is also available.

The following topics are covered in this section.

- Importing Data into TradingSolutions
- Managing Data with the Portfolio View
- Tracking Data with the Information View
- Displaying Data in a Chart
- Displaying Data in a Spreadsheet
- Working with Messages and Alerts
- Monitoring Processing
- Help with Specific Windows, Dialogs, and Controls

Importing Data into TradingSolutions

Importing Data into TradingSolutions: Overview

The primary way to bring financial data into TradingSolutions is to import it from a file or download it directly from the Internet. Data files can be exported from other programs or downloaded from one of a variety of web sites that offer financial data. In fact, almost any column-based data with date and value information can be imported into TradingSolutions.

For a step-by-step introduction to this topic, see the tutorial called Import Historical Data.

The following topics are covered in this section.

- Configuring Data Sources
- Working with Different Exchanges
- Importing Historical Data
- Updating Data
- Streaming Intraday Data
- Handling Data Adjusted for Stock Splits
- Understanding Periodicity
- Exporting Data for Use in Other Programs
- Importing Data from Specific Sources

The following sections cover importing data from specific sources.

- Importing Data from eSignal
- Importing Data from Prophet.net
- Importing Data from Quotes Plus
- Importing Data from Other Internet Sources
- Importing Data from Text Files
- Importing Data from MetaStock Files
- Importing Data from Other Programs

The following sections in other chapters also deal with this topic.

- The TradingSolutions Solution Service
- Sharing Your Functions with Other Users
- Sharing Your Solutions with Other Users
- Exporting Data for Use in NeuroSolutions

Configuring Data Sources

Data Sources" refer to services from which TradingSolutions can import data directly.

The following data sources can be used directly from within TradingSolutions.

- eSignal
- IQFeed
- Prophet
- Quotes Plus
- The TradingSolutions Solution Service

In addition to these data sources, data from other services can be used by downloading or exporting data to files and importing those files into TradingSolutions.

For help importing data from specific sources, see Importing Data from Specific Sources.

Configuring Data Sources

Most data sources require you to register for their service in order to access data. During registration, you will typically receive a username and password that uniquely identifies you to the service. In order to use a data source in TradingSolutions, this registration information needs to be available to access the data from the service.

Data sources can be configured by selecting **Configure Data Sources…** from the **Data** menu. This will display the Configure Data Sources Dialog, which allows you to view more information about each data source, registering for them, and specify any needed information.

Note: This dialog can also be displayed from the Import Data Wizard by pressing the **Data Sources…** button.

The important thing to understand with data sources is that if the service requires unique identification, it will need to be configured before it can be used in TradingSolutions.

Using Data Sources

Data sources are used when importing data into TradingSolutions. Here is a listing of where this information is specified.

- **Import Data Wizard**

  The Import Data Wizard allows you to import data from a variety of sources. When you select **Download new data from the Internet**, you will select which data source to import this new data from on the Select Data to Download page.

- **Data Series Settings**

  Each data series has a data source associated with it. This data source is the location that new data is imported from when you select **Update data in target group** in the Import Data Wizard. Normally, this is the last data source that was used to import data into this data series.
  The data source associated with a data series can be modified from the Modify Data Series: Properties page. In addition, the data source for all data series in a group can be modified from the Modify Group: Properties page.

Working with Different Exchanges

Exchanges" refer to the places where securities are traded. Examples of exchanges are the New York Stock Exchange and NASDAQ.

Exchanges are defined in TradingSolutions so that you can easily specify when new data is expected to be available for all of the securities traded in a single location. This information is used primarily for intraday data requests and assigning dates to future predictions.

Defining Exchanges

TradingSolutions includes a generic exchange called Major U.S. Exchanges" which can be used for stocks traded in the New York Stock Exchange, NASDAQ, and other exchanges. A common exchange can be used since these places trade at the same time and report data from the same time zone.

Additional exchanges should be defined for securities that are traded at times that are different from the major U.S. exchanges. The following information is specified for each exchange:

- Time zone where the exchange is located
- The times the exchange is open
- The days the exchange is open

Exchanges can be defined by selecting **Define Exchanges…** from the **Data** menu. This will display the Define Exchanges Dialog. This dialog can also be displayed from the Import Data Wizard, Modify Data Dialog, and Modify Group Dialog, among others.

To create a new exchange press the **Add New…** button on this dialog and enter information on the Specify Exchange Characteristics Dialog. You can also modify the settings for exchanges by selecting them and pressing the **Modify...** button.

Using Exchanges

Exchanges are used in several situations, including the following.

- Determining when intraday data is during market hours.
- Determining when intraday data should be available.
- Assigning dates and times to future predictions.

The exchange associated with a data series is typically specified when the data series is first created. Most data series are created from the Import Data Wizard. In addition, data series can be created from the Create Empty Data Series Dialog.

The exchange associated with a data series can be modified from the Modify Data Series: Properties page. In addition, the exchange for all data series in a group can be modified from the Modify Group: Properties page.

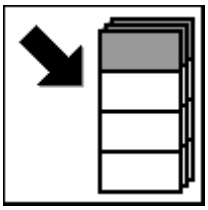
Handling Holidays and Special Sessions

Exchange definitions in TradingSolutions specify when securities are normally traded at an exchange. However, the definitions do not include information about holidays or special sessions when trading may be stopped.

Data services typically only include data for when the exchange is actively trading. Therefore, in most cases, it is not necessary to take any additional actions to account for holidays or special sessions. Projected values for predictions may be labeled with incorrect dates, but the information will still be valid.

In some cases, data services will include information when an exchange or market is technically closed. If this information is outside of normal market hours, TradingSolutions will discard it automatically. However, if this information occurs when the exchange is closed due to holiday or special session, TradingSolutions cannot detect it automatically. If this occurs, it may be necessary to remove the data manually by selecting the dates in the spreadsheet, right-clicking on the selection, and selecting **Remove Dates…**.

Importing Historical Data



TradingSolutions can import historical data from a wide variety of data sources and file formats. The term historical data" refers to prices and other data that has occurred in the past. This is different from streaming intraday data" which is imported into TradingSolutions while it is occurring.

TradingSolutions is normally used as follows:

1. Historical data is imported for one or more securities.
2. Models and entry/exit systems are developed based on this historical data.
3. Updated data is imported or streamed into TradingSolutions to generate current entry/exit signals based on these models and entry/exit systems.

Importing Historical Data

The initial importing of historical data is usually performed using the Import Data Wizard. This wizard walks you step-by-step through the following activities:

- Downloading new data from the Internet.
- Importing data from files on your computer
- Updating data you have imported previously.

This wizard can be accessed in several ways, including:

- Select **Import Data…** from the **File** menu.
- Select **Import Data…** from the context menu for a group in the Portfolio View.
- Select the **Import Data** button on the toolbar.
- Press the **Import Data** button on the Modify Group Dialog: Name page.

For more help importing historical data, see one of the following topics:

- Help for the Import Data Wizard
- Importing Data from Specific Sources
- Updating Data
- Streaming Intraday Data

Historical data is also imported by the TradingSolutions Solution Service. The Solution Service automatically imports data, models, and commentary for several selected stocks.

For help with the Solution Service, see The TradingSolutions Solution Service.

Historical data is traditionally split-adjusted". This means that the prices prior to stock splits have been adjusted so that the value of a single share remains consistent across the split.

For help with split-adjusted data, see Handling Data Adjusted for Stock Splits.

Updating Data

After historical data has been imported for a security, you will want to keep that data up-to-date in order to determine whether any new trades are required.

There are several ways to keep your data up-to-date.

- Update the data using the Import Data Wizard.
- Import intraday data while it is occurring – called streaming".
- Update the Solution Service, which updates only the stocks associated with the Solution Service.

For help streaming intraday data, see Streaming Intraday Data.

For help with the Solution Service, see The TradingSolutions Solution Service.

Updating Data with the Import Data Wizard

End-of-day data is typically updated using the Import Data Wizard.

This wizard can be accessed in several ways, including:

- Select **Import Data…** from the **File** menu.
- Select **Import Data…** from the context menu for a group in the Portfolio View.
- Select the **Import Data** button on the toolbar.
- Press the **Import Data** button on the Modify Group Dialog: Properties page.

Once started, select **Update data in the target group** and press the **Next** button. The Import Data Wizard will automatically determine which data to update and where to look for those updates. This analysis is based on the following:

- Only data in the **Target Group** is considered for update.

  Note: If you would like to update your entire portfolio, be sure My Portfolio" is selected as the target group

- Only data that has the option **Update when group is updated** selected is considered for update. This option is set on the Modify Data Series Dialog: Properties page.

  Note: This option can be overridden by pressing the **Update Options…** button in the Import Data Wizard and selecting **Include data that is not marked for updating with this group**.

- Data will be updated from its default data source. This value is displayed on the Modify Data Series Dialog: Properties page and is typically set to the last location that the data series was imported from.
- If data the default data source for a data series is a file, the file will be checked to determine if it has changed since the last time this data series was updated.

Only new data that is after the last date in the data series will be imported. If you would like to import data additional previous data from a data source, press the **Update Options…** button in the Import Data Wizard and select **Re-import and overwrite previous data**.

Note: If any of the data series being updated use the Solution Service as their data source, all of the Solution Service stocks will be updated.

Streaming Intraday Data

Intraday data is typically most effective when it used for trading while it is occurring. The process of bringing in intraday data while it is occurring is called streaming". In other words, the data is streaming" from the Internet into your TradingSolutions portfolio.

Streaming Data Basics

In order to stream intraday data into your portfolio, you need to have an account with a TradingSolutions data source that supports streaming data. At this time, eSignal is the only data provider supported by TradingSolutions.

Streaming is turned on and off using the **Stream Intraday Data** button in the toolbar. When streaming is turned on, any intraday data series that have the option **Include in intraday streaming updates** selected will be streamed.

Note: Additional information on these topics is available below.

The easiest way to add a symbol to your portfolio so that it will be streamed is to use the Import Data Wizard to import some historical data for that symbol. That historical data can then be used to develop entry/exit signals for this data. These signals can then be tested and traded on new data as it streams in.

Note: If you would like to stream a symbol without importing historical data, use the Create Empty Data Series Dialog.

For help importing historical data, see Importing Historical Data.

Each streaming symbol has an associated periodicity. The periodicity indicates the number of minutes to include in each High / Low / Open / Close bar. For example, streaming data with a periodicity of five minutes would calculate a new price bar every five minutes and, therefore, update any associated calculations or signals every five minutes. The periodicity also affects how data will be displayed in a chart or spreadsheet.

Note: Only one periodicity can currently be streamed at a time for each symbol.

Making Intraday Data Available for Streaming

In order for an intraday data series to be streamed, the following must be true:

- The data series must have the option **Include in intraday streaming updates** selected.
- The default data source for the data series must support streaming.
- Your account with that data source must support real-time streaming data.

  Note: Some data sources require individual exchanges to be activated. For example, eSignal requires separate activation of NYSE, NASDAQ, and AMEX exchanges within each account.

The data source and update options for individual data series can be viewed and modified from the Modify Data Series Dialog: Properties page These settings can be modified for entire groups from the Modify Group Dialog: Properties page.

Starting and Stopping Streaming Data

Streaming data is started and stopped by selecting **Stream Intraday Data** in the **Data** menu or pressing the **Stream Intraday Data** button in the toolbar.

Streaming will start as long as at least one data series is available for streaming. See above for rules in determining which data series are available for streaming.

Note: Unlike manual updates, streaming cannot be turned on for a single target group. To stream stocks from a specific group, turn the option **Include in intraday streaming updates** off for the stocks you do not want to stream.

Note: When streaming is started for eSignal, the eSignal Data Manager will start automatically if it has not been started already.

When streaming is first started, one or more gap fills" may be requested to update the data in the portfolio so that it has data through the current time.

Note: Depending on when a data series was last updated, the associated gap fill may include several hours or days of data. The larger the gap fill, the more processing that will be required to bring a data series up-to-date.

Because of this, it may sometimes take several minutes for TradingSolutions to begin processing new data at as fast as speed as possible.

Streaming will continue until it is stopped or until data can no longer be streamed. If streaming is stopped automatically, a message will be displayed in the Messages and Alerts Window indicating what happened.

Processing of Streaming Data

TradingSolutions is not limited in the number of symbols that it can stream at one time. However, it is limited in the amount of data it can process in a timely manner.

When new data is imported or streamed into TradingSolutions, the fields associated with that data are updated in the following order:

1. Alerts
2. Signals in the Portfolio View (Display Fields)
3. Other Values in the Portfolio View (Display Fields)
4. Values in Charts and Spreadsheets
5. Other Calculations

Note: When working with multiple periodicities of data, calculations for the shorter periodicity data are processed first. The one exception to this is other calculations", which are processed after the other items for all periodicities.

Since most trading decisions are based on the first three items (alerts and display fields), it is important that these values are calculated as quickly as possible. TradingSolutions keeps track of how long it is taking to calculate these fields and warns you if the performance may not be fast enough to make trades effectively.

When streaming is first started, any data and calculations need to be brought up-to-date from the last data in each streaming data series. This process is called a gap fill" and it is performed automatically for you. All of the data that has occurred since the last data in each streaming data series is downloaded and any calculations are updated. This process can take several minutes (or more) depending on the amount of data that is downloaded and the number of calculations that need to be updated.

Note: Additional information is available below about the messages associated with the status of this processing.

Once processing of the gap fill is complete, TradingSolutions will monitor the amount of time it takes to process each group of new bars for each periodicity. If it cannot calculate the associated alerts and display fields before new bars are arriving, a warning message is displayed indicating that the calculations are not being completed. In addition, if these calculations are taking longer than half of the periodicity, an informational message will be displayed.

Note: Additional information is available below about the messages associated with the status of this processing.

If either of these messages is displayed, you may want to consider reducing the amount of processing associated with streaming. Specifically, consider doing one of the following:

- Reduce the number of data series that are streaming.
- Reduce the number of alerts or calculated display fields associated with streaming data.

  Note: The special display fields described below do not have a significant effect on the amount of data that can be streamed.
- Reduce the number of charts and spreadsheets that are open. Updating these displays can take away from the time available for processing values.
- Work with longer periodicity data.

  Example: 1-minute bars require very fast processing and often trade very quickly. Using 2-minute bars (or longer) can make it possible to stream more symbols and perform more calculations.

Delayed Processing During Streaming

While TradingSolutions is streaming, the automatic signal analysis displayed on the Modify Data Dialog: Entry/Exit Signals Page is suspended. Signal analysis fields are still processed and individual signals can still be analyzed by selecting them from this dialog. However, the statistics on this page will not be updated until streaming has stopped.

The optimization or training of new fields can take a significant amount of time. Because of this, these operations are restricted to one of the two available processing tasks. In addition, calculating a new field for an entire data series can also take time. Adding new fields while streaming data can result in streaming results temporarily being delayed while processing being caught up.

Status of Processing of Streaming Data

The following messages will be displayed in the Messages and Alerts Window to notify you what state the streaming bars are in.

- **Alerts and display fields for streaming *n*-minute bars are being brought up-to-date.**

  This message indicates that TradingSolutions is performing a gap fill". Specifically, it is importing any data that occurred since the last update. It is also updating any calculations based on that data. Depending on the amount of data that has to be imported, this may take several minutes (or more).

  Note: It is valid to trade using signals generated during this period. However, alerts and signals may be delayed more than when they are updated directly from streaming data.

- **Alerts and display fields for streaming *n*-minute bars are now being updated from streaming data.**

  This message indicates that alerts and display fields associated with streaming data are now being updated from streaming data after TradingSolutions has performed a gap fill".

- **Processing of alerts and display fields for streaming *n*-minute bars averaging *time*.**

  This message appears as a warning that too many symbols may be being streamed or too much high-priority processing may be being performed on streaming data.

  Note: This message is displayed if the processing of alerts and calculated display fields takes longer than half of the periodicity.

  Note: See above for recommendations of how to handle this message.

- **Processing of alerts and display fields for streaming *n*-minute bars not completing before new data arrives.**

  This message appears as a warning that too many symbols may be being streamed or too much high-priority processing may be being performed on streaming data.

  Note: See above for recommendations of how to handle this message.

Special Display Fields for Streaming Data

Special display fields are available for displaying information in the Portfolio View while data is streaming. These include the following:

- Tick Price, Volume, and Time
- Bid/Ask Price, Size, and Time

Note: These tick values are used for display purposes only. They are not stored in the portfolio. Calculated fields are only updated based on complete bars.

The tick price can be added as a display field automatically by selecting **Add the streaming tick price to the portfolio display for the target group** on the Import Data Wizard: Select Data to Download page. The display fields can also by modified by selecting **Modify Display Fields…** from the context menu for any group. This will display the Modify Group Dialog: Display Fields page.

Note: These display fields are only available while streaming is turned on and only for data series for which streaming is available.

Streaming Charts

Charts that are displayed for data that is currently being streamed are updated automatically with the most recent tick price and volume.

Note: As with the special display fields, it is important to understand that these tick values are used for display purposes only. They are not stored in the portfolio. Calculated fields are only updated based on complete bars.

To display a streaming chart, simply display a chart for streaming data and include price or volume information in the fields being displayed. This can be the price fields themselves or composite fields, such as HLOC and Japanese Candlesticks. Fields calculated from these values will not be streamed with the price and will only be updated when the bar has completed.

Handling Data Adjusted for Stock Splits

A stock split is an action taken by a company in which it splits their outstanding shares into a larger number of shares. A 2-for-1 split would result in the company having twice the number of shares, investors having twice as many shares, and each share being worth half as much. Therefore, each investor has the same percentage of equity in the company, but the individual shares would cost half as much to purchase.

Unfortunately, if the price of the stock suddenly drops by 50%, this can look pretty bad in a chart. It can also make calculations and predictions react as if a big sell-off has taken place. Therefore, most historical data is split-adjusted".

With split-adjusted data, all of the prices that occur before a stock split are adjusted to match the prices after the stock split. If a stock splits 2-for-1, the price of a stock is cut in half. Therefore, all of the prices before this stock split also need to be cut in half to maintain continuity in the pricing.

Most historical data has already been split-adjusted. However, problems can occur when a stock split occurs and new split-adjusted is combined with older data that has not been split-adjusted. TradingSolutions automatically detects for when this occurs and uses the Stock Split Adjustment Wizard to help you resolve the problem.

Importing New Data after a Stock Split

When you import data into an existing data series in your portfolio, TradingSolutions automatically compares the prices in the new data to the prices in the old data. If the price changes by more than 25% on the first day of the new data, TradingSolutions warns you that a stock split may have occurred and offers to run the Stock Split Adjustment Wizard to resolve the problem.

Note: It is important to note that the date in this message is typically not the date of the actual stock split. The date that is checked and displayed is the first date of the new data. Again, this is because new data has typically already been split-adjusted. Therefore, any problems would occur at the start of the new data being imported, not on the date of the actual stock split.

The Stock Split Adjustment Wizard allows you to specify the size of the split and the date to begin adjusting the data. It also confirms the fields that should be adjusted. In most cases, none of these values will need to be modified. Once you have completed going through the wizard, all of the values on and before the specified date will be adjusted by the amount indicated.

Manually Adjusting Data after a Stock Split

There may be times that you want to run the Stock Split Adjustment Wizard manually to adjust data outside of the import process. This may occur if you decide not to run the wizard during import or if you occasionally enter data directly from the newspaper. You may also want to run the wizard to undo a previous stock split adjustment.

To run the Stock Split Adjustment Wizard, select **Split Adjust Data…** from the context menu for a data series from the Portfolio View. You can also select **Split Adjust from this Date…** from the context menu for any date in the Spreadsheet View. Note that unlike the automated split-adjustment that occurs during import, you will need to supply the size of the stock split and the date to start the adjustment from.

If you are using the wizard to undo a previous stock split adjustment, simply use the opposite amount for the same date. For example, if you want to undo an adjustment for a 2-for-1 split on 8/30/1966, adjust for a 1-for-2 split on that same date.

Understanding Periodicity

What is Periodicity?

The **periodicity** is the size of each bar of data. For example, end-of-day data has a periodicity of one day. Intraday data has a periodicity reflecting the number of minutes of information contained in each bar, as well as the frequency with which those bars are delivered.

The periodicity of a data series appears as an icon next to the data in the Portfolio View. It is also displayed on the Modify Data Dialog: Overview page.

The periodicity of a data series is set based on the actual data that is imported into that series and cannot be changed. For example, if you import end-of-day for a stock, you cannot change that data to intraday data, weekly data, or monthly data. Instead, you would need to import the desired periodicity separately.

Displaying Multiple Periodicities In Charts and Spreadsheets

The periodicity of a chart or spreadsheet is based on the context it is being displayed in. The context is determined by the data series you select to display.

Example: If you select to display a chart for a data series with 5-minute periodicity, the chart will have a 5-minute periodicity even if you add data with other periodicities to that chart.

Note: This means that weekly" and monthly" charts cannot be displayed from end-of-day data. You can display multiple years of end-of-day data, but there is no way to create weekly or monthly bars from that information. Similarly, there is no way to create daily bars from intraday information. In each of these cases, you would simply import the data in the periodicity you are interested in viewing.

Data with other periodicities will automatically be synchronized so that the most recently available bar at that time is displayed. In other words, the will line up to reflect when the information becomes available.

Example: Data with a 10-minute periodicity is added to a 1-minute periodicity chart. The 9:59 through 10:08 1-minute bars will synchronize with the 9:50 10-minute bar since that bar contains data for 9:50 through 9:59. At 10:10, the 10:09 1-minute bar and the 10:00 10-minute bar will both become available, so those will synchronize together.

Because of this synchronization, the times associated with data displayed in a chart or spreadsheet of a different periodicity will not match the times when it is displayed in its own periodicity or another periodicity.

Example: Data with a 10-minute periodicity is displayed in 1-minute periodicity chart. The data synchronized to the 10:00 1-minute bar is the 9:50 10-minute bar (since the 10:00 10-minute bar won't be available until after 10:09.) However, when the 10-minute data is displayed in its own 10-minute chart, the data associated with 10:00 is the 10:00 bar.

Using Multiple Periodicities In Field Inputs

Fields use the same logic as charts and spreadsheets when combining information from multiple periodicities. In other words, data is synchronized so that the most recently known value is used with each bar.

Example: A field from data with a 10-minute periodicity is used as an input to a prediction for 1-minute data. The 9:59 through 10:08 1-minute bars will use the 9:50 10-minute bar since that bar contains data for 9:50 through 9:59. At 10:10, the 10:09 1-minute bar and the 10:00 10-minute bar will both become available, so the 10:09 1-minute bar will use the 10:09 10-minute bar.

Change and percent change preprocessing for predictions is based on the periodicity of the field being calculated. Since the value associated with slower periodicity data does not change every bar, you should not use these types of preprocessing for slower periodicity data.

Example: In the above example, the value of the input with 10-minute periodicity would not change for 10 bars. Therefore, the change and percent change of the values during these bars would be 0.

Exporting Data for Use in Other Programs

TradingSolutions can export the values of any field to a text file for use in other programs. The data is separated with commas and can contain one or more securities in a single file.

Note: If you are exporting data for use in NeuroSolutions, please see Developing Models with NeuroSolutions.

Selecting Which Data to Export

To export data to a text file, select **Export Data…** from the **File** menu or press the **Export Data** button on the toolbar. This will display the Export Data Selection Dialog, which allows you to select which data series should be included in this export operation. After selecting the data series to include, press the **OK** button to continue.

Note: If a single data series is currently selected in the Portfolio View, the currently selected data series will be used and the Export Data Selection Dialog will not be displayed.

After you have selected which data series to export, the Export Field Selection Dialog will be displayed. This allows you to select which fields to export. By default, all of the fields will be selected. To continue, press the **OK** button.

Note: All available fields are displayed on the Export Field Selection Dialog. If a data series contains no data for a selected field, it will be exported with no data. To limit the list of available fields to those of a specific group, begin the export process from the context menu for that subgroup from the Portfolio View.

For help with the Export Data Selection Dialog or the Export Field Selection Dialog, see Selection Tree Dialogs.

Specifying the Export File

Once you have selected the data series and fields to export, you will see a file selection dialog labeled **Export Data As**. This dialog allows you to specify the name of the file to export the data to. Once you have selected a file name and directory, press the **Save** button.

For help with the file selection dialog, see the help for the File Selection Dialog.

Using the Exported Data

After you have exported the data to a file, you can import it into any program that supports comma-separated text files. Here are some examples.

- **Microsoft Access**

  To import the data into a table in a Microsoft Access database, create a new table using the Import Table wizard to import the exported data file and specify the following options:

  - Comma-delimited
  - First Row Contains Field Names
  - Text Qualifier is double quotes ( )

  Note: If you export fields that are not used in the first data series in the file, Access may default these empty fields to data type Text. The data type for these fields should be changed to a numeric data type such as Double. If you have many fields of this type, you may be able to accomplish this more easily from the Advanced Specifications Dialog.

- **Microsoft Excel**

  Select **Open…** from the **File** menu and select to import files of type Text Files". Then, select the exported data file. Excel will automatically convert the data into spreadsheet format.

- **TradingSolutions**

  For help with importing text files, see Importing Data from Text Files.

  Note: If you export TradingSolutions data and import it back into TradingSolutions, it will be imported as raw data. This means that it will load the values of any calculations or predictions, not the definitions.

Importing Data from Specific Sources

Importing Data from Specific Sources: Overview

TradingSolutions can import data from a wide variety of data sources and services. The following sections cover individual data sources in detail.

- Importing Data from eSignal
- Importing Data from IQFeed
- Importing Data from Prophet.net
- Importing Data from Quotes Plus
- Importing Data from Other Internet Sources
- Importing Data from Text Files
- Importing Data from MetaStock Files
- Importing Data from Other Programs

The following sections in other chapters also deal with importing data into TradingSolutions.

- The TradingSolutions Solution Service

Importing Data from eSignal

eSignal is an Internet-based service which provides market data to subscribers of their service.

TradingSolutions can download intraday, end-of-day, weekly, and monthly historical data over the Internet directly from eSignal. This allows you to keep all of the data in your portfolio up-to-date with the push of a few buttons.

TradingSolutions also supports importing real-time streaming intraday data over the Internet directly from eSignal. This allows you to get updated trading signals throughout the day while the market is open.

Configuring TradingSolutions to Use eSignal

eSignal is defined as a data source" in TradingSolutions. eSignal requires you to sign up for an account in order to access data from its service. This account has a username and password associated with it, which TradingSolutions must be made aware of in order to access data through your account.

You can sign up for an eSignal account on the web. Special pricing may be available for TradingSolutions users. To see what deals are available and/or sign up, please visit the Data Sources section of the TradingSolutions website or jump straight there from the Configure Data Sources Dialog.

For help signing up for and configuring data sources, see Configuring Data Sources.

Note: eSignal software will need to be downloaded and installed on your computer in order to use eSignal for streaming data. This software is available from the eSignal website.

Importing Data from eSignal

New data series can be imported from eSignal using the Import Data Wizard and selecting **Download new data from the Internet**. This will display the Select Data to Download page, where you can select eSignal as the data source.

Note: These options will not be available if the eSignal data source has not yet been configured.

For help importing historical data, see Importing Historical Data.

Existing data series can be updated from eSignal using the Import Data Wizard and selecting **Update data in the target group**. Individual data series are updated based on their currently selected data source. The data source for each data series can be viewed or modified from the Modify Data Series Dialog: Properties page. The data source for entire groups can be viewed or modified from the Modify Group Dialog: Properties page.

For help updating data, see Updating Data.

Streaming Intraday Data from eSignal

To stream intraday data from eSignal, it is recommended that you first download historical data for the symbol(s) you are interested in the periodicity or periodicities you would like to stream. This allows you to create any signals or other calculations before beginning streaming.

Once you have downloaded historical intraday data, turning on streaming will automatically update any intraday data which has not had the streaming option turned off.

For help with streaming updates, see Streaming Intraday Data.

Special Considerations with eSignal

Weekly and monthly data from eSignal is updated at the end of each day. On each day of the bar, the date and value of the current bar will be updated, resulting in new calculations based on these values. These calculated values should not be used until the bar is completed.

Importing Data from IQFeed

IQFeed is an Internet-based service which provides market data to subscribers of their service.

TradingSolutions can download intraday, end-of-day, weekly, and monthly historical data over the Internet directly from IQFeed. This allows you to keep all of the data in your portfolio up-to-date with the push of a few buttons.

TradingSolutions also supports importing real-time streaming intraday data over the Internet directly from IQFeed. This allows you to get updated trading signals throughout the day while the market is open.

Configuring TradingSolutions to Use IQFeed

IQFeed is defined as a data source" in TradingSolutions. IQFeed requires you to sign up for an account in order to access data from its service. This account has a username and password associated with it, which TradingSolutions must be made aware of in order to access data through your account.

You can sign up for an IQFeed account on the web. Special pricing may be available for TradingSolutions users. To see what deals are available and/or sign up, please visit the Data Sources section of the TradingSolutions website or jump straight there from the Configure Data Sources Dialog.

For help signing up for and configuring data sources, see Configuring Data Sources.

After you sign up for IQFeed, you will also need to download and install the IQFeed support software. This software is available from the TradingSolutions website on the IQFeed information page.

Note: IQFeed streaming data support requires your computer's clock to be periodically synchronized with a time server. In Windows XP, this default setting can be verified from the Control Panel, Date and Time, on the Internet Time tab. For previous Windows versions, external software can be downloaded to perform this synchronization.

Note: DTN.IQ customers who have migrated from the **Interquote** service may need to contact IQFeed to change their account type to support IQFeed. At the time of this writing, there is no charge for this conversion. However, legacy Interquote programs will no longer work with your account.

Importing Data from IQFeed

New data series can be imported from IQFeed using the Import Data Wizard and selecting **Download new data from the Internet**. This will display the Select Data to Download page, where you can select eSignal as the data source.

Note: These options will not be available if the IQFeed data source has not yet been configured.

For help importing historical data, see Importing Historical Data.

Existing data series can be updated from IQFeed using the Import Data Wizard and selecting **Update data in the target group**. Individual data series are updated based on their currently selected data source. The data source for each data series can be viewed or modified from the Modify Data Series Dialog: Properties page. The data source for entire groups can be viewed or modified from the Modify Group Dialog: Properties page.

For help updating data, see Updating Data.

Streaming Intraday Data from IQFeed

To stream intraday data from IQFeed, it is recommended that you first download historical data for the symbol(s) you are interested in the periodicity or periodicities you would like to stream. This allows you to create any signals or other calculations before beginning streaming.

Once you have downloaded historical intraday data, turning on streaming will automatically update any intraday data which has not had the streaming option turned off.

Note: The IQFeed server does not include seconds in the time associated with ticks. This will not affect the creation of bars. However, it will cause the tick time" display field value to appear without seconds.

For help with streaming updates, see Streaming Intraday Data.

Special Considerations with IQFeed

IQFeed streaming data support requires your computer's clock to be periodically synchronized with a time server. In Windows XP, this default setting can be verified from the Control Panel, Date and Time, on the Internet Time tab. For previous Windows versions, external software can be downloaded to perform this synchronization.

The IQFeed server does not include seconds in the time associated with ticks. This will not affect the creation of bars. However, it will cause the tick time" display field value to appear without seconds.

Windows 98 users may receive an error message indicating a socket error has occurred. If this happens, run Windows Update and install support for Internet Explorer 6. This should resolve the error. If it does not, please contact NeuroDimension technical support.

Importing Data from Prophet.net

Prophet.net is an Internet-based service which provides market data to subscribers of their service.

TradingSolutions can download end-of-day historical data over the Internet directly from Prophet.net (previously known as ProphetFinance.com). This allows you to keep all of the data in your portfolio up-to-date with the push of a few buttons.

Configuring TradingSolutions to Use Prophet.net

Prophet.net is defined as a data source" in TradingSolutions. Prophet.net requires you to sign up for an account in order to access data from its service. This account has a username and password associated with it, which TradingSolutions must be made aware of in order to access data through your account.

You can sign up for a Prophet.net account directly from within TradingSolutions. This is accessible from the Configure Data Sources Dialog.

Note: If you choose to sign up with Prophet.net over the phone, be sure to specify that you will be using your account with TradingSolutions; otherwise, TradingSolutions will not be able to log into their service.

For help signing up for and configuring data sources, see Configuring Data Sources.

Importing Data from Prophet.net

New data series can be imported from Prophet.net using the Import Data Wizard and selecting **Download new data from the Internet**. This will display the Select Data to Download page, where you can select Prophet.net as the data source.

Note: These options will not be available if the Prophet.net data source has not yet been configured.

For help importing historical data, see Importing Historical Data.

Existing data series can be updated from Prophet.net using the Import Data Wizard and selecting **Update data in the target group**. Individual data series are updated based on their currently selected data source. The data source for each data series can be viewed or modified from the Modify Data Series Dialog: Properties page. The data source for entire groups can be viewed or modified from the Modify Group Dialog: Properties page.

For help updating data, see Updating Data.

Special Considerations with Prophet.net

There are no special considerations for using the Prophet.net data source.

Importing Data from Quotes Plus

Quotes Plus is an Internet-based service which provides market data to subscribers of their service.

TradingSolutions can download end-of-day historical data over the Internet through Quotes Plus. This allows you to keep all of the data in your portfolio up-to-date with the push of a few buttons.

Configuring TradingSolutions to Use Quotes Plus

Quotes Plus is defined as a data source" in TradingSolutions. Quotes Plus requires you to sign up for an account in order to access data from its service. Although this account has a username and password associated with it, TradingSolutions does not access your account directly, so it does not need to be made aware of these values.

You can sign up for a Quotes Plus account on the web. Special pricing may be available for TradingSolutions users. To see what deals are available and/or sign up, please visit the Data Sources section of the TradingSolutions website or jump straight there from the Configure Data Sources Dialog.

For help signing up for and configuring data sources, see Configuring Data Sources.

Importing Data from Quotes Plus

New data series can be imported from Quotes Plus using the Import Data Wizard and selecting **Download new data from the Internet**. This will display the Select Data to Download page, where you can select Quotes Plus as the data source.

For help importing historical data, see Importing Historical Data.

Existing data series can be updated from Quotes Plus using the Import Data Wizard and selecting **Update data in the target group**. Individual data series are updated based on their currently selected data source. The data source for each data series can be viewed or modified from the Modify Data Series Dialog: Properties page. The data source for entire groups can be viewed or modified from the Modify Group Dialog: Properties page.

For help updating data, see Updating Data.

TradingSolutions does not contact Quotes Plus directly. Instead, it reads information from the database of stock information which Quotes Plus stores on your computer.

If TradingSolutions detects that the Quotes Plus database appears to be missing the most recent information for the data being downloaded, it will try to invoke the Quotes Plus Downloader to update the database with the most recent information. The Downloader may take several minutes to download information and verify all available information has been downloaded.

Special Considerations with Quotes Plus

There are no special considerations for using the Prophet.net data source.

Importing Data from Other Internet Sources

There are numerous sources of financial and economic information on the Internet. Many of these sources provide ways to save this data directly on your machine as text (CSV or ASCII) files. Once you have downloaded this data to your machine, you can import it using the Import Data Wizard by selecting **Import data from files on your computer**.

For help importing text files, see Importing Data from Text Files.

Locating Financial and Economic Data Sources on the Internet

There are many sources for financial and economic information on the Internet. Some are provided by government agencies. Others are provided by financial or general information sites as a service to their users. However, due to the dynamic nature of the Internet, this list of sources is constantly changing.

To assist you in locating useful financial and economic information, NeuroDimension (the makers of TradingSolutions) maintains an up-to-date list of information sources on the TradingSolutions web site, along with helpful hints for using this data in TradingSolutions. To visit this page directly from TradingSolutions, simply select **Locate Data on the Internet** from the **Help** menu while you are connected to the Internet.

Note: Any date-based data with a date column with month, day, and year in it can be used in TradingSolutions. This means that you can even use non-typical data in your financial predictions, such as astrological positions or daily temperatures.

Comparing Free Data to Built-in Data Sources

The primary difference between downloading data directly from data sources and using free data on the Internet is convenience. When downloading data from data sources, you can update your entire portfolio by pressing a few buttons. When downloading free data to files, there are many more steps involved. This can be a time-consuming process, especially if you want to examine your data on a daily basis.

Importing Data from Text Files

TradingSolutions can import a large variety of data saved to text files. The data can be separated with commas, tab characters, or other characters. It can have header information and column names. It can even have multiple securities in a single file.

For a step-by-step introduction to this topic, see the tutorial called Import Historical Data.

Importing Data from Text Files

New data series can be imported from text files using the Import Data Wizard and selecting **Import data from files on your computer**. This will display the Select Files page, where you can select which files to import.

For help importing historical data, see Importing Historical Data.

Existing data series can be updated from updated text files using the Import Data Wizard and selecting **Update data in the target group**. Individual data series are updated based on their currently selected data source, which can be set to the previously imported file. The data source for each data series can be viewed or modified from the Modify Data Series Dialog: Properties page. The data source for entire groups can be viewed or modified from the Modify Group Dialog: Properties page.

For help updating data, see Updating Data.

Text File Data Format

TradingSolutions is flexible enough to import most date-based financial data. However, there are some general formatting rules that do need to occur for a file to be imported.

- There can only have one date or date/time pair per line in the file.
- There cannot be information or blank lines between the lines of data.
- There cannot be any non-date information following the last line of data.

The following is an example of what valid data can look like. The number of columns has been reduced here for easier display.

```
Date, Close, Volume
11/19/01, 45.90, 53000
11/20/01, 46.76, 76000
11/21/01, 47.12, 23000
```

TradingSolutions can handle different date formats, separators, decimal points, and other settings. For each file it imports, it will automatically try to determine the best settings. To view or modify these settings, select **View text file import options for each file being imported** on the Import Data Wizard: Select Files page.

Importing Data from MetaStock Files

TradingSolutions can import end-of-day data directly from MetaStock data directories. This is done by selecting to import the Master file from the MetaStock data directory. You may then select individual ticker symbols from that directory to import.

Importing Data from MetaStock Files

New data series can be imported from MetaStock files using the Import Data Wizard and selecting **Import data from files on your computer**. This will display the Select Files page, where you can select which files to import.

Note: MetaStock data directories are selected by selecting the file named Master" in the data directory.

For help importing historical data, see Importing Historical Data.

Existing data series can be updated from updated MetaStock files using the Import Data Wizard and selecting **Update data in the target group**. Individual data series are updated based on their currently selected data source, which can be set to the previously imported file. The data source for each data series can be viewed or modified from the Modify Data Series Dialog: Properties page. The data source for entire groups can be viewed or modified from the Modify Group Dialog: Properties page.

For help updating data, see Updating Data.

Importing Data from Other Programs

Users of financial analysis programs other than MetaStock can share financial data with TradingSolutions by saving the data as text (CSV or ASCII) files. Once you have saved the data in this format, you can import it using the Import Data Wizard by selecting **Import data from files on your computer**.

For help importing text files, see Importing Data from Text Files.

Exporting Data from Microsoft Excel

To export data from Microsoft Excel into a comma-delimited text file, select **Save As…** from the **File** menu of Excel. Then, set **Save as type:** as CSV (Comma delimited) (*.csv)" and save the file, taking note of where it is located on your computer.

Note: It will be necessary to close the Excel spreadsheet prior to importing the data into TradingSolutions.

Note: TradingSolutions does not handle dollar signs ($), thousand-separating commas (,), percent signs (%), or parentheses ( )" while it is importing numeric fields. If the fields in the spreadsheet are formatted to contain these symbols, TradingSolutions may not be able to import the data.

Exporting Data from NeuroShell Trader

To export data from NeuroShell Trader into a comma-delimited text file, select **Export Chart/Data** from the **Tools** menu of the program. Select to export **Data Values** to a **File** and press **Next**. Press **Add Data Item(s)…** and select the data items (fields) you would like to export. Note that you can export the results of indicators and predictions if desired. After pressing **OK** to select the data items, press **Next**. Select either a **Comma separated ASCII file** or a **Tab separated ASCII file** and indicate a file name for the export data.

Note: Since NeuroShell Trader does not export a ticker symbol column, TradingSolutions will default to use the file name as the ticker symbol associated with the imported data. Therefore, it is a good idea to use the ticker symbol as the file name.

Managing Data with the Portfolio View

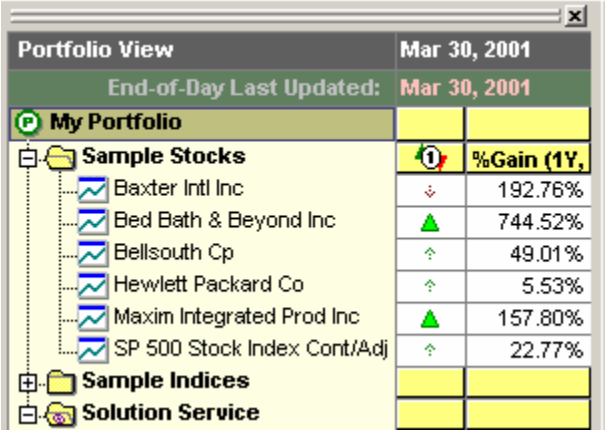
Managing Data with the Portfolio View: Overview

Data in TradingSolutions is managed primarily through the Portfolio View. From the Portfolio View, you can keep track of all of your historical data, assign that data into subgroups, and compare values and signals for data on any given day.

The following topics are covered in this section.

- The Portfolio View Window
- Grouping Data in your Portfolio
- Manipulating Data and Groups
- Using Display Fields

The Portfolio View Window



Understanding the Portfolio View

The Portfolio view is made up of several sections.

- **Docking Window Controls**

  The Portfolio View Window is a docking window. It can be attached to any inside edge of the TradingSolutions program window or it can be moved on top of the other views.

- **Portfolio View Header**

  The Portfolio View header displays the date that is currently being displayed in the display fields.

- **End-of-Day Last Updated Date**

  The Portfolio View header indicates the most recent end-of-day data that has been imported into the portfolio. The following colors are used to highlight this date:

Gray	Current To Display Date
Blue	Current To Previous Weekday
Pink	Older Than Previous Weekday

  Note: The evaluation version will mark everything as current until the Solution Service is updated.

- **Portfolio Tree**

  The Portfolio Tree displays all of the data this is currently in your portfolio. It allows you to cluster your data into groups and subgroups. A list of icons used in this section is listed below.

  Note: Data can be displayed by name or by symbol. To change this setting, see the Modify Options Dialog: General page.

- **Display Fields**

  Display fields can be used to display and compare calculations and entry/exit signals for the data in your portfolio. For more information about display fields, see Using Display Fields.

Portfolio View Icons

The following icons are used in the Portfolio Tree:

Portfolio Tree Icons	
	Portfolio (Main Group)
	Group (Subgroup)
	Solution Service Group
	End-of-Day Data

Weekly Data

Monthly Data

Dormant Intraday Data

Streaming Intraday Data

Note: The number in an intraday data icon indicates the size of the bars in minutes. A question mark will appear for bar sizes that will not divide into 60 minute intervals.

Hiding and Displaying the Portfolio View Window

By default, the Portfolio View Window will be displayed in the TradingSolutions program window. This is useful for immediately accessing your data from a central location at any time. However, when it is displayed, it takes away part of the space used for displaying data charts and spreadsheets.

Docked windows, such as the Portfolio View and Information View, can be hidden and redisplayed in unison using the **Toggle Docked Views** button in the toolbar or the **Toggle Docked Views** in the **View** menu.

The Portfolio View Window can be hidden and redisplayed by itself using the **Toggle Portfolio View** button in the toolbar or the **Display Portfolio View** in the **View** menu.

Moving the Portfolio View Window

By default, the Portfolio View window is docked on the left-hand side of the TradingSolutions window. This means that the Portfolio View is attached to the left-hand side of this window and will not cover any data windows.

To move the Portfolio View window to a new location, move the mouse to the window handle at the top of the Portfolio View window. When the window is docked, this handle is displayed as two gray lines. Once the mouse is positioned over the handle, you can drag the window to a new location by pressing the left mouse button down and moving the mouse. An outline of the new window position will be displayed while the mouse is being moved. When the desired location is reached, simply release the mouse button to end the dragging operation.

By default, if the Portfolio View window is being moved to a location near the edge the TradingSolutions window, it will dock itself on that edge. To move the window without docking, hold the Control key down while you are dragging the window.

Docking the Portfolio View window on the top or bottom edge of the TradingSolutions window is useful when you want to display many display fields at one time. Moving the Portfolio View window so that it is not docked is useful when you want to display several charts and spreadsheets, but also want to have access to the Portfolio View.

For more help with the Portfolio View, see Managing Data with the Portfolio View.

Grouping Data in your Portfolio

Data can be placed into groups in the Portfolio View in order to better organize and sort through large amounts of data. In addition, common operations can be assigned to all of the data in individual groups or the entire portfolio. This is useful for performing common analysis operations on specific data and enables you to fine-tune your analysis methods for data of specific types or data in specific financial sectors.

Any number of groups can be created in your portfolio. In addition, groups can contain multiple subgroups of their own. Data can appear in one or more groups anywhere in the portfolio.

Creating a New Data Group

To create a new group in a portfolio or group, select **Add New Subgroup…** from the context menu for the portfolio or group. This will display the Create Subgroup Dialog, where you can specify a name for the new subgroup.

Once a group has been created, data can be created or imported directly into the group. Data can also be moved or copied from another group in the new group by dragging it in the Portfolio View. For information on moving data, see Manipulating Data and Groups.

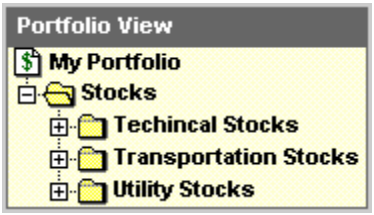
Determining How to Group Your Data

There is no best way group data in a portfolio. Begin by choosing a grouping that is most like the way you normally work with financial data. Then, modify the group structure over time to best fit the way you are currently using TradingSolutions.

Here are some examples of ways that data can be grouped.

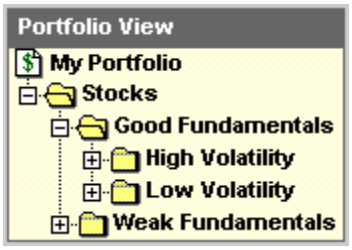
- **Grouping by Financial Sector**

  Financial data can be grouped with other data from the same financial sector. This is useful for comparing data from within a given sector. For example, stock data could be divided into subgroups of technical stocks, transportation stocks and utility stocks.



- **Grouping by Processing**

  Financial data can be grouped with other data that shares similar characteristics or has the same types of information available. This is useful since processing can be defined for entire groups. For example, stocks could be divided into those with good fundamentals and those with weak fundamentals and then further subdivided based on their volatility. This would allow you to define different processing for each of these different groups based on previous experiences.



- **Grouping by Interest Level**

  Financial data can be grouped based on your interest level in that data. This is useful for focusing your attention only on the data that is immediately relevant to your current actions. For example, stocks could be divided into groups that are being actively traded, hot prospects to be watched closely, and other stocks to look at occasionally.

These groupings are intended only as guidelines for effective portfolio management. They can be used alone or in combination. For example, a group containing hot prospects could be divided into different financial sectors, different processing groups, or both. In addition, data can be copied to multiple groups, so data could be processed in a group with similar characteristics and viewed as part of a group of hot prospects.

Feel free to experiment. Groups and data can be moved within a portfolio at any time. For information on moving data, see Manipulating Data and Groups.

For more help with the Portfolio View, see Managing Data with the Portfolio View.

Manipulating Data and Groups

Groups and data can be reorganized and renamed easily from the Portfolio View. Many operations can be performed directly in the portfolio tree using the mouse.

For help with using the mouse to drag objects, see Using Drag and Drop.

Moving Data between Groups

To move data from one group to another, use the mouse to drag the data to a new group. While the data is being dragged, the mouse pointer will display an arrow with a data sheet.

Moving Subgroups between Groups

To move a subgroup from one group to another, use the mouse to drag the subgroup to a new group. While the group is being dragged, the mouse pointer will display an arrow with an open group folder.

Note: To move a subgroup into the middle of a set of subgroups, use the right mouse button when dragging the subgroup. When the right mouse button is released, a context menu will be displayed allowing you to insert the subgroup into the selection location or inserting the subgroup after the selected location.

Copying Data to Multiple Groups

To copy data between multiple groups, use the right mouse button to drag the data to a new group. While the data is being dragged, the mouse pointer will display an arrow with a data sheet. When the right mouse button is released, a context menu will be displayed allowing you to select between moving the data or inserting a copy in the selected location.

Renaming Data and Groups

To rename a data series or group directly in the Portfolio View, select the object you would like to rename, then click again on its name. A cursor will appear in the name allowing you to change it using the keyboard. When you are finished editing the name, press the Enter key.

Removing Data and Groups

To remove a data series or group through the Portfolio View, select the object you would like to remove, then press the delete key. Your action will be confirmed and the object will be deleted.

Warning: Before you delete a subgroup, make sure that you no longer need any of the data series in it. After deleting a data series, you will not be able to get it back without using the steps you used to create it.

Note: If you are removing a data series that appears in multiple groups, only the copies will be removed. As long as the last copy of the data series is not being deleted, the actual data series will not be deleted.

For more help with the Portfolio View, see Managing Data with the Portfolio View.

Using Display Fields

The Portfolio View can be set up to display entry/exit signals and other fields using Display Fields. Any data field in any data series can be used as a display field.

Display fields are primarily used for displaying the current value of entry/exit signals and other information relevant for trading. For example, signal analysis fields can be used to display information about how an entry/exit signal has been trading. In addition, display fields can be sorted so that you can easily locate the best performers.

For a step-by-step introduction to this topic, see the tutorial called Modifying the Portfolio View.

Adding Display Fields to the Portfolio View

Display fields are assigned to portfolios or groups, allowing you to display information only where it is relevant. To display a field in the portfolio view, select **Modify Display Fields…** from the context menu for the portfolio or a subgroup that contains the field you want to display. This will display the Modify Group Dialog: Display Page, where you can define and manipulate the display fields associated with this group.

To add a display field for this group, select a field from the listing of available fields on this dialog and press the **Add to Display** button. When you exit from the Modify Group Dialog, the selected field or fields will be displayed in the Portfolio View.

Note: If you have added display fields, but do not see them in your Portfolio View, make sure the Portfolio View window is wide enough to display the added fields. The Portfolio View can be resized by dragging the edge of the window. In addition, the grid in the Portfolio View can also be resized.

Viewing Display Fields

All of the display fields in the Portfolio View display data for a single date at one time. This date is called the Display Date and is shown at the top of the Portfolio View over the display fields.

Note: If no display fields are currently being displayed, the display date will not be displayed.

The values displayed in the Portfolio View represent the last known value of a field in a data series. For example, when the closing price of a stock is displayed for a Sunday, the value being displayed is from the last day with data, which is typically the preceding Friday. This allows you to view weekly, monthly, and quarterly data along with current daily data.

Every data series in a group with a display field will attempt to display a value for the selected field. If that field hasn't been defined for a data series, the value n/a" will be displayed. In addition, if no data is available on or prior to the display date, the value n/a" will be displayed.

Display fields are highlighted when they need to be brought to your attention. The following colors are used:

- **Pink Background**

  A pink background is displayed when an entry/exit signal results in a change in position from the previous values of that signal. For example, an exit long after an enter long or an enter long after an enter short.

  Note: Signal highlighting does not take into account stops or limits in trading styles. Because of this, enter signals may not be highlighted when previous trades were stopped out or did not occur due to failure to reach a price limit.

- **Light Gray Background**

  A light gray background is displayed when data for a data series may be out-of-date". For end-of-day data, this means the last date in the data series is not equal to the last date in the portfolio. For intraday data, this means the data is not being streamed.

  Note: When displaying previous display dates in the Portfolio View, a gray background is used to indicate that the date associated with the currently displayed data occurs prior to the display date.

- **Dark Gray Background**

  59.09%

  A dark gray background is displayed when a signal analysis field with an adjusted date range is displayed for a date prior to the last date in the data series. These values should not be used. Fields of this type contain valid data only for the last date in the data series.

  Example: A signal analysis field with a one-year percent gain only contains the analysis for one year of data on the last date of the data series.

For an explanation of how entry/exit signals are displayed, see Analyzing Entry/Exit Signals.

Sorting Display Fields

Data that is displayed in a display field can be sorted in the Portfolio View for an entire subgroup. This is useful for comparing the values in multiple data series. To sort a display field in the Portfolio View, select **Sort Values Ascending** or **Sort Values Descending** from the context menu for the heading of the display field you would like to sort. To return to sorting the data series by their name, select **Sort Data Names** from the context menu for the subgroup.

Note: Data in multiple subgroups cannot be sorted together. However, you can achieve the same result by creating a new subgroup with copies of all of the data you would like to sort and sorting the copies.

Changing the Display Date

By default, the display fields will initially display the data for the last available date. Any display fields added after these initial fields will be displayed for this same date.

To adjust the display date, use the Portfolio menu or use the context menu from the display date. These menus provide options for viewing the next day, viewing the previous day, viewing today, and selecting a specific date and time. In addition, toolbar buttons are available with these items.

For help selecting a display date, see the help for the Select Portfolio View Display Date Dialog.

Once a new display date is selected, all of the display fields in the Portfolio View will update automatically to display the values for the new date.

For more help with the Portfolio View, see Managing Data with the Portfolio View.

Tracking Data with the Information View

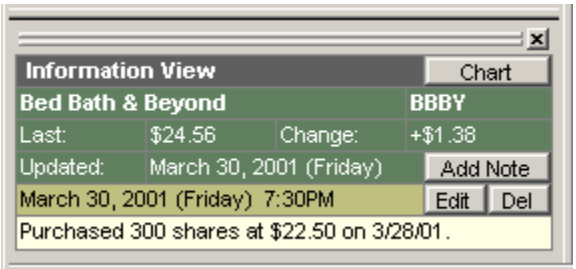
Tracking Data with the Information View: Overview

The Information View makes it easy to track the latest information about the group or data series currently selected in the Portfolio View.

The following topics are covered in this section.

- The Information View Window
- Keeping Notes with the Information View

The Information View Window



Understanding the Information View

The Information View window is made up several sections.

- **Docking Window Controls**

  The Information View Window is a docking window. It can be attached to any inside edge of the TradingSolutions program window or it can be moved on top of the other views.

- **Information Section**

  The information section contains several pieces of information for the group or data series currently selected in the Portfolio View.

  - **Selected Group or Data**

    The first line of the information section displays the name of the currently selected group or data series.

  - **Last Price and Change**

    If a data series is selected, the closing price for the last bar in the data series is displayed, along with the change from the previous close of the previous day.

    Note: For intraday data, the change and percent change is from the close of the last bar for data before the current day. It is not the change from the previous bar.

  - **Last Update**

    The last line of the information section displays the last date in the currently selected group or data series. If the data series in a selected group have multiple end dates, the words and earlier" are also displayed.

- **Chart Button**

  The **Chart** button displays the default chart for the selected data series. The information included on the default chart can be selected from the Modify Options Dialog: Charting page.

  Note: The **Chart** button is only available for data series.

- **Notes Section**

  The Information View allows you to store notes associated with individual groups and data series. In addition, the Solution Service uses the Notes Section to display commentary about the service and particular models.

  For more information about the notes section, see Keeping Notes with the Information View.

Hiding and Displaying the Information View Window

The Information View makes it easy to track the latest information about the group or data series currently selected in the Portfolio View. However, when it is displayed, it takes away part of the space used for displaying data charts and spreadsheets.

Docked windows, such as the Portfolio View and Information View can be hidden and redisplayed in unison using the **Toggle Docked Views** button in the toolbar or the **Toggle Docked Views** in the **View** menu.

The Information View Window can be hidden and redisplayed by itself using the **Toggle Information View** button in the toolbar or the **Display Information View** in the **View** menu.

Moving the Information View Window

By default, the Information View Window is docked on the left-hand side of the TradingSolutions window, beneath the Portfolio View. This means that this window is attached to the left of this window and will not cover any data windows.

To move this window to a new location, move the mouse to the window handle on the left edge of the window. When the window is docked, this handle is displayed as two gray lines. Once the mouse is positioned over the handle, you can drag the window to a new location by pressing the left mouse button down and moving the mouse. An outline of the new window position will be displayed while the mouse is being moved. When the desired location is reached, simply release the mouse button to end the dragging operation.

By default, if this window is being moved to a location near the edge the TradingSolutions window, it will dock itself on that edge. To move the window without docking, hold the Control key down while you are dragging the window.

For more help with the Information View, see Tracking Data with the Information View.

For more help with the Portfolio View, see Managing Data with the Portfolio View.

Keeping Notes with the Information View

The Information View allows you to store notes associated with individual groups and data series. In addition, the Solution Service uses the Notes Section to display commentary about the service and particular models.

Adding, Editing, and Deleting Notes

The Information View displays the information associated with the currently selected group or data series in the Portfolio View. Because of this, the notes kept in the Information View are associated with the currently selected group or data series.

To add a note for the current selection, press the **Add Note** button. This will add a new, empty note to the top of the notes section. It will also place the cursor in the empty note so that you can begin typing.

Note: See below for more information on entering notes.

To edit a note after you have entered it, press the **Edit** button on the heading for that note. Again, this will place the cursor in the note so that you can begin typing.

Note: Solution Service commentary can only be edited by NeuroDimension.

To delete a note you no longer want to see displayed, press the **Del** button on the heading for that note.

Note: Deleting a Solution Service commentary will cause that note to no longer be displayed, even if it is updated. However, later Solution Service commentaries for the selected group or data series will continue to be added.

For more information about the Solution Service, see The TradingSolutions Solution Service.

Entering Notes

After pressing the **Add Note** or **Edit** button, you will be able to modify the contents of a note. While entering notes, most keystrokes will be entered directly into the note.

The following keys have special meanings when entering notes:

- **Escape**

  The escape (**Esc**) key will undo any changes you have made to the note and exit from edit mode.

- **Enter**

  The **Enter** key will store any changes you have made to the note and exit from edit mode. To insert a carriage return into a note, hold down the **Shift** key while pressing Enter.

For more help with the Information View, see Tracking Data with the Information View.

Displaying Data in a Chart

Displaying Data in a Chart : Overview

Data visualization is typically done through a Chart View. From a Chart View, you can display charts of one or more data fields over any given period of time. Chart Views can be divided into sub-charts with different value scales and multiple Chart Views can be open at one time.

The following topics are covered in this section:

- Displaying Data in a Chart
- The Chart View Window
- Adjusting Chart Ranges
- Working with Sub-Charts
- Changing Field Properties
- Customizing Chart Options
- Saving and Restoring Charts

Displaying Data in a Chart

Data is displayed in a chart using a Chart View. One or more fields can be displayed in a Chart View, but at least one field must be selected when opening a new Chart View.

For a step-by-step introduction to this topic, see the tutorial called Displaying Charts.

Opening a New Chart View

There are several ways to open a new Chart View.

- **From the Menu and Toolbars**

  A new Chart View can be opened using the **Display Chart** button in the toolbar or **Display Chart** in the **View** menu. Selecting either of these items will display the Display Chart Dialog to allow you to select which fields to display.

- **From the Portfolio View**

  Any data series in the Portfolio View can be displayed in a chart using a context menu. Requesting a chart for a data series will display the Display Chart Dialog to allow you to select which fields to display. In addition, a chart for any Display Field for a data series can be displayed from the context menu for the displayed value.

- **From a Spreadsheet View**

  The fields currently being displayed in a spreadsheet can be displayed in a chart by selecting **Display Fields in Chart…** from the context menu for a spreadsheet.

- **From the Modify Field Dialog: Overview page**

  The values of a field can be displayed in a chart using the **Display in Chart** button on the Modify Field Dialog: Overview page.

From the Display Chart Dialog, you can select individual fields to display, or select to display a previous view.

Modifying the Current Chart View

Data fields from any data series can be added to an existing Chart View. To add modify the current Chart View, select **Add/Change Fields in Chart…** from the context menu for the legend or chart areas of the Chart View. This will display the Display Chart Dialog to allow you to modify the list of fields being displayed.

Adding a Moving Average to a Chart

There are two different ways to display moving average in a chart.

To quickly display a simple moving average of a field in the chart, select **Display Moving Average of this Field** from the context menu for a field in the chart and select the number of bars from the submenu. This will create an additional copy of the selected field and set the moving average value to the selected number of bars. However, this moving average will only be available in the chart.

To add a moving average of a field to your portfolio so that you can display it in a chart and use it elsewhere, select **Add/Change Fields in Chart…** from the context menu for the chart, and select **Create a New Field….** Then, use the Calculate a Value Wizard to create a moving average.

Displaying HLOC and Candlestick Charts

HLOC (High/Low/Open/Close) and Japanese Candlestick charts are types of composite fields. Composite fields can be included in any chart by selecting the appropriate entry in the field tree from under the **Composite Charts** type on the Display Fields in Chart Dialog.

Displaying Entry/Exit Signals in Charts

Entry/exit signals can be displayed in two different ways in charts. When they appear in a sub-chart after a non-signal, they are displayed as triangles, typically indicating the points at which actions would have been taken. When they appear in a sub-chart by themselves, they are displayed as a graph of the value of the signal.

For a description of these symbols and their underlying values, see How Signals Are Displayed.

By default, entry/exit signals in charts only display new actions. For example, if three enter long signals appear in a row, only the first will be displayed. Furthermore, an exit short signal that follows them would not be displayed since it does not result in a new action. The next signal that would be displayed would either be an exit long or an enter short.

To change the chart to display redundant signals, right-click on the name of the signal field in the chart legend and select **Change Display Properties of Field…** from the context menu. This will display the Change Display Properties Dialog, where you can set the **Display (with non-signal)** setting to **Display Redundant Signals**.

If multiple signals are displayed in a chart, different color arrows are used for each field. In addition, the signals are positioned a different distance from the underlying price information so that multiple signals on the same bar can be seen.

Charting Equity or Profit of an Entry/Exit Signal

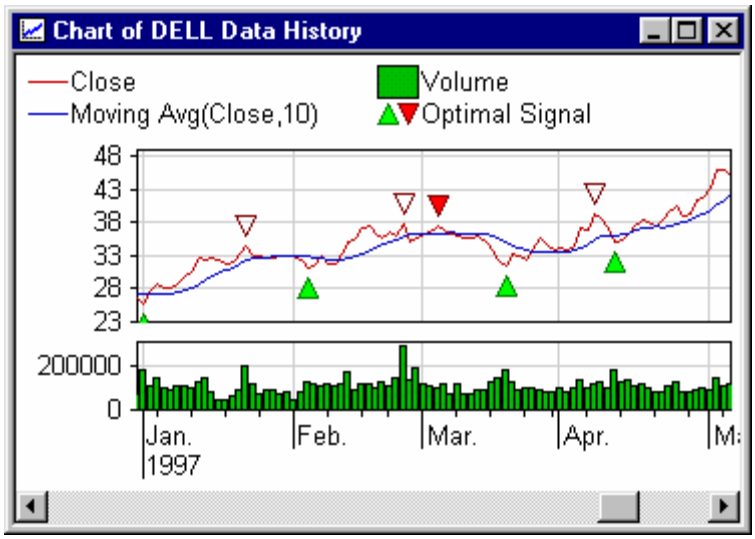
To display the equity or profit of the simulated trading of an entry/exit signal in a chart, create a signal analysis field to analyze the entry/exit signal. Then, select that field to be displayed in a chart as you would any other field.

For help generating this type of field, see Analyzing Entry/Exit Signals.

Displaying Data With Different Periodicities

For information about working with different periodicities, see Understanding Periodicity.

The Chart View Window



The Chart View window has the following features:

- **Chart View Title Bar**

  The title bar displays the name of the primary data series in the Chart View window. It also includes buttons for minimizing, maximizing, and closing the window.

  Note: If the Chart View is maximized, the information in the title bar will appear as part of the main title bar for TradingSolutions and the buttons will appear on the far right of the menu bar.

- **Legend Area**

  The legend area indicates which data fields are currently being displayed along with which line or symbol is being used to represent them. The legend area always appears at the top of the window.

- **Chart Area**

  The chart area is made up of one or more sub-charts. Each sub-chart has its own value axis (y-axis). All sub-charts share a common date axis (x-axis). In other words, all of the sub-charts in a Chart View display their data over the same date range.

- **Value Axes (y-axis)**

  The value axis (y-axis) of each sub-chart displays the range of values included in that sub-chart. By default, the range of values adjusts automatically to include all of the values in the current date range for the data fields in the sub-chart. It can also be set to a constant value range.

- **Date Axis (x-axis)**

  The date axis (x-axis) displays the range of dates currently being shown in the sub-charts. The date range can be changed to any range of dates for which there is data. The values used in the date axis adjust automatically to display as much detail about the date range as possible.

- **Horizontal Scroll Bar**

  The scroll bar at the bottom of the Chart View can be used to quickly move the date range while keeping the number of samples being displayed the same.

Obtaining the Value of a Field in the Chart

While the mouse is over the Chart View, the status bar at the bottom of the TradingSolutions window displays the value of the currently selected field in the sub-chart under the mouse. If no fields are currently selected, the first field in the sub-chart is displayed.

Note: All of the values associated with a composite field will be displayed on the status bar. For HLOC and Candlestick charts, the values are displayed in the order: High, Low, Open, Close. For high/low charts, the values are display in the order: High, Close, Low.

You can also obtain the value or any field in the chart by positioning the mouse over the point in the chart that you would like a value for. If the mouse is left stationary over a chart point for a few seconds, a tip window will be displayed with the value on that date. This tip window will disappear when the mouse is moved again or after a few seconds.

Note: If multiple chart fields occupy the requested chart point, the most recently added chart field will be displayed. To see the value for a different chart field, select the desired chart field in the legend area before getting the value.

Loading All Available Data

By default, the Chart Window loads only a subset of the data for display. This allows TradingSolutions to display the data more quickly. To load all of the available data into a chart, right-click on the date axis and select **Load Remaining Data** from the context menu. Alternatively, the amount of data to be loaded can be selected when the chart is first created.

For more help with the Chart View, see Displaying Data in a Chart.

Adjusting Chart Ranges

The date and value ranges of the Chart View can be adjusted using several different techniques. The key concept to remember when changing the date and value ranges is that each sub-chart has its own value range, but all sub-charts in a Chart View share a single date range.

Automatically Sizing a Value Range

By default, TradingSolutions automatically adjusts the value range of each sub-chart to include all of the values in the current date range. As the date range is adjusted, the minimum and maximum values on the y-axis will adjust to include only the values currently being displayed.

Note: There are some exceptions to this being the default. For example, when signals are charted in their own sub-chart, the value range defaults to a constant range from -1 to 1.

If you manually resize the value range or enter a constant value range, the auto-fit feature will be disabled. The feature can be manually toggled on and off using the context menu for the y-axis and selecting **Auto-Fit Value Range**.

To force the auto-fit range to include zero, use the context menu for the y-axis to select **Include Zero in the Auto-Fit Range**. This feature can be turned off by deselecting this same item from the context menu.

Note: If the value range includes values that are less than zero, the auto-fit value range will extend beyond zero to include the minimum value.

Including zero in the auto-fit range can also be toggled by double-clicking on the y-axis. If the auto-fit feature is not currently on, the first double-click will enable that feature.

Maintaining a Constant Value Range

A sub-chart can be set to maintain a constant value range, rather than automatically adjust to include all values. To turn off the auto-fit value range feature, deselect **Auto-Fit Value Range** from the context menu for the y-axis. This will leave the y-axis with the current value range.

To select a specific value range, use the context menu for the y-axis and select **Select Value Range…**. This will display the Select Value Range Dialog. This dialog will let you enter the minimum and maximum values to use for the value range.

You can also use the mouse to drag the value range. To do this, position the mouse over a value on the y-axis, then press and hold down the left mouse button. While holding down the left mouse button, move the mouse up or down to move the value. The value on the closest edge will automatically adjust so that the value under the mouse remains the same. During this operation, the mouse cursor will change to include an arrow that points at the edge that is being adjusted. When you are finished moving the value, release the mouse button.

Displaying Fields with Different Value Ranges

There are two ways to display fields with different value ranges. One way is to display the fields in different sub-charts. This method is typically selected to display price information with other information, such as volume. For more information on sub-charts, see Working with Sub-charts.

Another way to display fields with different value ranges is to place them in the same sub-chart, but to display them as the percent change from the first value being displayed. This allows you to visually compare the changes between two or more fields over a period of time.

When you add data from two different data series to a sub-chart, you will be prompted if you would like to display the values in this percent change format. You can also turn this option on and off from the context menu for the sub-chart of the fields in the sub-chart using by selecting **Display as Percent Change**.

Note: Turning on percent change charting will turn off logarithmic charting.

Displaying a Logarithmic Chart

Individual sub-charts can be set to display values using a logarithmic scale by selecting **Display in Logarithmic Scale** from the context menu for the sub-chart. This is useful for visually removing the effects of compounded gains from equity and price charts.

Note: Turning on logarithmic charting will turn off percent change charting.

Showing More or Less Data

By default, TradingSolutions will open a Chart View with the date range specified from the Modify Options Dialog: Charting page. The date range can be changed to a new range of dates quickly using the context menu for the x-axis and selecting to display a week, month, quarter, year, or other data range. The new range can be specified to begin from the point at which the menu was selected or end at the last available date.

The date range can also be adjusted to display a specific range of dates by selecting **Select Range…** from the context menu for the x-axis. This will display the Specify Range Dialog, which allows you to enter specific start and end dates.

You can also use the mouse to drag the date range. To do this, position the mouse over a date on the x-axis, then press and hold down the left mouse button. While holding down the left mouse button, move the mouse left or right to move the date. The date on the closest edge will automatically adjust so that the date under the mouse remains the same. During this operation, the mouse will change to include an arrow that points at the edge that is being adjusted. When you are finished moving the date, release the mouse button.

Zooming In on a Specific Date Range

The Chart View can be zoomed in to quickly enlarge a portion of the date range being displayed. To do this, position the mouse in the empty area of a sub-chart at the beginning of the region you would like to zoom. Then, press and hold down the left mouse button and move the mouse to the end of the region you would like to zoom. Releasing the mouse button will cause the Chart View to display only the selected region.

After adjusting the date range using any of the above methods, you can undo them one at a time using the context menu option to **Undo Last Scaling**.

For more help with the Chart View, see Displaying Data in a Chart.

Working with Sub-Charts

Fields displayed in a Chart View can be displayed in one or more sub-charts within the same window. Sub-charts let you display fields with different value ranges over the same date range. For example, price data and volume data could be displayed in a single Chart View using sub-charts. Sub-charts also let you separate fields visually so that you can analyze them in detail.

For a step-by-step introduction to this topic, see the tutorial called Displaying Charts.

Displaying a Field in a Sub-Chart

The quickest way to display a field in a sub-chart is to select **Display field in a new sub-chart** on the Display Chart Dialog while you are adding a new field to a chart. The new sub-chart will be denoted by a dashed line in the field list.

If you would like to move an existing chart field to a new sub-chart, select **Move Field to a New Sub-Chart** from the context menu for the field you would like to move. You can also drag chart fields to new or existing sub-charts using the mouse.

Displaying Signal Fields in Sub-Charts

Signal fields are displayed as value lines when they are displayed in their own sub-chart or in a sub-chart with other signals. This allows you to see the actual value of the field rather than just when it crosses threshold values. By default, the value range of a signal sub-chart is set to a constant range from -1 to 1.

Signal fields that are added to sub-charts with non-signal data in them are typically displayed as entry/exit arrows. By default, only the first of a series of redundant signals is displayed. For example, if several enter long signals appear in a row, an arrow will only be displayed for the first one. To display arrows for all signals, select **Change Display Properties of Field …** from the context menu for the signal field and select **Include redundant buy/sell arrows in display** on the Change Display Properties Dialog.

Note: In order for a signal field to recognize non-signal data, it must be added to the Chart View after that data.

Changing the Order of Sub-Charts

If you would like to change the order of the sub-charts in a Chart View, you can use drag and drop to move the sub-charts. Position the mouse to the left of the values in the y-axis or to the right of the sub-chart in the Chart View, then press and hold down the left mouse button. The mouse cursor should change to an arrow with a chart next to it. While holding the left mouse button, move the mouse up or down in the Chart View to adjust the order in which the sub-chart is displayed.

For more help with the Chart View, see Displaying Data in a Chart.

Changing Field Properties

Several defaults are used to display fields in charts. Chart field line colors are assigned using a color list. All fields are displayed as solid lines except volume, which is displayed as bars, and signals, which are displayed as entry/exit arrows. In addition, prediction fields are automatically shifted to display the values for when they are predicted.

To change the appearance and/or value properties of a chart field, select **Change Display Properties of Field…** from the context menu for the field. This will display the Change Display Properties Dialog. The pages on this dialog allow you to change the type and color of the chart field, along with providing the ability to shift or smooth displayed values.

For more help with the Chart View, see Displaying Data in a Chart.

Customizing Chart Options

Several of the defaults can be changed for the charts when they are being displayed. These defaults can be modified from the Modify Options Dialog: Charting page.

- **Initial Date Range for Charts**

  The initial date range to load and display in the Chart View can be adjusted for each periodicity of data.

- **Values to Display in Default Chart**

  The **Chart** button on the Information View displays the Default Chart. The values displayed in this chart can be selected from a list of values.

  For help with the Information View, see Tracking Data with the Information View.

- **Mouse Lines to Display on Charts**

  Horizontal and vertical lines can be displayed under the mouse while it is moving over the Chart View. These lines are also known as crosshairs. This is useful for visually comparing values across different dates or different sub-charts.

For more help with the Chart View, see Displaying Data in a Chart.

Saving and Restoring Charts

Charts and spreadsheets can be saved in TradingSolutions to be viewed later using a concept called Data Views". A data view allows you to take the current settings of a chart or spreadsheet and save it with a name so that you can open it later. In addition, the most recent chart and spreadsheet for each data series are automatically saved so that you can return to viewing them.

Restoring the Most Recent Chart

Each time you close a chart, it is automatically saved as the most recent view for that data series. When you select to view another chart for that data series, the Display Chart Dialog is displayed with the most recent view automatically selected. To open this view, press the **OK** button without making any additional changed. To open a different saved view, select it from the list of previous views. Or, to create a new view, choose **Select new fields to display** and select the desired fields.

You can also set TradingSolutions to automatically restore all of the previously open charts and spreadsheets from when you last closed TradingSolutions. This option is available on the Modify Options Dialog: General page. It is left off by default to allow TradingSolutions to open and close faster.

Saving and Restoring Charts

Individual charts can be saved with a name to be restored later. To do this, select **Save this Chart…** from the context menu for the chart. This will display the Save View Dialog, which will allow you to specify a name for your chart.

Note: You can update previously saved views by saving them with the same name.

To open the saved view, select it from the Display Chart Dialog and press **OK**. Saved views can be renamed or deleted by pressing the **Manage Views** button on this dialog. This will display the Modify Data Series Dialog: Data Views page.

For more help with the Chart View, see Displaying Data in a Chart.

Displaying Data in a Spreadsheet

Displaying Data in a Spreadsheet: Overview

The Spreadsheet View allows you to view and change the values in your data series using a familiar spreadsheet format. The Spreadsheet View can also be used to add new data directly or remove subsets of data.

The following topics are covered in this section:

- Displaying Data in a Spreadsheet
- The Spreadsheet View Window
- Changing the Spreadsheet Appearance
- Changing the Values in the Spreadsheet
- Saving and Restoring Spreadsheets

Displaying Data in a Spreadsheet

Data is displayed in a spreadsheet using a Spreadsheet View. All of the fields for a single data series are display in a Spreadsheet View.

For a step-by-step introduction to this topic, see the tutorial called Displaying Spreadsheets.

Opening a New Spreadsheet View

There are several ways to open a Spreadsheet View for a data series.

- **From the Menu and Toolbars**

  A new Spreadsheet View can be opened using the **Display Spreadsheet** button in the toolbar or **Display Spreadsheet** in the **View** menu. Selecting either of these items will display the Display Spreadsheet Dialog to allow you to select which fields to display.

- **From the Portfolio View**

  Any data series in the Portfolio View can be displayed in a spreadsheet using a context menu. Requesting a spreadsheet for a data series will display the Display Spreadsheet Dialog to allow you to select which fields to display. In addition, a spreadsheet for any Display Field in a data series can be displayed from the context menu for the displayed value.

- **From a Chart View**

  The values that are being graphed in a Chart View can be displayed in a spreadsheet using the context menu for any of the chart fields. Selecting this option will display the Display Spreadsheet Dialog with the fields currently in the chart pre-selected.

- **From the Modify Field Dialog: Overview page**

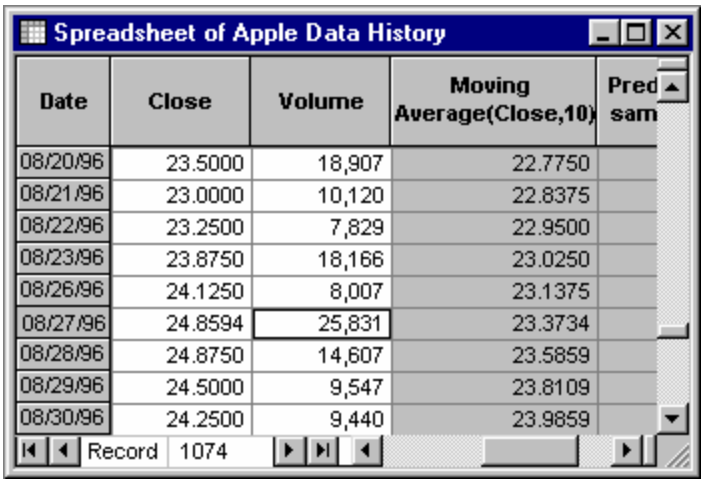
  The values of a field can be displayed in a spreadsheet using the **Display in Spreadsheet** button on the Modify Field Dialog: Overview page.

For more help with the Spreadsheet View, see Displaying Data in a Spreadsheet.

Displaying Data With Different Periodicities

For information about working with different periodicities, see Understanding Periodicity.

The Spreadsheet View Window



The Spreadsheet View window has the following features:

- **Spreadsheet View Title Bar**

  The title bar displays the name of the data series in the Spreadsheet View window. It also includes buttons for minimizing, maximizing, and closing the window.

  Note: If the Spreadsheet View is maximized, the information in the title bar will appear as part of the main title bar for TradingSolutions and the buttons will appear on the far right of the menu bar.

- **Date Column**

  The Date column always appears on the left side of the Spreadsheet View window. It displays the date associated with data and has its own context menu with options for inserting and removing dates.

- **Field Columns**

  The field columns display the data associated with the dates in the Date column. The context menu for the heading row includes options that let you manipulate the fields. The data in each column has different background colors depending on the source of the data:

Background	Meaning
White	Raw data that can be modified.
Gray	Calculated data or data from another data series.
Pink	Predicted data in the training set.
Green	Predicted data in the cross validation set.
Blue	Predicted data in the testing set.

- **Scroll Bars**

  The Spreadsheet View window has scroll bars that allow you to move quickly forward and backward through the dates, as well as left and right through the fields.

- **Splitter Bars**

  At the top of the vertical scroll bar and at the right of the horizontal scroll bar are splitter bars that allow you to divide the Spreadsheet View window into multiple sections so that you can view non-contiguous data or fields at the same time.

- **Record Controls**

  The bottom of the Spreadsheet View window includes record controls that display the record number of the current entry relative to the beginning of the data. These controls allow you to move quickly through the data or jump directly to a specific record number.

Loading All Available Data

By default, the Spreadsheet Window loads only a subset of the data for display. This allows TradingSolutions to display the data more quickly. To load all of the available data into a spreadsheet, right-click on the date column and select **Load Remaining Data** from the context menu. Alternatively, the amount of data to be loaded can be selected when the spreadsheet is first created.

For more help with the Spreadsheet View, see Displaying Data in a Spreadsheet.

Changing the Spreadsheet Appearance

The appearance of the Spreadsheet View can be changed in several ways to allow you to customize the way in which you view the data.

Changing the Fields in the Spreadsheet View

The fields displayed in the Spreadsheet View are selected by using the Display Spreadsheet Dialog. This dialog is displayed when you request to view a data series in a spreadsheet. This dialog can be displayed for an existing spreadsheet by selecting **Change Spreadsheet…** from the context menu of a field heading in the Spreadsheet View. From there, fields can be added or removed from the spreadsheet and current fields can be moved into any order.

Changing the Values Being Displayed in the Spreadsheet View

Typically, values displayed in the Spreadsheet View are the actual values of the fields being displayed. However, it is sometimes desirable to modify these values to view these values in different ways.

The shifting and smoothing of the values being displayed for individual fields can be modified by selecting **Change Field Properties…** from the context menu for that field. This will display the Change Display Properties Dialog. From there, you can select to display such values as the absolute value of the field, the moving average of the field, or the change in value of a field.

For help changing the actual values of a field, see Changing Values in the Spreadsheet.

Changing the Order of the Fields in the Spreadsheet View

The order of the fields being displayed in the Spreadsheet View is specified using the Display Spreadsheet Dialog. This dialog is displayed when you request to view a data series in a spreadsheet. This dialog can be displayed for an existing spreadsheet by selecting **Change Spreadsheet…** from the context menu of a field heading in the Spreadsheet View. From there, fields can be added or removed from the spreadsheet and current fields can be moved into any order.

Changing the Format of Numbers

TradingSolutions automatically selects a default format for all fields in the Spreadsheet View. This format specifies how many decimal places to display, along with how to display negative values and whether to display special symbols. Different formats can be selected for individual non-signal fields by selecting **Modify Field…** from the context menu for the field name and selecting a different format on the Modify Field Dialog: Name page. In addition, new field formats can be created using the Define Field Formats Dialog.

Sorting Data in the Spreadsheet View

The data in the Spreadsheet View can be sorted based on the values in any field. By default, the data is sorted based on the date field. To sort the data based on another field, select **Sort Ascending** or **Sort Descending** from the context menu for the field you would like sorted. You can also sort the data based on a field by double-clicking on the heading of that field.

Resizing Columns to Different Widths

By default, TradingSolutions sizes the field columns so that the values in the columns are completely visible. To make a field column a different width, you can use the mouse to resize the column. Simply position the mouse over the right edge of the heading for that column, then press and hold the left mouse button. Moving the mouse left or right will change the width of that column until the mouse button is released.

Note: It is possible to resize a column until it is no longer displayed. If this occurs and you are not able to restore the column, simply close the Spreadsheet View window and open a new Spreadsheet View for that data series.

You can also restore a field column to its default width by double-clicking on the right edge of the heading for that column.

Using a Larger or Smaller Font

Sometimes, it may be desirable to make the font used in the Spreadsheet View larger or smaller, whether it is to fit more information in the window or to make the values easier to read. To do this, select the zooming options from the context menu for the Date in the header row.

Note: If you have a mouse with a wheel control, such as a Microsoft Intellimouse, you may also be able to zoom in and out by holding down the **Ctrl** key and moving the mouse wheel. However, this feature may not be available for all systems.

For more help with the Spreadsheet View, see Displaying Data in a Spreadsheet.

Changing Values in the Spreadsheet

Values in fields that have been imported or are manual entry fields can be modified directly in the Spreadsheet View. Cells of fields that can be modified have a white background to clearly distinguish them from fields that cannot be modified.

Modifying Values in the Spreadsheet

To modify a single value, simply click on the cell containing the value and type in a new value. You can also use copy, cut, and paste to edit these values. If this is the first change to the values in this Spreadsheet View, TradingSolutions will confirm that you want to modify the values in the spreadsheet. After pressing enter or moving to a new cell, any calculated values affected by the new entry will be recalculated automatically.

Note: Values can be entered as decimal numbers or fractional numbers, regardless of the current display format.

Using copy, cut, and paste, it is also possible to copy the values from entire dates, fields, or sections. The only requirement when doing this is that the region being pasted to must be the same size as the region that was copied.

Adding New Dates

To add new dates to the spreadsheet, select **Insert New Dates…** from the context menu for the date field. This will display the Insert Date Range Dialog, which allows you insert new dates at the beginning, middle, or end of the data series. Once the dates are added, you can enter the values for them directly into the spreadsheet.

Note: If you will be importing the values for these new dates from a file, you do not need to perform this step. Data that is being imported automatically creates any needed new date records in the data series.

Removing Dates

One or more rows of data can be removed from the data series by selecting them in the Spreadsheet View and selecting **Remove Data** from the context menu for a date in the selected region. This will display the Remove Date Range Dialog, which allows you to remove a range of dates.

For more help with the Spreadsheet View, see Displaying Data in a Spreadsheet.

Saving and Restoring Spreadsheets

Charts and spreadsheets can be saved in TradingSolutions to be viewed later using a concept called Data Views". A data view allows you to take the current settings of a chart or spreadsheet and save it with a name so that you can open it later. In addition, the most recent chart and spreadsheet for each data series are automatically saved so that you can return to viewing them.

Restoring the Most Recent Spreadsheet

Each time you close a spreadsheet, it is automatically saved as the most recent view for that data series. When you select to view another spreadsheet for that data series, the Display Spreadsheet Dialog is displayed with the most recent view automatically selected. To open this view, press the **OK** button without making any additional changed. To open a different saved view, select it from the list of previous views. Or, to create a new view, choose **Select new fields to display** and select the desired fields.

You can also set TradingSolutions to automatically restore all of the previously open charts and spreadsheets from when you last closed TradingSolutions. This option is available on the Modify Options Dialog: General page. It is left off by default to allow TradingSolutions to open and close faster.

Saving and Restoring Spreadsheets

Individual spreadsheets can be saved with a name to be restored later. To do this, select **Save this Spreadsheet…** from the context menu for the chart. This will display the Save View Dialog, which will allow you to specify a name for your chart.

Note: You can update previously saved views by saving them with the same name.

To open the saved view, select it from the Display Spreadsheet Dialog and press **OK**. Saved views can be renamed or deleted by pressing the **Manage Views** button on this dialog. This will display the Modify Data Series Dialog: Data Views page.

For more help with the Spreadsheet View, see Displaying Data in a Spreadsheet.

Working with Messages and Alerts

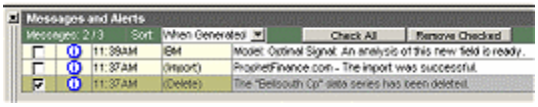
Working with Messages and Alerts: Overview

Messages and alerts are displayed in the Messages and Alerts Window. Informational and warning messages are displayed as feedback from the operations you perform in TradingSolutions. Alert messages are generated when conditions occur that you specify through the creating of alerts.

The following topics are covered in this section:

- The Messages and Alerts Window
- Using Alerts to Highlight Events
- Writing Your Own Alert Definitions
- Help for Specific Messages

The Messages and Alerts Window



The Messages and Alerts Window displays a list of the most recent messages that have been generated by TradingSolutions. These messages indicate information that may be helpful when using TradingSolutions.

You can view this window as a to-do list of things to look into along the way. When you are finished with a message, simply click on its check box. After you are done with several messages, you can remove all of the checked messages by pressing the **Remove Checked** button.

For help with individual messages, see Help for Specific Messages.

Note: The Messages and Alerts Window typically appears in the lower left corner of the TradingSolutions display. If it is not currently visible, you may have hidden it. See Hiding and Displaying…" below for information about redisplaying it.

Understanding the Messages and Alerts Window

This window is made up of several sections. The green header section contains the following controls and information:

- **Message Counter**

  These numbers indicate the number of unchecked messages currently in the list and the total number of messages currently in the list.

  Example: **Messages: 2 / 3** indicates there are two unchecked messages requiring attention and a total of three messages in the list.

- **Sort Control**

  The Sort combo box allows you to select how the messages are sorted. By default, they are kept in the order they are generated. When any other type of sorting is used, duplicate values are sorted in the order the messages were issued.

  - **When Generated**

    Display messages in the order that they were issued.

  - **When Dated**

    Sort messages by the date associated with them. In most cases, this is the same as the generation order. However, alerts display the date for which they were generated.

  - **Not Checked**

    Display unchecked messages before checked messages.

  - **Message Source**

    Sort messages by the text in the Message Source column.

  - **Message Type**

    Sort messages so that the icons in the Message Icon column are grouped together.

  - **Message Text**

    Sort messages by the text in the Message Text column.

- **Check All**

  This button allows you to check all of the unchecked messages in this window.

- **Remove Checked**

  This button allows you to remove all checked messages from this window once you are done with them.

Each message has the following controls and information.

- **Checkbox**

  The checkbox allows you to indicate when you are finished with a message. Checking a message will darken the message to indicate it has been handled. In addition, you can remove all checked messages by pressing the **Remove Checked** button.

- **Icon**

  The icon indicates the severity of the message.

  Information (Low Importance)

  Warning (Medium Importance)

  Error (High Importance)

  Alert (User Defined)

  Delayed Alert

- **Time / Date**

  The time and date associated with a message is displayed here. In most cases, this is the time the message was issued. However, alerts display the date for which they were generated.

  Note: The date associated with alerts is the date and time on the data, which is in the exchange time of the data. This allows you to correlate new and previous alerts with the data in charts and spreadsheets.

  Note: Messages for today display the time only. Messages for previous days display the date. The time for these messages can be displayed by positioning the mouse over the date.

- **Source**

  This is the data series, group, or TradingSolutions section that is responsible for generating this message.

- **Text**

  This is the text of the message or alert.

  For help with individual messages, see Help for Specific Messages.

Additional Commands on the Messages and Alerts Window

In addition to checking and unchecking messages, you can also interact with them by double-clicking on them or right-clicking on them and selecting from a context menu.

- **Perform Action for Message…**

  This menu selection performs a common action associated with the message if one is available.

  Example: The action for messages indicating a new analysis is available for a field is to display that analysis.

- **Copy Message To Clipboard**

  This menu selection copies the message text and other information to the Windows clipboard. You can then paste this information as text into documents such as e-mail messages. This is useful if it is necessary to report an error to technical support.

- **Export Messages to a File…**

This menu selection writes all of the unchecked messages to a file. This is useful if it is necessary to report multiple errors to technical support. In this case, simply attach the exported message file to an e-mail message.

- **Double-Click on Message Text**

  Double-clicking on the Message Text performs the same action as selecting Perform Action for Message…" described above.

- **Double-Click on Message Source**

  Double-clicking on the Message Source performs common actions for message sources if one is available.

  Example: The source action for messages indicating a new analysis is available for a field is to display a list of all analyses available for the data series.

Hiding and Displaying the Messages and Alerts Window

By default, the Messages and Alerts Window will be displayed in the TradingSolutions program window. This is useful for immediately seeing all of the messages that may require attention. However, when it is displayed, it takes away part of the space used for displaying data charts and spreadsheets.

Docked windows, such as the Portfolio View and the Messages and Alerts Window, can be hidden and redisplayed in unison using the **Toggle Docked Views** button in the toolbar or the **Toggle Docked Views** in the **View** menu.

The Messages and Alerts Window can be hidden and redisplayed by itself using the **Toggle Messages and Alerts Window** button in the toolbar or the **Display Messages and Alerts Window** in the **View** menu.

Moving the Messages and Alerts Window

By default, the Messages and Alerts Window is docked on the lower left side of the TradingSolutions window. This means that this window is attached to the bottom of this window and will not cover any data windows.

To move this window to a new location, move the mouse to the window handle on the left edge of the window. When the window is docked, this handle is displayed as two gray lines. Once the mouse is positioned over the handle, you can drag the window to a new location by pressing the left mouse button down and moving the mouse. An outline of the new window position will be displayed while the mouse is being moved. When the desired location is reached, simply release the mouse button to end the dragging operation.

By default, if this window is being moved to a location near the edge the TradingSolutions window, it will dock itself on that edge. To move the window without docking, hold the Control key down while you are dragging the window.

For more help with messages and alerts, see Working with Messages and Alerts.

Using Alerts to Highlight Events

Note: Alerts are only available in the real time version of TradingSolutions. Alert definitions and alert fields can be created in other versions, but they will not issue messages when the condition is met.

Alerts can be used to generate a message in the Messages and Alerts window each time an event occurs. Here are several examples of when alerts can be used:

- When an entry/exit signal indicates to take a new position.
- When a price or indicator crosses a specified value.
- When the volume or another value is above a specified value.

Alerts are similar to functions and entry/exit systems. They are defined using formulas in a definition. This definition can then be used to generate any number of alerts in data series or entire groups.

Like functions and entry/exit systems, alerts are assigned to data series or groups by creating new fields. However, unlike functions and entry/exit systems, the value of the individual alert fields is typically not used directly. Instead, the value simply indicates when to generate the message associated with this alert. Anytime the value of the alert is not zero, a message will be generated.

TradingSolutions includes several common alert definitions that can be used as soon as TradingSolutions is started. Additional alerts can be easily defined. See Writing Your Own Alert Definitions for more information.

Creating a New Alert Field

To create a new alert field, open the Create a Field Wizard and select to create a new field to **Generate an alert**. This will begin the Generate an Alert Wizard.

The Generate an Alert Wizard begins with the Select Function page, which allows you to select which function to use for calculating the value. The functions are broken into groups of functions that have different purposes. For example, there are function groups for statistical functions, trigonometric functions, and different types of financial indicators. A brief description of each function group and function is displayed when they are selected, helping you to understand what the selection includes.

The wizard continues with the Select Inputs page, which allows you to select which inputs to provide to the selected alert definition. Inputs to functions are typically data fields from the data series to which the field is being added; however, they can also be numbers (constant values) or data fields from other data series in the portfolio.

Note: If a data field is selected from a data series that does not have the same dates or periodicity as the target data series, TradingSolutions will use the last known value as the input. For example, if quarterly data is used for a calculation in a daily data series, the value from the preceding quarter will be used until a new quarter is reached. This holding of values can also be seen when charting values from different data series.

The final page of the Generate an Alert Wizard is the Select Name page. TradingSolutions provides several suggestions for names for the new field based on the definition and inputs selected. Any of these names can be used directly from the combo box, or you can enter your own. The name of a field should be something meaningful so that you know what the values in the field are without having to see how they are calculated.

For more help generating alerts, see the help for the Generate an Alert Wizard.

Working with Alerts

After you create an alert field, it will be calculated the same as a function or entry/exit system field. In other words, alerts have values just like functions. Because of this, alerts can be verified in charts and spreadsheets while they are being developed. When all of the conditions of an alert are true, the value is non-zero; otherwise, it is zero.

When new data is imported or streamed into TradingSolutions, any newly imported data that causes the alert conditions to be true will generate a message in the Messages and Alerts Window.

If the most recent bar has a true alert, the text associated with the alert definition will be displayed. If previous bars are also imported or updated, the message will still be generated, but the message will indicate Delayed Alert" and the icon will be gray. The sound associated with delayed alerts is also different.

Note: If more than two delayed alerts are generated by one field due to the same data update, a single message will be issued indicating how many delayed alerts were generated by the updated data. In addition, the most recent delayed alert will be displayed.

Note: If TradingSolutions needs to recalculate an alert field from the beginning following an update, a message will be issued indicating how many delayed alerts were generated over the entire date range.

The dates associated with alerts and delayed alerts are related to the data that generated them. Because of this, these dates are for the exchange time of the data. This is different from most other messages which use the time on your computer.

For more help with messages and alerts, see Working with Messages and Alerts.

Writing Your Own Alert Definitions

TradingSolutions comes with many built-in alert definitions for you to use. However, there may be many situations in which you want to write your own alert definitions. Creating your own alert definitions is simply a matter of entering the conditions to check for, as well as the message to issue when those conditions are true.

Creating a New Alert Definition

To begin creating a new alert definition, use the **Define Alert Definitions** button in the toolbar or select **Define Alert Definitions…** from the **Processing** menu. Either of these options will display the Define Alert Definitions Dialog, from which you can view existing alert definitions and create new ones. From this dialog, select the **New…** button beneath the list of systems. This will display the Create an Alert Definition Wizard.

Tip: TradingSolutions uses groups to separate alert definitions and make them easier to find. When creating a new alert definition, try to place it in an appropriate group to make it easier to find later. This can either be an existing group or a new group that you use just for your own alerts.

The Create an Alert Definition Wizard begins with the Basic Information page. This page allows you to enter the name and description of the new alert definition, as well as assign it to a group.

Tip: Try to name your alert definitions something that will help you to remember what they do. Using a name like Alert when Position Changes" will probably be more useful than a name like Dan's First Alert" when you go back to use it.

The next page in this wizard is the Enter Rules page. This is the page where you actually enter the rules for your new alert definition using combinations of function definitions. Rules are the conditions to check to determine when to issue an alert message. This can be a fairly complex process to get used to, but after writing a few alerts or functions, it should become a very intuitive process.

For help entering formulas in general, see Formula Entry.

After entering the rules, the next page of this wizard is the Enter Message page. This is the page where you enter the message that is displayed when the conditions specified in the rules are true. This message can be defined to include the values being tested.

The final pages of the Create an Alert Definition Wizard are the Verify Inputs page and, optionally, the Enter Notes page. These pages allow you to verify the order and types of inputs that you will specify when you want to use it. In addition, you can specify any notes about using the alert definition at this time.

For more help creating alert definitions, see the help for the Create an Alert Definition Wizard.

Modifying an Existing Alert Definition

There are two ways to modify an existing alert definition. The easiest way is to actually modify the definition itself. To modify a definition directly, simply select the alert definition you would like to modify on the Define Alert Definitions Dialog and press **Edit…**. This will display the Modify Alert Definition Dialog, where you can modify the name, rules, message, input order, or descriptions.

Note: Alert definitions that are provided with TradingSolutions are protected from changes. Instead of modifying these directly, you should make a copy and modify the copy.

If you would like to modify an existing alert definition without changing the original, you can create a copy of the definition and modify it to suit your needs. For example, if a provided alert definition uses one type of moving average and you would like to use another type, you can copy the alert definition and replace the type of moving average that is being used.

To copy an alert definition, begin by creating a new one. As described above, this is done from the Define Alert Definitions Dialog by pressing the **New…** button beneath the list of alert definitions. Then, from the Create an Alert Definition Wizard: Basic Information page, press the **Copy another Alert Definition…** button. This will display the Copy Alert Definition Dialog, where you can select which definition to copy.

Once you select an alert definition to copy, your new definition will have copies of the rules, message, descriptions, and notes ready for you to modify. Simply continue through the Create an Alert Definition Wizard as you would when creating a new alert definition.

For more help with messages and alerts, see Working with Messages and Alerts.

For help distributing your alert definitions, see Sharing Your Functions with Other Users.

Help for Specific Messages

Help for Specific Messages

When a message appears in the Messages and Alerts Window, it is accompanied by an icon that indicates the type of message that it is. The help for these messages is divided into sections for these icons.

	Information Messages
	Warning Messages
	Error Messages
	Alerts

Help for Information Messages

Messages in this section are sorted based on the item in TradingSolutions that issued the message. General messages are listed first, followed by messages about specific groups, data, or fields.

(Compact) Messages

- **Compacting the portfolio files will reclaim unused disk space.**

  During normal TradingSolutions usage, the portfolio database system can develop empty spaces from deleted and moved information. These spaces can lead to larger portfolio files and reduced performance. Compacting the portfolio files when you receive this message can improve performance and restore unused disk space.

  Action: Double-clicking on this message will allow you to compact the portfolio files.

(Delete) Messages

- **The *name"* data series has been deleted.**

  This message indicates that the data series listed in the message has been deleted from this portfolio along with any fields associated with it. It should only appear in response to you requesting to delete this data series.

- **The *name*" group has been deleted.**

  This message indicates that the group listed in the message has been deleted from this portfolio along with any data series and fields associated with it. It should only appear in response to you requesting to delete this group.

(Import) Messages

- ***Data source* – Import cancelled.**

  This portion of the import was cancelled.

- ***Data source* – Import successful.**

  All of the selected data was imported successfully for this portion of the import.

- ***Data source* – The remainder of the import was successful.**

  All of the selected data was imported successfully for this portion of the import, with the exception of any problems reported in other messages.

- **Data streaming stopped due to processing shutdown.**

  Data streaming is being stopped automatically due to processing shutting down due to TradingSolutions closing, changing work directories, or another action.

- **Import separated into multiple tasks.**

  When a large number of symbols are being imported from files, the importing of those symbols is divided into two or more tasks. These tasks will display individual Status Dialogs and issue individual messages on completion.

- **Large import from Prophet separated into multiple requests.**

  ProphetFinance.com has a maximum amount of data that can be requested at one time. If a large number of symbols are requested at one time, the request is separated into multiple requests automatically.

- **No current data series are marked for streaming. Streaming has been stopped.**

  Data streaming is being stopped automatically since any data series that had been marked for streaming have been deleted or had streaming turned off.

- **No new data is available.**

  No new data was available for the selected symbols. Typically, this message is displayed when an update was requested and all of the selected data was already up-to-date.

Note: End-of-day data may not be available for the current day until after 5:30pm Eastern Time or later. In addition, no new end-of-day data is available on weekends or holidays when the financial markets are closed.

- **No new data was available for: *symbols***

  No new data was available for the specified symbols, but other symbols may have been updated.

- **Streaming started. Data for streaming symbols since the last update will be imported automatically.**

  After streaming is started in TradingSolutions, data for streaming symbols since the last update will be imported automatically using a gap fill". A message will be displayed when all of the data is up-to-date.

  Note: It is valid to trade using signals generated during this period. However, alerts and signals may be delayed more than when they are updated directly from streaming data.

  For more information on the processing of streaming data, see Streaming Intraday Data.

- **The exchange *exchange name*" is currently closed. New streaming bars will not be available until this exchange returns to being open.**

  This message appears when you start symbols streaming that are set to use an exchange which currently appears to be after the closing time or before the opening time. New data will begin streaming again after the exchange returns to being open.

  Action: If this message appears to be in error, check the following:

  - **Check the exchange associated with the data.**

    Each data series has an exchange is associated with. The exchange includes settings for the opening and closing times, along with the time zone the exchange is in. The exchange associated with a data series is displayed on the Modify Data Series Dialog: Properties page.

  - **Check the settings for the selected exchange.**

    Each exchange includes settings for opening and closing times, along with the time zone the exchange is in. If you are using an exchange you have defined, verify that these settings are correct for that exchange by viewing the Specify Exchange Characteristics Dialog.

  - **Check the clock and time zone settings on your computer.**

    TradingSolutions uses the clock and time zone settings in Windows to determine whether the exchange is open. Verify these values are correct by double-clicking on the clock in the lower right corner of your Windows screen.

- **The exchange *exchange name*" is now closed. New streaming bars will not be available until this exchange returns to being open.**

  This message appears when you are streaming symbols streaming that are set to use an exchange which is now after its closing time. New data will begin streaming again after the exchange returns to being open.

  Action: If this message appears to be in error, see the actions suggested for the message above.

- **The exchange *exchange name*" is now open. New streaming bars are now being created.**

  This message appears when you are streaming symbols streaming that are set to use an exchange which is now after its opening time. New bars will be added to the data series as they become available.

  Action: If this message appears to be in error, see the actions suggested for the message above.

- **The Solution Service is being updated to obtain data for stocks with Solution Service listed as their data source.**

  This message appears when an update is requested from the Import Data Wizard and one or more of the stocks in the target group list the Solution Service as their data source. This will cause all of the stocks in the Solution Service to be updated. This may also cause two status windows to display simultaneously.

(Processing) Messages

- **Alerts and display fields for streaming data are now up-to-date.**

This message indicates that alerts and display fields associated with streaming data are now up to date. It appears once the data for the most recent bar of all streaming data has been received and any alerts and display fields dependent on that data have been calculated.

For more information on the processing of streaming data, see Streaming Intraday Data.

- **Processing *n* fields took *time*.**

  This message indicates the amount of time it took to process a large number of fields.

  Note: This message appears only if continuous processing took longer than 5 minutes.

  Note: Different activities take different amounts of time to process. For example, the initial training of a field can take significantly longer than processing it for an update. This message is primarily displayed as a visual confirmation that processing has completed.

- **Processing of alerts and display fields for streaming *n*-minute bars averaging *time*.**

  This message appears as a warning that too many symbols may be being streamed or too much high-priority processing may be being performed on streaming data.

  Action: If this message continues to appear, you may want to reduce the number of symbols being streamed, the number of alerts being calculated, or the number of calculated display fields associated with streaming data of this or a shorter periodicity.

  Note: This message is displayed if the processing of alerts and calculated display fields takes longer than half of the periodicity.

  For more information on handling this message, see Streaming Intraday Data.

- **Processing of all fields is now up-to-date.**

  This message indicates that a large number of fields have been updated. It is displayed instead of the *n*-fields too *time*" message if streaming data may have resulted in fields being recalculated multiple times. It is primarily to inform you that all processing associated with the initial gap fill has completed.

  Note: This message appears only if continuous processing took longer than 5 minutes.

(Service) Messages

- ***Data"* data series added to the Solution Service.**

  This message appears when this symbol is added to the Active Solutions group.

- ***Data"* data series removed from the Solution Service.**

  This message appears when this symbol has been removed from the Active Solutions group. The data series will be moved to the Previous Solutions group and no longer be updated through the Solution Service.

- ***Data"* data series completely updated by the Solution Service.**

  This message appears when all of the data for a stock has been updated. This will occur when a stock is added to the Solution Service or when the Solution Service has not been updated in over two weeks. This can also occur after a stock split causes previous price data to be adjusted or when the Solution Service data includes a value correction.

- ***Data"* notes updated with new information from the Solution Service.**

  This message appears when new notes are added for this symbol, or when previous notes are updated.

  Action: Double-click on this message to view the most recent note for this data series. Any previous notes can be viewed in the Information View.

  For help with the Information View, see Tracking Data with the Information View.

- ***Data"* Service Signal updated by the Solution Service.**

  This message appears when the Solution Service applies a new trading solution to this data series. This will typically result in a new Service Signal being set.

  Action: Double-click on this message to view the entry/exit signals for this data series. From here, you can view an analysis of the new Service Signal.

For more information on the Service Signal, see Primary, Secondary, and Service Signals.

- **The Solution Service information is currently up-to-date.**

  This message appears when no new information has been added to the Solution Service since the last time it was updated.

- **The update completed successfully.**

  This message appears when the data for the Solution Service has been updated successfully and there were no additional messages generated.

- **The update was cancelled.**

  This message appears when the **Cancel Processing** button is pressed during the updating of the Solution Service. Any information that has been updated will be indicated in this dialog. The processing of any modified fields will be deferred. To resume the update, press the **Update Solution Service** button again.

Data and Group Messages

- ***Field: Message***

  Messages that begin with a field name contain information about a specific field. See Field Messages" below.

- **The default data source has been updated to *data source*".**

  This message appears when a data series is imported from a data source other than the one with which it is currently associated. When this occurs, the default data source for the data series is automatically adjusted so that the data matches as closely as possible.

  Note: This message most frequently appears in regards to the Solution Service. If you would prefer to download data for Solution Service stocks from another source, change the settings on the Update Solution Service dialog

  Action: None necessary. If you would like to restore the previous settings for this data series, double-click on this message to display the Modify Data Series Dialog: Properties page.

Field Messages

- **An analysis of this new field is ready.**

  This message indicates that an analysis of a signal and/or prediction is now ready for viewing.

  Action: Double-click on this message to view the analysis.

- **External data used as an input was missing one or more dates found in the *name*" set. Values from the previous date were used.**

  When external data is used as an input to a field and that data is missing one or more dates, the previous values of that data will be reused. For example, if you use weekly data as an input to a daily prediction, the last known value for each date will be used.

  Action: This message requires no action, it is displayed only to inform you the data is being reused. It does not indicate any type of problem.

- **The signal analysis begins before the start of the data. No values have been produced.**

  This message is typically displayed when a signal analysis field has an adjusted starting point and the start of the data occurs after the calculated starting point. Examples of adjusted starting points are year-to-date and six-month returns.

  Example: A five-year return has been requested and five years of data are not available. In this case, no values will be produced.

  Note: The checks associated with this message are very specific. For example, if year-to-date values are requested, TradingSolutions will start the analysis at January 1st of the current Year. If the first available data is for January 3rd of the current year, no values will be produced.

  Action: To obtain this signal analysis value for the specified data, either obtain more data for this data series or decrease the length of time associated with the adjusted starting point.

- **The trading style of the signal analysis field does not match the trading style used to create the field being analyzed.**

  This message is displayed when the trading style of a signal analysis field does not match the trading style used in the definition of the field being analyzed. For predicted signals, this is the trading style used for postprocessing optimization, which is set on the Signal Postprocessing Dialog.

  Note: This message will be displayed every time this field is calculated, except during data updates.

  Action: None necessary. This message is displayed primarily to highlight if unexpected results appear between the optimization of a field and its signal analysis.

Help for Warning Messages

Messages in this section are sorted based on the item in TradingSolutions that issued the message. General messages are listed first, followed by messages about specific groups, data, or fields.

(Import) Messages

- **Streaming stopped due to general connection error.**

  This message appears when streaming has stopped due to an error trying to connect to the data service. Additional messages will typically appear indicating specific information about the error.

  Action: View the messages prior to this message to determine the cause of the problem.

- **Streaming updates are not currently enabled for any data series in this portfolio.**

  This message appears when you attempt to turn data streaming on, but no data series are currently marked to be streamed.

  Action: Use the Modify Data Dialog: Properties page or Modify Group Dialog: Properties page to enable data for streaming.

  For help with streaming updates, see Streaming Intraday Data.

- **TradingSolutions must be stopped and restarted in order to support streaming through IQFeed after it has been disconnected.**

  This message appears when you attempt to turn data streaming on after the connection to IQFeed has been lost.

  Action: Close TradingSolutions and restart it, then resume streaming.

  For help with streaming updates, see Streaming Intraday Data.

(Processing) Messages

- **Processing of alerts and display fields for streaming *n*-minute bars not completing before new data arrives.**

  This message appears as a warning that too many symbols may be being streamed or too much high-priority processing may be being performed on streaming data.

  Action: If this message continues to appear, you may need to reduce the number of symbols being streamed, the number of alerts being calculated, or the number of calculated display fields associated with streaming data of this or a shorter periodicity.

  For more information on handling this message, see Streaming Intraday Data.

(Service) Messages

- **Solution Service update failed since no longer registered.**

  This message appears when a request to update the Solution Service occurs automatically through performing another action, but the Solution Service is not registered on this computer.

  Action: Press the **Update Solution Service** button on the toolbar to display the Register for the Solution Service Wizard.

  For help with the Solution Service, see The TradingSolutions Solution Service.

Data and Group Messages

- ***Field: Message***

  Messages that begin with a field name contain information about a specific field. See Field Messages" below.

- **A *n*-for-*m* stock split may have occurred after *date*.**

This message appears when newly imported price data for a data series jumps up or down significantly, such as by a factor of 2. This is often due to data being adjusted after a split has occurred. If a split has occurred, any previously imported data will need to be adjusted to match the new data.

Action: Double-clicking on this message will display the Stock Split Adjustment Wizard, which can be used to adjust data after a split.

For help with stock splits, see Handling Data Adjusted for Stock Splits.

- **Could not scan for empty records in order to delete any that may exist. This may be due to a large number of columns being imported.**

  Files downloaded from some data services include records for dates when the market is closed, but have no records for those dates. These records are automatically removed if possible. However, if a large number of columns are in the file being imported, this process may fail leaving these empty records.

  Action: Display the recently imported values in a spreadsheet to determine if the imported data is correct.

- **Data series marked for streaming, but missing data source or exchange setting.**

  This message appears when a data series is marked for streaming updates, but it does not currently have either data source or exchange information.

  Action: Double-clicking on this message will display the Modify Data Dialog: Properties page, which can be used to set this information or turn off streaming updates.

  For help with streaming updates, see Streaming Intraday Data.

- **Data was only available from *date*.**

  This message appears when data was requested from a data source starting on a specific date, but the earliest date for that data was more than one week after the starting date.

- **Data was only available through *date*.**

  This message appears when data was requested from a data source, but the most recent data was for more than one week ago.

- **Imported data may contain errors: *date (note)***

  This message appears when the data that was imported for a symbol contains some values which appear unusual. You may want to check these values against another data source before using them.

Note	Meaning
date repeated	A date (or date/time combination) was repeated in the data that was imported. Only the first instance of the date will be used.
price outlier	The high, low, open, or close changed by more than 20%, then changed back the next bar. This can happen normally (especially on days of high volume), but can also be due to incorrect values.
repeated values	The high, low, open, close, and volume all appear to be equal for two consecutive bars. This can happen normally, but can also be due to incorrect values.
zero price	The high, low, open, or close are zero. Traded prices should never be zero. However, some calculated indices may have a zero value and be stored in a close column.
zero volume	The volume for the bar is zero, but high, low, open, and close prices are not equal, which typically indicates trading occurred. This is a common data error and can be ignored unless volume-based indicators are being used.

  Note: All warnings of this type are written to the file TSImport.log" which is located in the current work directory. If more than a few warnings are generated for a single symbol, you will be instructed to look at that file for the remaining warnings.

  Action: Look at the indicated values in a spreadsheet. If possible, compare the values to another data source.

- **Some raw data fields were left blank since they were not available in the import data.**

  This message appears if the data series currently has manually entered data fields in addition to the fields being imported. Since these fields were not in the data being imported, there are left blank.

Note: For imports from files, if the option to overwrite existing data is turned on, any values for the date range being overwritten will be lost.

Note: For imports from other data sources, if the option to overwrite previous bars is turned on, any values for the date range being overwritten will be lost.

- **The data source returned invalid date values. This data was ignored.**

  This message appears if the data received from a data source contained any data with invalid date information. The records with the invalid date information were ignored.

  Action: Display the recently imported values in a spreadsheet to determine if the imported data is correct.

- **The data source returned multiple records for one or more dates. Only the first instance of each date was kept.**

  This message appears if the data received from a data source contained multiple records with the same date and time. Only the first instance of each date and time was kept. Any duplicate records are ignored.

  Action: Display the recently imported values in a spreadsheet to determine if the imported data is correct.

- **The data source returned one or more records that may be repeated from the previous bar.**

  This message appears when the data imported from a data source had the exact same values for high, low, open, close, and volume where the open and close values were not equal. While it is possible for this to occur, especially in lightly traded securities, this can also occur when the data source repeats the prices associated with the previous record in error.

  Action: Display the recently imported values in a spreadsheet to determine if the imported data is correct.

- **The data source returned one or more records where a price value was zero.**

  This message appears when the data imported from a data source had a high, low, open, or close value of zero.

  Action: Display the recently imported values in a spreadsheet to determine if the imported data is correct.

- **The data source returned one or more records where the price changed but the volume was zero.**

  This message appears when the data imported from a data source contained one or more records where the volume field was zero, but the open, high, or low prices were different from the closing price.

  Action: Display the recently imported values in a spreadsheet to determine if the imported data is correct.

- **The selected data source is not configured to support streaming.**

  This message appears when a data series is marked for streaming updates, but it currently is configured to use a data source that does not support streaming data.

  Action: Double-clicking on this message will display the Modify Data Dialog: Properties page, which can be used to select a different data source or turn off streaming updates.

  For help with streaming updates, see Streaming Intraday Data.

Field Messages

- ***n*% of the *data* set was removed due to null values or other conditions.**

  If the value of an input or desired output of a prediction is null, the data for the date containing the null will be skipped. This message warns when a significant portion of a data set is lost due to null values. This is typically caused by functions such as Moving Average requiring a certain amount of data before they can produce a value. This can also be caused by a large **Samples Per Exemplar** setting for a dynamic network.

  Action: If possible, try to obtain additional data for the beginning of the data set. Otherwise, you may want to adjust the training range to include less of the unavailable data.

  Note: This message is only displayed when greater than 10% of the data is removed from the specified set.

- **Null values were skipped in the middle of the *data* set.**

  Dynamic neural networks contain a memory of recent values that allow them to detect sequential patterns for making time-series predictions. If the value of an input or desired output of a prediction is null, the data for the

date containing the null will be skipped. If dates in the middle of the data are skipped, the sequence of values sent to the neural network may not be what you expected.

Null values in the middle of a data set typically occur because a function used to calculate an input cannot handle a given case. An example of this would be dividing by zero when the High and the Low prices are equal or the Volume is not available.

Action: This model is usable, but will typically be more accurate without holes in the data. Examine the inputs to determine what data is missing from the specified data set. If possible, specify any values that are missing.

- **This prediction is defined for a group with multiple periodicities. The training date range may be incorrect for this particular data.**

  This message appears when a prediction is defined for entire group and that group contains data series with multiple periodicities. Since the training range associated with predictions controls the amount of data used for training and optimizing the prediction, using multiple predictions can make it difficult to set a valid training date range.

  Action: If possible, separate data with different periodicities into different groups or define any predictions directly for each data series.

- **The training range for this field starts before the beginning of the data.**

  This message appears when the training range defined for a prediction begins before the start of the data. Training ranges are limited to begin after the beginning of the data when they are defined. However, moving a data series into a group with a group prediction field can cause this condition, as can manually removing old data from this data series.

  Action: Obtain more data for this data series. If this is a group prediction and more data is not available for this data series, you should consider removing the data series from this group.

Help for Error Messages

Messages in this section are sorted based on the item in TradingSolutions that issued the message. General messages are listed first, followed by messages about specific groups, data, or fields.

(Delete) Messages

- **The *name"* data series could not be accessed to be deleted. Please wait and try again.**

  This message appears when other operations are accessing this data series, causing it to not be immediately available for deletion.

  Action: Wait a moment and try again. You may need to stop and restart TradingSolutions to completely resolve the problem. If this does not resolve the problem, please contact NeuroDimension.

- **The *name"* group could not be deleted. Please wait and try again.**

  This message appears when other operations are causing this group to not be immediately available for deletion.

  Action: Wait a moment and try again. You may need to stop and restart TradingSolutions to completely resolve the problem. If this does not resolve the problem, please contact NeuroDimension.

(Exception) Messages

- ***Message***

  Messages that indicate (Exception)" should not occur while using TradingSolutions.

  Action: Please contact NeuroDimension for assistance, indicating any additional information in this message.

(Import) Messages

- **A com error occurred while attempting to download the data from Prophet. Message: *message***

  An error occurred while downloading data from ProphetFinance.

  Action: Please contact NeuroDimension for assistance, indicating any additional information in this message.

- **An unknown error occurred trying to initialize support for *service* (error = *code*).**

  An error occurred while trying to open the connection to the listed data service. Typical cases will generate a specific message indicating the source of the problem. However, in this case, an unexpected error occurred.

  Action: Contact NeuroDimension technical support. In many cases, closing TradingSolutions and/or rebooting your computer will resolve the problem.

- **Could not connect to the data server.**

  This message indicates TradingSolutions could not contact the data source.

  Action: Check your Internet connection to verify you can reach this data source.

- **Could not import data. Verify formatting.**

  This message appears when the file could not be read using the current settings.

  Action: View the date and time formats being used to import this file by selecting **View text file import options for each file being imported** on the Import Data Wizard: Select Files page.

- **Could not merge data. The downloaded data may contain errors or duplicate dates.**

  This message appears when a data series is being updated with data from the Internet that appears to have erroneous date information.

  Action: Since this message is typically caused by an error in the data from the data source, wait a moment and retry the import. If the problem continues, please contact NeuroDimension for assistance.

- **Could not merge data. Verify formatting and verify dates appear only once in new data.**

The import of the data for the specified data series failed. If this message appears, the date field typically contains one or more invalid dates or it contains more than one record for a single date/time.

Action: View the date and time formats being used to import this file by selecting **View text file import options for each file being imported** on the Import Data Wizard: Select Files page. Also, check the file to ensure the file does not contain multiple entries for a single date/time.

- **Could not request historical data. Could not connect to the data server.**

  This message appears when TradingSolutions could not connect to the data server associated with this request.

  Action: Wait a moment and retry the import. If the problem continues, please contact NeuroDimension for assistance.

- **Could not request historical data. Data series is currently streaming.**

  This message appears when a data series is currently set for streaming and streaming is turned on. Data cannot currently be imported into data series while they are being streamed.

  Action: When streaming is started for a data series, TradingSolutions automatically downloads any data that may have occurred since the last date in the data series. Therefore, it is typically not necessary to manually download historical data for a data series while it is streaming. To download earlier historical data, turn off streaming for either all of TradingSolutions or just for this data series, then perform the import.

- **Could not request historical data. Date range ends before the first date allowed by the data server.**

  This message appears when a historical data request is made for a specific date range, but limitations in the service associated with the selected data source prevent data with the specified date range from being requested.

  Action: Retry the import with a later end date.

- **Could not request historical data. eSignal indicated account not authorized for daytime use.**

  This message appears when your account is only authorized to download historical data after market hours.

  Action: Retry the import after the market has closed or upgrade your account to support importing data during market hours.

- **Could not request historical data. eSignal indicated account not entitled to this service.**

  This message appears when your account is not entitled to the data you have requested. This can occur if you request data for an exchange that your account does not include.

  Action: Import data from a different exchange or upgrade your account to include this data.

- **Could not request historical data. eSignal indicated server too busy. Try again later.**

  This message appears when eSignal has returned an error code indicating its server is too busy to process your request.

  Action: Try this request again at a later time. If this problem continues, please contact NeuroDimension for assistance.

- **Could not request historical data. eSignal indicated username or password is incorrect.**

  This message appears when eSignal has returned an error code indicating the username or password you have entered for this data source does not match their records.

  Action: Check to make sure these values are set correctly in the Modify Data Source Settings Dialog. If they appear correct and the problem continues, contact eSignal to ensure they match their records.

- **Data was imported, but the data series could not be copied to the target group due to conflicting field definitions.**

  This message appears when a data series currently exists in the portfolio and the import would cause it to be added to the target group. Furthermore, the data series has fields using the same name as fields in the target group, causing the data series to no be able to be copied to the target group.

  Action: None necessary. If you would like the data series to be copied to the target group, try manually copying the data series to the target group for more information on the reason this copy failed.

- **Download failed. The data source returned unexpected symbol (*symbol*).**

This message appears when data is received from the data source that was not requested.

Action: Try the import again. If you continue to encounter problems please contact NeuroDimension for assistance.

- **Import could not scan ticker column.**

  This message appears when a file is indicated to have a ticker column, denoting multiple securities in the file, but the ticker column cannot be processed.

  Action: View the field formats being used to import this file by selecting **View text file import options for each file being imported** on the Import Data Wizard: Select Files page.

- **Import failed. The downloaded data may contain errors or duplicate dates.**

  This message appears when a data series is being updated with data from the Internet that appears to have erroneous date information.

  Action: Since this message is typically caused by an error in the data from the data source, wait a moment and retry the import. If the problem continues, please contact NeuroDimension for assistance.

- **Import failed. Verify that the dates in the date field appear only once for each data series in the file.**

  The import of the data for the specified data series failed. If this message appears, the date field typically contains one or more invalid dates or it contains more than one record for a single date/time.

  Action: View the date and time formats being used to import this file by selecting **View text file import options for each file being imported** on the Import Data Wizard: Select Files page. Also, check the file to ensure the file does not contain multiple entries for a single date/time.

- **Internal Error. *Message***

  Messages that indicate Internal Error" should not occur while using TradingSolutions.

  Action: Please contact NeuroDimension for assistance, indicating any additional information in this message.

- **Logging into Prophet failed. Please check your Internet connection.**

  The Internet download could not be started because TradingSolutions could not contact the Internet. Your computer should be connected to the Internet before beginning any Internet downloads. This message may also appear if the Prophet data service is temporarily unavailable.

  Action: Try visiting the Prophet web site at http://www.prophetfinance.com using an Internet browser to determine if the Prophet server is currently online. This will also test your Internet connection.

- **Logging into Prophet failed. Please check your account name and password in the Internet settings.**

  The Internet download could not be started because Prophet did not recognize the account name and password combination that were entered for the ProphetFinance.com data source.

  Action: Please verify these entries, retyping them if necessary. If they appear correct, contact Prophet to determine the source of the problem.

- **Logging into Prophet timed out. Please check your Internet connection.**

  The Internet download could not be started because TradingSolutions could not contact the Internet. Your computer should be connected to the Internet before beginning any Internet downloads. This message may also appear if the Prophet data service is temporarily unavailable.

  Action: Try visiting the Prophet web site at http://www.prophetfinance.com using an Internet browser to determine if the Prophet server is currently online. This will also test your Internet connection.

- **MetaStock directory could not be opened.**

  The MetaStock file library has indicated that the selected MetaStock directory is not valid or otherwise not available.

- **MetaStock directory in a bad state.**

  The MetaStock file library has indicated that the selected MetaStock directory is not valid or otherwise not available.

- **No data series in the target group were found in this end-of-day file.**

This message appears when an end-of-day data file has been selected, but none of the data series in the target group are found in the file.

- **No data was available for import from this MetaStock file.**

  This message appears when a MetaStock file has been selected, but no data was found for the selected symbols.

- **No data was available for import.**

  This message appears when the import operation found no data to import for the specified symbol.

- **No new data was available for import.**

  This message appears when a request to update data from an Internet data source returned no new data.

- **No new data was available to import. This data series already contains data for *date*.**

  This message appears when the file contains data for the selected symbol, but the current date range of the data series contains the dates found in the file.

  Action: If you would like to import this data from the file despite the dates already existing in the data series, select **Overwrite duplicate dates with data from the files** on the Import Data Wizard: Select Files page.

- **No new data was imported.**

  This message appears when the file selected for update contains data for the selected symbol, but the current date range of the data series contains the dates found in the file.

- **No new data was imported. The option to overwrite old data was turned off and no new data was available.**

  This message appears when the file contains data for the selected symbol, but the current date range of the data series contains the dates found in the file.

  Action: If you would like to import this data from the file despite the dates already existing in the data series, select **Overwrite duplicate dates with data from the files** on the Import Data Wizard: Select Files page.

- **One or more records contained invalid date information. No data was imported.**

  The import of the data for the specified data series failed. If this message appears, the date field typically contains one or more invalid dates. For example, most of the data could be in MDY (month/day/year) format, but one of the days could be in DMY (day/month/year) format. This can be seen occasionally in data files downloaded from the Internet.

  Action: View the date and time formats being used to import this file by selecting **View text file import options for each file being imported** on the Import Data Wizard: Select Files page. Also, check the file to make sure the dates in the file are in a consistent format throughout the file.

- **The connection to IQFeed was lost.**

  TradingSolutions lost contact with the IQFeed Connection Manager or the IQFeed Connection Manager lost contact with the IQFeed server.

  Action: Resolve why the connection was lost. If you were in the middle of importing data, retry the import.

  Note: TradingSolutions currently cannot resume streaming after the IQFeed Connection Manager was lost. To resume streaming, stop and restart TradingSolutions first.

- **The data appears to have more than one record for individual minutes or contains seconds information. TradingSolutions does not support tick or sub-minute data.**

  TradingSolutions cannot be used with tick data or data with seconds in the time information.

- **The date field (or time field) could not be processed. It may contain invalid information.**

  The import of the data for the specified data series failed. If this message appears, the date field typically contains one or more invalid dates. For example, most of the data could be in MDY (month/day/year) format, but one of the days could be in DMY (day/month/year) format. This can be seen occasionally in data files downloaded from the Internet.

  Action: View the date and time formats being used to import this file by selecting **View text file import options for each file being imported** on the Import Data Wizard: Select Files page.

- **The Evaluation Version is restricted to importing the TradingSolutions sample data and data from the Solution Service.**

  This message appears in the evaluation version as a reminder of the restrictions placed on this version. Specifically, this version is restricted to importing the TradingSolutions sample data and data from the Solution Service.

- **The fields could not be imported. This may be caused by too many fields in a series.**

  This message appears when the fields being imported could not be added to the data series. Data series are limited to containing only 255 fields.

- **The MetaStock file library could not read the data.**

  The MetaStock file library has indicated that the selected MetaStock directory is not valid or otherwise not available.

- **The Prophet Internet support library is not registered.**

  The Prophet Internet download could not be started because the Internet support library was not found on your computer. This file is typically installed automatically during TradingSolutions installation.

  > The file ProphetConnect.dll should be found in the TradingSolutions directory. It also needs to be registered on the system using the Windows registration server (RegSvr32.exe in the Windows\System directory). Contact NeuroDimension if this message appears and you need help locating or registering this DLL.

- **The Prophet server did not respond to this request. Please try again in a few minutes.**

  The Internet download could not be started because TradingSolutions could not contact the Internet. Your computer should be connected to the Internet before beginning any Internet downloads. This message may also appear if the Prophet data service is temporarily unavailable.

  Action: Try visiting the Prophet web site at http://www.prophetfinance.com using an Internet browser to determine if the Prophet server is currently online. This will also test your Internet connection.

- **The Prophet server reported an internal error.**

  This message appears when the Prophet server returns an unexpected return code.

  Action: Please contact NeuroDimension for assistance.

- **The username for the *service* data source is not set.**

  The listed data source requires an account to be established with their service. After the account is established, the username and password of your account must be entered into TradingSolutions.

  Action: Enter the username and password for the data source in the Modify Data Source Settings Dialog.

- **TradingSolutions could not connect to *data source*. If the associated data manager is already started, try stopping and restarting it to resolve the problem.**

  TradingSolutions could not connect to the listed data source.

  Action: If the data manager associated with the listed data source is currently displayed in the lower right corner of your Windows screen, try stopping and restarting it to see if this resolves the problem. If this fails, try rebooting your computer. If this does not appear to resolve the problem, contact NeuroDimension technical support.

(Service) Messages

- **Access for this machine to the Solution Service has been suspended.**

  This message appears when you are attempting to use the Solution Service with a machine or account that is no longer permitted to access the Solution Service.

  Action: Please contact NeuroDimension for assistance.

- **Either the e-mail address or the password is not recognized.**

  This message appears when you are attempting to update data from the Solution Service and the e-mail address or password associated with that data source is not recognized by the Solution Service server.

- **Error Importing Solution: *solution name***

  This message appears when a solution downloaded by the Solution Service contains an error and could not be imported. It may appear if the Solution Service is currently being updated.

  Action: Wait a few minutes and try updating the Solution Service again. If you continue to receive this error, contact NeuroDimension for assistance, indicating the solution name reported in this message.

- **Internal Error. *Message***

  Messages that indicate Internal Error" should not occur while using TradingSolutions.

  Action: Please contact NeuroDimension for assistance, indicating any additional information in this message.

- **Text being sent to the Solution Service is too long to be processed.**

  This message appears when you are registering for the Solution Service and enter an abnormally large amount of data for you contact information.

- **The data was deleted during the update. Perform the update again to obtain this data.**

  This message appears when data required by the Solution Service was deleted while the update was being performed.

  Action: Wait a few minutes and try updating the Solution Service again. If you continue to receive this error, contact NeuroDimension for assistance.

- **The definition file contained incorrect information.**

  This message appears when the definition file for the Solution Service contains an error and cannot be processed. It may appear if the Solution Service is currently being updated.

  Action: Wait a few minutes and try updating the Solution Service again. If you continue to receive this error, contact NeuroDimension for assistance.

- **The definition file format has been updated. A more recent version of TradingSolutions is required to use the service.**

  This message appears when the definition file for the Solution Service is in a format that is not supported by this version of TradingSolutions.

  Action: The most recent version of TradingSolutions is required to use the Solution Service. Visit the TradingSolutions web site to download an update to your TradingSolutions software.

- **The definition file is incomplete. This typically occurs while the service is being updated. Please try again in a few minutes.**

  This message appears when the definition file for the Solution Service contains an error and cannot be processed. It may appear if the Solution Service is currently being updated.

  Action: Wait a few minutes and try updating the Solution Service again. If you continue to receive this error, contact NeuroDimension for assistance.

- **The Solution Service server could not be contacted.**

  This message appears when the TradingSolutions program cannot communicate with the Solution Service server on the Internet. This typically occurs when you are not connected to the Internet, but can occur for other reasons. The first thing to check is to make sure you are currently connected to the Internet by opening a browser to view a web site.

  Some software firewalls may default to preventing this type of communication. To permit communication with the Solution Service server, it may be necessary to allow TradingSolutions to send and receive information from the Internet. It may also be necessary to allow the Solution Service server access by listing IP address 64.225.33.176 as a friendly site.

  Action: After checking your Internet connection and firewall settings, wait a few minutes and try updating the Solution Service again. If you continue to receive this error, contact NeuroDimension for assistance.

- **The Solution Service could not download a file from server.**

  This message appears when the TradingSolutions program cannot download a specific file from the Solution Service server. This can occur when the Solution Service is being updated.

Action: Wait a moment and try again. If you continued to encounter this problem, please contact NeuroDimension for assistance.

- **The Solution Service could not download information from server.**

  This message appears when the TradingSolutions program cannot download a specific file from the Solution Service server. This can occur when the Solution Service is being updated.

  Action: Wait a moment and try again. If you continued to encounter this problem, please contact NeuroDimension for assistance.

- **The update file could not be processed.**

  This message appears when an error occurs during the processing of an update file. It may appear if the Solution Service is currently being updated.

  Action: Wait a few minutes and try updating the Solution Service again. If you continue to receive this error, contact NeuroDimension for assistance.

- **The update file was not up-to-date. This typically occurs while the service is being updated. Please try again in a few minutes.**

  This message appears when the update file for this data series does not match the information in the definition file. It typically appears when the Solution Service is being updated.

  Action: Wait a few minutes and try updating the Solution Service again. If you continue to receive this error, contact NeuroDimension for assistance.

- **This e-mail address has already been registered with the Solution Service.**

  This message appears when you are registering for the Solution Service and the e-mail address that you specified has already been registered.

  Action: Return to the Register for the Solution Service Wizard: Introductory page and indicate that you have already registered for the Solution Service. If you do not think you have registered for the Solution Service, please contact NeuroDimension for assistance.

- **This e-mail address is not currently registered with the Solution Service.**

  This message appears when you are attempting to update data from the Solution Service and the e-mail address or password associated with that data source is not recognized by the Solution Service server.

- **This machine is not currently registered with the Solution Service.**

  This message appears when you are attempting to update data from the Solution Service and the e-mail address or password associated with that data source is not recognized by the Solution Service server.

- **This solution returned the following error: *error message***

  This message appears when a solution downloaded by the Solution Service could not be applied to the data that was downloaded. Common error messages include:

  - **The function definition *function name*" could not be found.**

    This message appears when function definitions used by this solution could not be found in your portfolio. Solutions automatically include any custom functions required for calculations, but do not include functions normally included as part of the program.

    If you see this message, your system functions may not be up to date. A request to add any new system functions typically appears when you start TradingSolutions in this case. However, you can also request to manually update the system functions by selecting **Import Functions…** from the **Tools** menu and importing the NDTSSeed.tsf" file from the TradingSolutions program folder.

    If updating your system functions does not correct this problem, please contact NeuroDimension for assistance.

  - ***Other error messages.***

    This message appears when the Solution Service processing encounters an error that is typically not based on the information being imported.

    Action: Please contact NeuroDimension for assistance, indicating the error message that was reported.

Data and Group Messages

- ***Field: Message***

  Messages that begin with a field name contain information about a specific field. See Field Messages" below.

- **Download failed. Prophet returned unexpected data for *date*.**

  This message appears when data is received from Prophet that was not requested.

  Action: Try the import again. If you continue to encounter problems please contact NeuroDimension for assistance.

- **Internal Error. *Message***

  Messages that indicate Internal Error" should not occur while using TradingSolutions.

  Action: Please contact NeuroDimension for assistance, indicating any additional information in this message.

- **No data was available for import from this MetaStock file.**

  This message appears when the MetaStock file library indicates no data is available.

- **Security not found with this periodicity in the selected MetaStock file.**

  This message appears if this data series was previously imported from a MetaStock file and can no longer be found in this file with this periodicity.

- **Streaming data buffer had invalid date. Record was skipped.**

  This message appears when an internal error occurs with during streaming the specified data series.

  Action: Please contact NeuroDimension for assistance.

- **The security could not be accessed. It may currently be being written to by another application.**

  This message appears when the MetaStock file library is not permitting access to a security.

Field Messages

- **Internal Error. *Message***

  Messages that indicate Internal Error" should not occur while using TradingSolutions.

  Action: Please contact NeuroDimension for assistance, indicating any additional information in this message.

- **One or more input fields, trading style fields, or desired output fields cannot be processed because they contain errors (or their inputs contain errors).**

  This message appears when an input field or desired output field required for this field cannot be calculated, causing this field to not be available. It can also appear when the trading style used by this field references a field that contains an error.

  Action: Examine any other messages for indications of which field may be encountering this error.

- **One or more input fields, trading style fields, or desired output fields cannot be processed because they no longer exist.**

  This message appears when an input field or desired output field required for this field has been deleted. It can also appear when the trading style used by this field references a field that has been deleted or was never created.

  Action: Examine the input fields associated with this field, along with the trading style if applicable.

- **One or more input fields or desired output fields did not contain data.**

  All of the input fields and desired output fields for a date must contain values for that date to be used in the training set. This failure may be reported if a field is empty for the entire training range, or if percent change is being used and the value is zero for the entire training range.

  Action: Check the values of the inputs and desired outputs of this field. For predictions, the inputs and desired outputs must be set for at least part of the training range.

- **The definition for this field contains an error.**

  This message appears when TradingSolutions cannot load this field to calculate this value.

  Action: Double-click on this message to access the field definition and determine the source of the problem. If you cannot determine the cause of the problem, you may need to delete the field and recreate it.

- **The learning rates resulted in the cost evaluating to infinity.**

  Neural networks use internal weights to mathematically modify the input values to produce the output value. In some situations, it is possible for these weights to increase or decrease until a mathematical error is produced. Possible situations where this may occur are the step size or momentum being too high or the desired value being constant across the training set.

  Action: This will typically not occur with the default settings. If you have adjusted the step sizes or momentum settings either directly or using genetic optimization, you may need to lower these values or re-optimize.

- **The neural network for this prediction could not be loaded.**

  This message appears when the neural network associated with a prediction cannot be loaded. It typically appears when a field uses a Custom Solution Wizard DLL and that DLL file has been renamed or deleted.

  Action: Double-click on this message to access the field definition and examine the settings. If you cannot determine the cause of the problem, please contact NeuroDimension.

- **The selected network is recall only.**

  When using a Custom Solution Wizard DLL, the necessary components for learning must be included on the neural network breadboard. In addition, the Developers level of the Custom Solution Wizard must be used to generate DLLs for TradingSolutions.

  Action: Replace the selected Custom Solution Wizard DLL with a DLL capable of learning.

- **The training samples could not be divided into exemplars based on the samples per exemplar setting.**

  When using a Custom Solution Wizard DLL with a dynamic network, the number of samples in the training set must be evenly divisible by the Samples/Exemplar setting of the breadboard. This setting can be found in the properties for the dynamic controller on your NeuroSolutions breadboard.

  Action: Double-click on this message to access the field definition and determine the number of training samples that are being sent to the neural network from the Modify Field Dialog: Training Analysis page. Then, set the Samples/Exemplar setting on the NeuroSolutions breadboard appropriately and regenerate the DLL.

- **The training weights could not be saved.**

  When a neural model is trained for a prediction, the weights associated with that training are saved to a file. If the disk drive that holds your TradingSolutions work is full, these weights may not be able to be saved.

  Action: Check the amount of space available on the disk drive containing your work directory, then try retraining the prediction.

Monitoring Processing

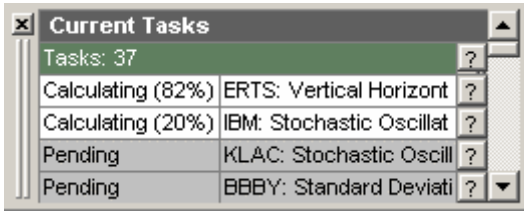
Monitoring Processing: Overview

TradingSolutions frequently performs processing that requires several seconds or minutes to complete. Special types of processing can even take multiple hours. TradingSolutions provides several ways to monitor the status of longer operations so that you can determine how they are proceeding and when they will complete.

The following topics are covered in this section:

- The Current Tasks Window
- Working with Status Dialogs
- Understanding Processing Order

The Current Tasks Window



The Current Tasks Window displays the tasks that TradingSolutions is currently working on. Most of the tasks listed in this window will be fields awaiting processing when they are created or when they require calculation after new data is imported. Other tasks include the status of various operations, such as data import.

For information about the order in which tasks are processed, see Understanding Processing Order.

Note: The Current Tasks Window typically appears in the lower right corner of the TradingSolutions display. If it is not currently visible, you may have hidden it. See Hiding and Displaying…" below for information about redisplaying it.

Understanding the Current Tasks Window

This window is made up of several sections.

- **Tasks Counter**

  The tasks counter indicates how many tasks are currently in the Current Tasks list.

  Note: The Current Tasks list is limited to 200 tasks. If more than 200 tasks are pending, a **plus sign** (+) will be displayed next to the task counter and no additional tasks will be added to the list. After the current task list reduces to 150 tasks, the task list will be updated with pending tasks.

- **Task Activity**

  The task activity indicates how the task is currently being processed.

- **Task Description**

  The task description indicates the target of this task. For most tasks, this is the name of the field being updated.

- **Task Detail Button [?]**

  The question mark (?) button displays the Status Dialog associated with this task. The Task Detail Button on the header displays a Status Dialog with an overview of current field processing.

Special Processing Messages

In addition reporting the number and status of all current tasks, the following messages may be displayed in the Current Tasks Window:

- **No tasks currently require processing.**

  This message indicates that no fields are currently scheduled to have their calculations updated.

- **PROCESSING STOPPED**

  This message appears when processing is stopped. This can occur when **Stop All Tasks** is selected from the context menu for this window, and when **Stop/Start Processing** is selected from the **Processing** menu. It can also appear if TradingSolutions was not closed normally while processing was in progress. To restart processing, re-select **Stop All Tasks** from the context menu for this window.

- **PROCESSING DISABLED**

  This message appears when the evaluation version has expired, causing processing to be disabled. It can also appear if TradingSolutions has been deactivated. If you are using the optional hardware key, make sure it is plugged in. Otherwise, you will need to purchase a TradingSolutions license for this computer.

Additional Commands on the Current Tasks Window

In addition to the buttons on the Current Task Window, you can also interact with it by double-clicking on tasks or right-clicking on them and selecting from a context menu.

- **Display Detail Window…**

  This menu selection displays the Status Dialog associated with this task, the same as the Task Detail Button.

- **Stop All Tasks**

  This menu selection stops all fields from being processed. This is useful when other processing on your computer is being slowed by TradingSolutions processing. Reselect this item to restart field processing.

- **Double-Click on Task**

  Double-clicking on a task performs the same action as selecting Display Detail Window…" described above.

Hiding and Displaying the Current Tasks Window

By default, the Current Tasks Window will be displayed in the TradingSolutions program window. This is useful for seeing what TradingSolutions is currently working on. However, when it is displayed, it takes away part of the space used for displaying data charts and spreadsheets.

Docked windows, such as the Portfolio View and the Current Tasks Window, can be hidden and redisplayed in unison using the **Toggle Docked Views** button in the toolbar or the **Toggle Docked Views** in the **View** menu.

The Current Tasks Window can be hidden and redisplayed by itself using the **Toggle Current Tasks Window** button in the toolbar or the **Display Current Tasks Window** in the **View** menu.

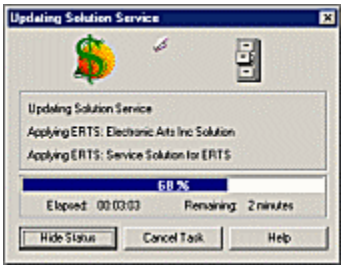
Moving the Current Tasks Window

By default, the Current Tasks Window is docked on the lower right side of the TradingSolutions window. This means that this window is attached to the bottom of this window and will not cover any data windows.

To move this window to a new location, move the mouse to the window handle on the left edge of the window. When the window is docked, this handle is displayed as two gray lines. Once the mouse is positioned over the handle, you can drag the window to a new location by pressing the left mouse button down and moving the mouse. An outline of the new window position will be displayed while the mouse is being moved. When the desired location is reached, simply release the mouse button to end the dragging operation.

By default, if this window is being moved to a location near the edge the TradingSolutions window, it will dock itself on that edge. To move the window without docking, hold the Control key down while you are dragging the window.

Working with Status Dialogs



The Status Dialog displays the current status of operations that may take some amount of time to complete. These operations include calculating fields, training predictions, and importing or exporting data.

For help with the controls on this dialog, see the help for the Status Dialog.

Hiding and Redisplaying Status Dialogs

Status Dialog are closed (hidden) in the following cases:

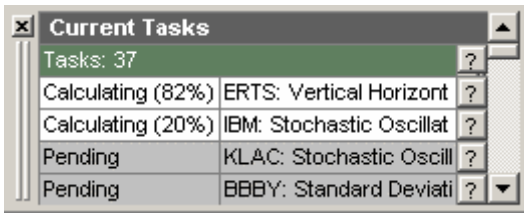
- You press the **Hide Status** button.
- You press the dialog close gadget [x] in the upper right corner.
- The task associated with the Status Dialog completes or is cancelled.
- The Status Dialog is covered by another dialog or message box (other than another Status Dialog).

After a Status Dialog has been hidden, it can be redisplayed by pressing the Task Detail Button [?] associated with the task for that dialog. This button is located on the Current Tasks Window, the Tasks toolbar, and some Status Dialogs.

Working with Multiple Status Dialogs

TradingSolutions can perform more than one task at a single time. Because of this, it is possible to display multiple Status Dialogs at one time. When possible, TradingSolutions will arrange additional Status Dialogs so that they can be displayed and viewed simultaneously.

Understanding Processing Order



The order that fields are processed in is arranged to provide you with the results that matter the most as quickly as possible. This section outlines the various rules that are used to determine what order fields are processed in.

Priority Processing

Tasks are assigned a priority based on how quickly the results are required. The following rules are used when establishing the priority of task.

1. Alerts
2. Signals used as Display Fields
3. Other Display Fields
4. Fields Displayed in Charts and Spreadsheets

Any fields required as inputs to these fields are given a slightly higher priority than the fields themselves.

Example: Inputs to display fields have higher priority than display fields, but lower priority than alerts.

Periodicity is also used to determine priority. Data with a faster periodicity is given higher priority than data with a slower periodicity. However, fields included in the rules listed above are always given priority over fields that are not included in those rules.

Example: Display fields for 1-minute bar data have higher priority than alerts for 5-minute bars.

Example: Display fields for end-of-day data have higher priority than any fields not listed in the rules above, regardless of periodicity.

Regardless of priority, a field can only be calculated once its inputs are calculated.

Note: One exception to this is the desired output values of predictions. After they are trained, predictions can be recalculated before their desired output values are recalculated since the desired output is not used when generating a value.

Intra-field Processing Order

Multiple steps may be required each time a field is recalculated. Each time a field is calculated, the following steps must be taken.

1. Calculate new value.
2. If field is a prediction and values in the training range are calculated (or recalculated), update prediction analysis.

   Note: This step requires the desired output to be calculated before it can be completed.

3. If field is a signal, update the signal analysis.

In addition, each time a new prediction is created, the following steps must be taken before it can be calculated.

1. Train Prediction

2. Pre-calculate Prediction
3. Pre-analyze Prediction
4. Optimize Postprocessing

Processing States

In order to increase the speed with which updates can be performed, the internal state" of each calculation is kept for the last value calculated for each field. This allows TradingSolutions to resume each calculation where it left off when new values are added to the end of each data series.

The following are examples of values stored in states:

- Values stored in neural network memories
- Previous values of calculations, such as Exponential Moving Averages

Since these saved states are associated only with the last value in each data series, overwriting values currently in the data series will cause many calculations to start over from the beginning. Because of this, if you select to overwrite previous values during an import operation or modify values directly in a spreadsheet, calculations can take significantly longer than when values are only added to the end.

Tasks Appearing To Calculate Out of Order

Due to the intra-field processing order, it is possible that tasks will sometimes appear to calculate in the wrong order, especially when calculating from the beginning of the data series. This is because fields are not removed from the Current Task Window until all of the processing steps listed in the Intra-field Processing Order list are completed.

Here is a detailed example of how processing can appear to be out of order.

Let's say you have the following fields:

1. Optimal Signal
2. Model #1 of Optimal Signal
3. Model #2 of Optimal Signal
4. Committee of Model #1 and Model #2

When watching the Current Task Window or the Signal Analysis page, these fields may appear to calculate in the following order after an import with overwrite occurs.

1. Committee of Model #1 and Model #2
2. Optimal Signal
3. Model #1 of Optimal Signal
4. Model #2 of Optimal Signal

The actual order of the processing is as follows:

1. Model #1 of Optimal Signal – Calculate Value
2. Model #2 of Optimal Signal – Calculate Value
3. Committee of Model #1 and Model #2 – Calculate Value
4. Committee of Model #1 and Model #2 – Analyze Signal
5. Optimal Signal – Calculate Value
6. Optimal Signal – Analyze Signal

7. Model #1 of Optimal Signal – Analyze Prediction
8. Model #1 of Optimal Signal – Analyze Signal
9. Model #2 of Optimal Signal – Analyze Prediction
10. Model #2 of Optimal Signal – Analyze Signal

This ordering occurs because the Analyze Prediction step for each model cannot be performed until the Optimal Signal has been updated. Therefore, the tasks for the Model fields will stay in the Current Task Window until all of the steps have been performed. This order also causes the Committee field to report its results in the Signal Analysis page before the other fields have completed.

Help with Specific Windows, Dialogs, and Controls

Help with Specific Controls

This section walks you through the individual wizards and dialogs available in TradingSolutions. Each of the pages in this section can be reached directly by pressing the **Help** button on the dialog or wizard you need help with. The Table of Contents of this interactive help can be used to jump directly to any of these helps. Or, if you prefer, you can also advance through the dialogs one at a time using the forward arrow to get a feel for the types of actions that can be performed through the interface.

For help with a specific dialog or wizard, click on **Help Topics**, and select the appropriate dialog from under the **Help with Specific Controls** chapter.

For help with windows and views, see TradingSolutions at a Glance.

Help with Windows and Views

Help with Toolbars and Menus

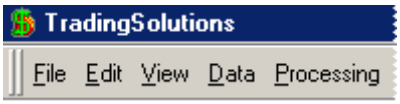
Hot Keys

There are several hot keys" that you can press at any time that you are not viewing a dialog. These hot keys perform many of the most common options in TradingSolutions.

Alt+A Analyze Field
Alt+C Display Chart
Alt+D Modify Display Fields
Alt+E Export Data
Alt+F Add New Field
Alt+H Help Topics and Index
Alt+I Import Data
Alt+L Locate Data on the Internet
Alt+M Modify Field
Alt+O Modify Global Options
Alt+P Toggle Portfolio
Alt+R Resume Deferred Processing
Alt+S Display Spreadsheet
Alt+W Visit TradingSolutions Web Site

The TradingSolutions Main Menu

The TradingSolutions Main Menu: Overview



The TradingSolutions program menu typically appears along the top of the TradingSolutions program window. It is made up of several submenus, each with their own options.

Note: The main menu is similar to the toolbars in that it can be moved and placed in other locations in the program window. If you cannot locate it at the top of the program window, check to see if you may have moved it elsewhere.

- **File Menu**
  This menu contains options associated with files, including import, export, and print commands.
- **Edit Menu**
  This menu contains options for editing individual values, including, copy, cut, and paste commands.
- **View Menu**
  This menu contains options for viewing your data. It also contains options for hiding parts of the interface.
- **Data Menu**
  This menu contains options for importing and exporting data.
- **Processing Menu**
  This menu contains options for processing data in your portfolio.
- **Portfolio Menu**
  This menu contains options for manipulating the Portfolio View.
- **Chart Menu**
  This menu contains options for manipulating the Chart View.
  Note: This menu is only available when a Chart View is the active window.
- **Spreadsheet Menu**
  This menu contains options for manipulating the Spreadsheet View.
  Note: This menu is only available when a Spreadsheet View is the active window.
- **Tools Menu**
  This menu contains options for changing and customizing the TradingSolutions software.
- **Window Menu**
  This menu contains options for changing how the current Chart and Spreadsheet views are displayed.
- **Help Menu**
  This menu contains access to common help topics.

Main Menu: File Menu

The File Menu contains options associated with files, including import, export, and print commands. It contains the following menu items.

- **Change Work Directory…**

  This option allows you to specify a different Work directory. The Work directory is the location where TradingSolutions stores all of your user data.

- **Import Data…**

  This option allows you to import data from other sources into your TradingSolutions portfolio.

  For help with importing data, see Importing Data into TradingSolutions.

- **Export Data…**

  This option allows you to export data from your TradingSolutions portfolio for use in other programs.

  For help with exporting data, see Exporting Data for Use in Other Programs.

- **Update Solution Service…**

  This option allows you to update your portfolio with data and commentary from the TradingSolutions Solution Service.

  For help with the Solution Service, see The TradingSolutions Solution Service.

- **Import Functions…**

  This option allows you to import functions and entry/exit systems that have been exported by other TradingSolutions users.

  For help with importing functions, see Sharing Your Functions with Other Users.

- **Export Functions…**

  This option allows you to export functions and entry/exit systems that you have written for other TradingSolutions users to import and use.

  For help with exporting functions, see Sharing Your Functions with Other Users.

- **Import Trading Solution…**

  This option allows you to import a trading solution that has been exported by another TradingSolutions user.

  For help with importing trading solutions, see Sharing Your Solutions with Other Users.

- **Export Trading Solution…**

  This option allows you to export a trading solution for other TradingSolutions users to import and use.

  For help with exporting trading solutions, see Sharing Your Solutions with Other Users.

- **Compact Portfolio Files…**

  This option allows you to compact the database used to store the data in your portfolio. This is useful after you have deleted several data series or groups of data series. It may also be necessary to do this after importing data in order to reclaim the space used for temporary data tables.

- **Repair Portfolio Files…**

  This option allows you to repair some errors and inconsistencies that can occur in field definitions in your portfolio. It is typically not necessary to do this unless you are encountering problems calculating fields after TradingSolutions encounters other errors.

- **Print…**

  This option allows you to print the contents of the current Chart View or Spreadsheet View to a printer.

- **Print Preview**

  This option allows you to preview how the contents of the current Chart View or Spreadsheet View would be displayed on a printer.

- **Print Setup…**

  This option allows you to change the options for how Chart Views and Spreadsheet Views are printed on a printer.

- **Exit**

  This option causes the TradingSolutions program to close. This option has the same effect as selecting the close gadget from the upper right hand corner of the TradingSolutions window.

For help with other submenus, see The TradingSolutions Main Menu.

Main Menu: Edit Menu

The Edit Menu contains options for editing individual values, including, copy, cut, and paste commands. It contains the following menu items.

- **Cut**

  This option allows you to remove the currently selected value or values from the Spreadsheet View. The values can then be pasted to a same-sized region in a Spreadsheet View. They can also be pasted into other programs that accept pasted text.

- **Copy**

  This option allows you to copy the currently selected value or values from the Spreadsheet View. The values can then be pasted to a same-sized region in a Spreadsheet View. They can also be pasted into other programs that accept pasted text. The Copy option can also be used to copy the contents of the Chart View window so that it can be pasted in a program that accepts pasted graphics, such as Microsoft Word.

- **Paste**

  This option allows you to paste values that have been cut or copied from another location into the Spreadsheet View.

For help with changing values in the Spreadsheet View, see Changing Values in the Spreadsheet.
For help with other submenus, see The TradingSolutions Main Menu.

Main Menu: View Menu

The View Menu contains options for viewing your data. It also contains options for hiding parts of the interface. It contains the following menu items.

- **Display Data in a Chart**

  This option allows you to display the currently selected data field in a chart. If no data field is currently selected, a dialog is presented allowing you to select which data field to display.

  For help with displaying data in a chart, see Charting Your Data.

- **Display Data in a Spreadsheet**

  This option allows you to display the currently selected data series in a spreadsheet. If no data series is currently selected, a dialog is presented allowing you to select which data series to display.

  For help with displaying data in a spreadsheet, see Viewing Your Data.

- **Toggle All Docked Views**

  This option allows you to hide all or redisplay the Portfolio View, the Information View, the Messages and Alerts Window, and the Current Tasks Window. Hiding these windows is useful for creating more space in the TradingSolutions window for displaying data.

- **Display Portfolio View**

  This option allows you to hide or display the Portfolio View window.

  For help with the Portfolio View window, see Managing Your Portfolio.

- **Display Information View**

  This option allows you to hide or display the Information View window.

  For help with the Information View window, see Tracking Data with the Information View.

- **Display Messages and Alerts Window**

  This option allows you to hide or display the Messages and Alerts Window.

  For help with the Messages and Alerts Window, see The Messages and Alerts Window.

- **Display Current Tasks Window**

  This option allows you to hide or display the Current Tasks Window.

  For help with the Portfolio View window, see The Current Tasks Window.

- **Display Toolbars**

  This option allows you to hide or display the toolbars. Hiding the toolbars is useful for creating more space in the TradingSolutions window for displaying data.

  For help with the toolbars, see Customizing the Toolbars.

- **Display Status Bar**

  This option allows you to hide or display the status bar the bottom of the TradingSolutions window. Hiding the status bar is useful for creating more space in the TradingSolutions window for displaying data.

For help with other submenus, see The TradingSolutions Main Menu.

Main Menu: Data Menu

The Data Menu contains options for importing and exporting data.

- **Update Solution Service…**

  This option allows you to update your portfolio with data and commentary from the TradingSolutions Solution Service.

  For help with the Solution Service, see The TradingSolutions Solution Service.

- **Stream Intraday Data…**

  This option allows you to import intraday data into your portfolio continuously while it is occurring.

  For help streaming data, see Streaming Intraday Data.

- **Import Data…**

  This option allows you to import data from other sources into your TradingSolutions portfolio.

  For help with importing data, see Importing Data into TradingSolutions.

- **Export Data…**

  This option allows you to export data from your TradingSolutions portfolio for use in other programs.

  For help with exporting data, see Exporting Data for Use in Other Programs.

- **Configure Data Sources…**

  This option allows you to configure the data sources associated with services from which you can import data.

  For help with data sources, see Configuring Data Sources.

- **Define Exchanges…**

  This option allows you to create and modify exchanges that specify when individual markets are open and have data available.

  For help with exchanges, see Working with Different Exchanges.

For help with other submenus, see The TradingSolutions Main Menu.

Main Menu: Processing Menu

The Processing Menu contains options for processing data in your portfolio.

- **Stop/Restart Processing**

  This menu selection stops all fields from being processed. This is useful when other processing on your computer is being slowed by TradingSolutions processing. Reselect this item to restart field processing.

  For help with processing concepts, see Monitoring Processing.

- **Display Current Tasks Window**

  This option allows you to hide or display the Current Tasks Window.

  For help with the Portfolio View window, see The Current Tasks Window.

- **Define Alert Definitions…**

  This option allows you to define new alert definitions to use for generating alerts.

  For help creating alerts, see Writing Your Own Alert Definitions.

- **Define Entry/Exit Systems…**

  This option allows you to define new entry/exit systems to use for generating entry/exit signals.

  For help creating entry/exit systems, see Writing Your Own Entry/Exit Systems.

- **Define Functions…**

  This option allows you to define new functions for use in calculated fields.

  For help creating functions, see Writing Your Own Functions.

- **Define Trading Solutions…**

  This option allows you to define new trading solutions to use for generating entry/exit signals and all of the fields required to calculate them.

  For help creating trading solutions, see Creating Your Own Trading Solutions.

- **Import Functions…**

  This option allows you to import functions, entry/exit systems, and alert definitions that have been exported by other TradingSolutions users.

  For help with importing functions, see Sharing Your Functions with Other Users.

- **Export Functions…**

  This option allows you to export functions, entry/exit systems, and alert definitions that you have written for other TradingSolutions users to import and use.

  For help with exporting functions, see Sharing Your Functions with Other Users.

- **Import Trading Solution…**

  This option allows you to import a trading solution that has been exported by another TradingSolutions user.

  For help with importing trading solutions, see Sharing Your Solutions with Other Users.

- **Export Trading Solution…**

  This option allows you to export a trading solution for other TradingSolutions users to import and use.

  For help with exporting trading solutions, see Sharing Your Solutions with Other Users.

For help with processing concepts, see Monitoring Processing.

For help with other submenus, see The TradingSolutions Main Menu.

Main Menu: Portfolio Menu

The Portfolio Menu contains options for manipulating the Portfolio View. It contains the following menu items.

- **Modify Display Fields**

  This option allows you to modify the display fields in the Portfolio View for the portfolio or a specific subgroup. Display fields can be used to display information, such as closing prices and trading signals, for current or previous data.

  For help with display fields, see Using Display Fields.

The remaining options are only available when there are display fields in the Portfolio View.

- **View Today**

  This option adjusts the display date of the display fields to the current date.

- **Select Display Date**

  This option allows you to select the display date of the display fields using a calendar date selection.

  For help with the calendar control, see the Date Selection Controls information on using a calendar to adjust the date.

- **View Next Day**

  This option adjusts the display date of the display fields to the day after the current display date.

- **View Previous Day**

  This option adjusts the display date of the display fields to the day before the current display date.

For help with the Portfolio View, see Managing Your Portfolio.

For help with other submenus, see The TradingSolutions Main Menu.

Main Menu: Chart Menu

The Chart Menu contains options for manipulating the Chart View. It is only available when the Chart View is the active window. It contains the following menu items.

- **Add Field to Chart…**
  This option allows you to add a new data field to the current Chart View.

- **Change Field Properties…**
  This option allows you to change how a chart field is displayed. These properties include the color of the chart line and the type of line.

- **Remove Field from Chart**
  This option allows you to remove the currently selected field from the Chart View. This option is only available when a field is visibly selected and there is more than one field in the chart.

- **Modify Field…**
  This option allows you to change the definition of the currently selected field in the Chart View. The definition includes the name of the field and how it is calculated.

- **Analyze Field…**
  This option allows you to analyze the field that is currently selected in the Chart View. This option only applies to predicted fields and signals.

- **Undo Last Scaling**
  This option allows you to undo the most recent change to the date range of the Chart View.

- **Select Date Range…**
  This option allows you to select a specific data range to display in the Chart View.

For help with the Chart View, see Displaying Data in a Chart.
For help with other submenus, see The TradingSolutions Main Menu.

Main Menu: Spreadsheet Menu

The Spreadsheet Menu contains options for manipulating the Spreadsheet View. It is only available when the Spreadsheet View is the active window. It contains the following menu items.

- **Change Spreadsheet…**
  This option allows you to add or remove fields from the Spreadsheet View. In addition, you can also change the order of the fields being displayed.

- **Add New Field…**
  This option allows you to add a new field to the data series currently displayed in the Spreadsheet View.

- **Analyze Field…**
  This option allows you to analyze the field that is currently selected in the Spreadsheet View. This option only applies to predicted fields and signals.

- **Modify Field…**
  This option allows you to change the definition of the currently selected field in the Spreadsheet View. The definition includes the name of the field and how it is calculated.

- **Remove Field…**
  This option allows you to remove the field that is currently selected in the Spreadsheet View from the data series.

- **Insert New Dates**
  This option allows you to insert one or more new dates into the data series displayed in the Spreadsheet View.

- **Remove Dates**
  This option allows you to remove the dates that are currently selected in the Spreadsheet View from the data series.

- **Zoom In**
  This option enlarges the font used in the Spreadsheet View to make it easier to read.

- **Zoom Normal**
  This option resizes the font used in the Spreadsheet View to its original size.

- **Zoom Out**
  This option shrinks the font used in the Spreadsheet View to allow more data to be displayed.

For help with the Spreadsheet View, see Displaying Data in a Spreadsheet.
For help with other submenus, see The TradingSolutions Main Menu.

Main Menu: Tools Menu

The Tools Menu contains options for changing and customizing the program environment. It contains the following menu items.

- **Define Field Formats…**

  This option allows you to modify and define new formats for displaying fields.

  For help with field formats, see the help for the Modify Field Formats Dialog.

- **Define Trading Styles…**

  This option allows you to modify and define new trading styles for analyzing and optimizing fields.

  For help with trading styles, see Using Trading Styles.

- **Customize Toolbars…**

  This option allows you to customize the toolbars in TradingSolutions.

  For help with customizing the toolbars, see Customizing the Toolbars.

- **Options…**

  This option allows you to customize the defaults used in TradingSolutions.

  For help with customizing the defaults, see Changing Global Defaults.

For help with other submenus, see The TradingSolutions Main Menu.

Main Menu: Window Menu

The Window Menu contains options for changing how the current Chart and Spreadsheet View windows are displayed. It contains the following menu items.

- **Resize Program for Help Panel**

  This option moves the program window to the upper left corner of the screen and resizes it so that the program help will be displayed next to it on the right. This is useful especially when performing the step-by-step tutorials.

- **Cascade Windows**

  This option organizes all of the open Chart and Spreadsheet View windows by displaying them cascading from the upper left corner of the display area. Multiple view windows are overlaid so that only the title bar of most windows is visible.

- **Tile Windows Horizontally**

  This option organizes all of the open Chart and Spreadsheet View windows by resizing them so that all of the open windows can be displayed at the same time, stacked horizontally.

- **Tile Windows Vertically**

  This option organizes all of the open Chart and Spreadsheet View windows by resizing them so that all of the open windows can be displayed at the same time, side-by-side vertically.

- **Close All**

  This option closes all open Chart and Spreadsheet View windows.

- ***Current Charts and Spreadsheets***

  This menu also lists all of the open Chart and Spreadsheet view windows in a list. Selecting a specific window will cause that window to be brought to the top if other windows are covering it.

For help with other submenus, see The TradingSolutions Main Menu.

Main Menu: Help Menu

The Help Menu contains access to common help topics. It contains the following menu items.

- **Getting Started**

  This option opens the online help documentation to information on how to begin using TradingSolutions.

  For help getting started, see Getting Started.

- **Welcome Dialog**

  This option displays the Welcome Dialog that is normally displayed when TradingSolutions is first started.

- **Introductory Demos**

  This option displays the introductory demos that are available when TradingSolutions is started.

- **Step-by-Step Tutorials**

  This option displays the list of step-by-step tutorials that are available when TradingSolutions is started.

  For help with the step-by-step tutorials, see the Step-by-Step Tutorials Overview.

- **Help Topics and Index**

  This option opens the online help documentation to a dialog with access to the table of contents, the index, and a search tool.

- **Locate Data on the Internet**

  This option opens the default Internet browser software for the system and displays an updated list of services from which you can obtain data.

  Note: This option requires your computer to be connected to the Internet.

- **TradingSolutions Web Site**

  This option opens the default Internet browser software for the system and displays the TradingSolutions web site. This web site includes the latest information on TradingSolutions.

  Note: This option requires your computer to be connected to the Internet.

- **NeuroDimension Web Site**

  This option opens the default Internet browser software for the system and displays the NeuroDimension company web site. This web site includes product information for NeuroSolutions and the Custom Solution Wizard, along with information on the uses of neural networks in general.

  Note: This option requires your computer to be connected to the Internet.

- **Activate/Purchase Software…**

  This option displays the Activate Software Dialog, which allows you convert the Evaluation Version of the software to the fully functional version.

- **About TradingSolutions…**

  This option displays information about the version of TradingSolutions that you are running.

For help with other submenus, see The TradingSolutions Main Menu.

The TradingSolutions Toolbars

The TradingSolutions Toolbars: Overview

The TradingSolutions toolbars typically appear along the top of the TradingSolutions program window. They present icons for common options you may want to perform while using TradingSolutions. Some toolbars also present brief versions of information presented in other windows.

Toolbars can be customized, moved, and hidden. These helps address the default layout of the toolbars and their contents.

For help customizing the toolbars, see Customizing Toolbars.

The following toolbars are displayed by default when TradingSolutions is first started.

- **Standard Tools**
  This toolbar contains a collection of the most frequently used toolbar options.
- **Message Tools**
  This toolbar displays the most recent unchecked message in the Messages and Alerts Window and provides some message processing options.
- **Task Tools**
  This toolbar displays a summary of the tasks that TradingSolutions is currently performing.

The following toolbars are also available in TradingSolutions.

- **Data Tools**
  This toolbar contains options for importing and exporting data.
- **Edit Tools**
  This toolbar contains options for editing data, such as copy, cut, and paste.
- **Field Tools**
  This toolbar contains options for modifying fields.
- **Help Tools**
  This toolbar contains options for accessing different types of help.
- **Portfolio Tools**
  This toolbar contains options for working with the Portfolio View.
- **Processing Tools**
  This toolbar contains options for adding and changing processing in TradingSolutions.
- **View Tools**
  This toolbar contains options for viewing information.
- **General Tools**
  This toolbar contains options that do not fit in any other category.

Toolbars: Standard Tools

This toolbar contains a collection of the most frequently used toolbar options.

Toggle All Docked Views

This button allows you to hide all or redisplay the Portfolio View, the Information View, the Messages and Alerts Window, and the Current Tasks Window. Hiding these windows is useful for creating more space in the TradingSolutions window for displaying data.

Toggle Portfolio View

This button allows you to hide or display the Portfolio View window.

For help with the Portfolio View window, see Managing Your Portfolio.

Toggle Information View

This button allows you to hide or display the Information View window.

For help with the Information View window, see Tracking Data with the Information View.

Toggle Messages and Alert Window

This button allows you to hide or display the Messages and Alerts Window.

For help with the Messages and Alerts Window, see The Messages and Alerts Window.

Toggle Current Tasks Window

This button allows you to hide or display the Current Tasks Window.

For help with the Portfolio View window, see The Current Tasks Window.

Import Data

This button allows you to import data from other sources into your TradingSolutions portfolio.

For help with importing data, see Importing Data into TradingSolutions.

Update Solution Service

This button allows you to update your portfolio with data and commentary from the TradingSolutions Solution Service.

For help with the Solution Service, see The TradingSolutions Solution Service.

Stream Intraday Data

This button allows you to import intraday data into your portfolio continuously while it is occurring.

For help streaming data, see Streaming Intraday Data.

Display New Chart

This button allows you to display the currently selected data field in a chart. If no data field is currently selected, a dialog is presented allowing you to select which data field to display.

For help with display data in a chart, see Charting Your Data.

Display New Spreadsheet

This button allows you to display the currently selected data series in a spreadsheet. If no data series is currently selected, a dialog is presented allowing you to select which data series to display.

For help with displaying data in a spreadsheet, see Viewing Your Data.

Cut Value

This button allows you to remove the currently selected value or values from the Spreadsheet View. The values can then be pasted to a same-sized region in a Spreadsheet View. They can also be pasted into other programs that accept pasted text.

Copy Value

This button allows you to copy the currently selected value or values from the Spreadsheet View. The values can then be pasted to a same-sized region in a Spreadsheet View. They can also be pasted into other programs that accept pasted text. The Copy option can also be used to copy the contents of the Chart View window so that it can be pasted in a program that accepts pasted graphics, such as Microsoft Word.

Paste Value

This button allows you to copy the currently selected value or values from the Spreadsheet View. The values can then be pasted to a same-sized region in a Spreadsheet View. They can also be pasted into other programs that accept pasted text. The Copy option can also be used to copy the contents of the Chart View window so that it can be pasted in a program that accepts pasted graphics, such as Microsoft Word.

Define Functions

This button allows you to define new functions for use in calculated fields.

For help creating functions, see Writing Your Own Functions.

Define Entry/Exit Systems

This button allows you to define new entry/exit systems to use for generating entry/exit signals.

For help creating entry/exit systems, see Writing Your Own Entry/Exit Systems.

Define Alert Definitions

This button allows you to define new alert definitions to use for generating alerts.

For help creating alerts, see Writing Your Own Alert Definitions.

Define Trading Solutions

This button allows you to define new trading solutions to use for generating entry/exit signals and all of the fields required to calculate them.

For help creating trading solutions, see Creating Your Own Trading Solutions.

Define Trading Styles

This button allows you to modify and define new trading styles for analyzing and optimizing fields.

For help with trading styles, see Using Trading Styles.

List Help Topics and Index

This button opens the online help documentation to a dialog with access to the table of contents, the index, and a search tool.

View Introductory Demos

This button displays the introductory demos that are available when TradingSolutions is started.

View Step-by-Step Tutorials

This button displays the list of step-by-step tutorials that are available when TradingSolutions is started.

For help with the step-by-step tutorials, see the Step-by-Step Tutorials Overview.

About TradingSolutions

This button displays information about the version of TradingSolutions that you are running.

For help with other toolbars, see The TradingSolutions Toolbars.

Toolbars: Data Tools

This toolbar contains options for importing and exporting data.

Stream Intraday Data

This button allows you to import intraday data into your portfolio continuously while it is occurring.

For help streaming data, see Streaming Intraday Data.

Import Data

This button allows you to import data from other sources into your TradingSolutions portfolio.

For help with importing data, see Importing Data into TradingSolutions.

Export Data

This button allows you to export data from your TradingSolutions portfolio for use in other programs.

For help with exporting data, see Exporting Data for Use in Other Programs.

Update Solution Service

This button allows you to update your portfolio with data and commentary from the TradingSolutions Solution Service.

For help with the Solution Service, see The TradingSolutions Solution Service.

Configure Data Sources

This button allows you to configure the data sources associated with services from which you can import data.

For help with data sources, see Configuring Data Sources.

Define Exchanges

This button allows you to create and modify exchanges that specify when individual markets are open and have data available.

For help with exchanges, see Working with Different Exchanges.

For help with other toolbars, see The TradingSolutions Toolbars.

Toolbars: Edit Tools

This toolbar contains options for editing data, such as copy, cut, and paste.

Cut Value

This button allows you to remove the currently selected value or values from the Spreadsheet View. The values can then be pasted to a same-sized region in a Spreadsheet View. They can also be pasted into other programs that accept pasted text.

Copy Value

This button allows you to copy the currently selected value or values from the Spreadsheet View. The values can then be pasted to a same-sized region in a Spreadsheet View. They can also be pasted into other programs that accept pasted text. The Copy option can also be used to copy the contents of the Chart View window so that it can be pasted in a program that accepts pasted graphics, such as Microsoft Word.

Paste Value

This button allows you to copy the currently selected value or values from the Spreadsheet View. The values can then be pasted to a same-sized region in a Spreadsheet View. They can also be pasted into other programs that accept pasted text. The Copy option can also be used to copy the contents of the Chart View window so that it can be pasted in a program that accepts pasted graphics, such as Microsoft Word.

For help with other toolbars, see The TradingSolutions Toolbars.

Toolbars: Field Tools

This toolbar contains options for modifying fields. Each of these options works in the current context. New fields are created in the currently selected data series or group. Field modification and analysis buttons work with the currently selected field.

Add New Field

This button opens the Create a Field Wizard for the currently selected data series or group.

Modify Field Properties

This button opens the Modify Field Dialog for the currently selected field.

Analyze Field

This button opens the most common analysis option used for the currently selected field. For signals, it opens the Modify Field Dialog: Signal Analysis page. For predictions that are not signals, this it opens the Modify Field Dialog: Training Analysis page. For other fields, it opens the Correlation Analysis Wizard, or the Modify Field Dialog: Correlation Analysis page if an analysis has already been performed.

Add Calculation Field

This button opens the Calculate a Value Wizard for the currently selected data series or group.

Add Prediction Field

This button opens the Predict a Value Wizard for the currently selected data series or group.

Add Entry/Exit System Field

This button opens the Apply an Entry/Exit System Wizard for the currently selected data series or group.

Add Optimal Signal Field

This button opens the Generate an Optimal Signal Wizard for the currently selected data series or group.

Add Committee Field

This button opens the Create a Committee Wizard for the currently selected data series or group.

Add Signal Analysis Fields

This button opens the Create Signal Analysis Fields Wizard for the currently selected data series or group.

Add Alert Field

This button opens the Generate an Alert Wizard for the currently selected data series or group.

Add Complete Trading Solution

This button opens the Apply a Trading Solution Wizard for the currently selected data series or group.

Add Raw Data Field

This button opens the Create a Field Wizard for the currently selected data series or group, opened to the Select Name page.

For help with other toolbars, see The TradingSolutions Toolbars.

Toolbars: General Tools

This toolbar contains options that do not fit in any other category.

Define Field Formats

This button allows you to modify the formats used to display different types of values.

For help with field formats, see Using Custom Field Formats.

Define Trading Styles

This button allows you to modify and define new trading styles for analyzing and optimizing fields.

For help with trading styles, see Using Trading Styles.

For help with other toolbars, see The TradingSolutions Toolbars.

Toolbars: Help Tools

This toolbar contains options for accessing different types of help.

Getting Started

This button opens the online help documentation to information on how to begin using TradingSolutions.

For help getting started, see Getting Started.

List Help Topics and Index

This button opens the online help documentation to a dialog with access to the table of contents, the index, and a search tool.

Welcome Dialog

This button displays the Welcome Dialog that is normally displayed when TradingSolutions is first started.

View Introductory Demos

This button displays the introductory demos that are available when TradingSolutions is started.

View Step-by-Step Tutorials

This button displays the list of step-by-step tutorials that are available when TradingSolutions is started.

For help with the step-by-step tutorials, see the Step-by-Step Tutorials Overview.

Locate Data on the Internet

This button opens the default Internet browser software for the system and displays an updated list of services from which you can obtain data.

Note: This option requires your computer to be connected to the Internet.

TradingSolutions Web Site

This button opens the default Internet browser software for the system and displays the TradingSolutions web site. This web site includes the latest information on TradingSolutions.

Note: This option requires your computer to be connected to the Internet.

NeuroDimension Web Site

This button opens the default Internet browser software for the system and displays the NeuroDimension company web site. This web site includes product information for NeuroSolutions and the Custom Solution Wizard, along with information on the uses of neural networks in general.

Note: This option requires your computer to be connected to the Internet.

About TradingSolutions

This button displays information about the version of TradingSolutions that you are running.

For help with other toolbars, see The TradingSolutions Toolbars.

Toolbars: Message Tools

This toolbar displays the most recent unchecked message in the Messages and Alerts Window and provides some message processing options.

Toggle Messages and Alert Window

This button allows you to hide or display the Messages and Alerts Window.

For help with the Messages and Alerts Window, see The Messages and Alerts Window.

Perform Action for Message

This button performs a common action associated with the message if one is available.

Example: The action for messages indicating a new analysis is available for a field is to display that analysis.

Check Message as Completed

The button allows you to indicate when you are finished with a message.

Note: Checking a message will not remove it. In order to remove a message completely, press the **Remove Checked** button on the Messages and Alerts Window.

For help with other toolbars, see The TradingSolutions Toolbars.

Toolbars: Portfolio Tools

This toolbar contains options for working with the Portfolio View.

Toggle Portfolio View

This button allows you to hide or display the Portfolio View window.

For help with the Portfolio View window, see Managing Your Portfolio.

Toggle Information View

This button allows you to hide or display the Information View window.

For help with the Information View window, see Tracking Data with the Information View.

Modify Display Fields

This button allows you to modify the display fields for the currently selected group.

For help with the display fields, see Using Display Fields.

View Previous Day

This button allows you to change the display date of the Portfolio View to the previous day.

View Next Day

This button allows you to change the display date of the Portfolio View to the next day.

Select Display Date

This button allows you to select the date being displayed in the Portfolio View.

View Today

This button allows you to set the date being displayed in the Portfolio View to today.

For help with other toolbars, see The TradingSolutions Toolbars.

Toolbars: Processing Tools

This toolbar contains options for adding and changing processing in TradingSolutions.

Define Alert Definitions

This button allows you to define new alert definitions to use for generating alerts.

For help creating alerts, see Writing Your Own Alert Definitions.

Define Entry/Exit Systems

This button allows you to define new entry/exit systems to use for generating entry/exit signals.

For help creating entry/exit systems, see Writing Your Own Entry/Exit Systems.

Define Functions

This button allows you to define new functions for use in calculated fields.

For help creating functions, see Writing Your Own Functions.

Define Trading Solutions

This button allows you to define new trading solutions to use for generating entry/exit signals and all of the fields required to calculate them.

For help creating trading solutions, see Creating Your Own Trading Solutions.

Import Functions

This button allows you to import functions, entry/exit systems, and alert definitions that have been exported by other TradingSolutions users.

For help with importing functions, see Sharing Your Functions with Other Users.

Export Functions

This button allows you to export functions, entry/exit systems, and alert definitions that you have written for other TradingSolutions users to import and use.

For help with exporting functions, see Sharing Your Functions with Other Users.

Import Trading Solutions

This button allows you to import a trading solution that has been exported by another TradingSolutions user.

For help with importing trading solutions, see Sharing Your Solutions with Other Users.

Export Trading Solutions

This button allows you to export a trading solution for other TradingSolutions users to import and use.

For help with exporting trading solutions, see Sharing Your Solutions with Other Users.

For help with other toolbars, see The TradingSolutions Toolbars.

Toolbars: Task Tools

This toolbar displays a summary of the tasks that TradingSolutions is currently performing.

Toggle Current Tasks Window

This button allows you to hide or display the Current Tasks Window.

For help with the Portfolio View window, see The Current Tasks Window.

Stop/Restart Task Processing

This menu selection stops all fields from being processed. This is useful when other processing on your computer is being slowed by TradingSolutions processing. Reselect this item to restart field processing.

Display Task Details

This menu selection displays the Status Dialog associated with this task, the same as the Task Detail Button.

For help with other toolbars, see The TradingSolutions Toolbars.

Toolbars: View Tools

This toolbar contains options for viewing information.

Toggle All Docked Views

This button allows you to hide all or redisplay the Portfolio View, the Information View, the Messages and Alerts Window, and the Current Tasks Window. Hiding these windows is useful for creating more space in the TradingSolutions window for displaying data.

Toggle Portfolio View

This button allows you to hide or display the Portfolio View window.

For help with the Portfolio View window, see Managing Your Portfolio.

Toggle Information View

This button allows you to hide or display the Information View window.

For help with the Information View window, see Tracking Data with the Information View.

Toggle Messages and Alert Window

This button allows you to hide or display the Messages and Alerts Window.

For help with the Messages and Alerts Window, see The Messages and Alerts Window.

Toggle Current Tasks Window

This button allows you to hide or display the Current Tasks Window.

For help with the Portfolio View window, see The Current Tasks Window.

For help with other toolbars, see The TradingSolutions Toolbars.

Customizing Toolbars

The toolbars in TradingSolutions can be selected and modified to fit individual preferences and working styles. The toolbars can be moved to any edge of the TradingSolutions window, or they can be left floating in the middle of the window. There are multiple toolbars available, each with different sets of frequently used options. Plus, each toolbar can be modified to include different options.

For help with specific toolbars, see The TradingSolutions Toolbars.

Moving Toolbars

By default, toolbars are docked on the top of the TradingSolutions window. This means that toolbars are attached to the top of this window and will not cover any data windows.

To move a toolbar to a new location, move the mouse to the window handle at the left of the toolbar. When the toolbar is docked, this handle is displayed as two gray lines. Once the mouse is positioned over the handle, you can drag the toolbar to a new location by pressing the left mouse button down and moving the mouse. An outline of the new toolbar position will be displayed while the mouse is being moved. When the desired location is reached, simply release the mouse button to end the dragging operation.

By default, if a toolbar is being moved to a location near the edge the TradingSolutions window, it will dock itself on that edge. To move a toolbar without docking, hold the **Ctrl** key down while you are dragging the window.

Note: The Portfolio View window is treated like a toolbar for the purposes of determining where toolbars can be docked. This may result in toolbars wrapping around the Portfolio View window when it is docked.

Temporarily Removing Toolbars

There are times when it may be useful to temporarily hide the toolbars from the TradingSolutions window in order to display more data. To hide or redisplay the toolbars, toggle the **Display Toolbars** option on the **View** menu. Additional space can also be created toggling the status bar in a similar manner.

Selecting Different Toolbars

By default, TradingSolutions displays a single toolbar with a standard set of commonly used options. Other toolbars are also available with options that are typically less frequently used. All of the options available from these toolbars are available using menus or dialog options and generally only need to be added to provide shortcuts or other customizations.

To select new or different toolbars, select **Customize Toolbars…** from the **Tools** menu. This will display the Customize Dialog, which will allow you to enable and disable specific toolbars.

Modifying the Contents of Toolbars

The toolbars and menu bar of TradingSolutions can be modified to provide different options. To add or remove options from the toolbars, select **Customize Toolbars…** from the **Tools** menu. Then, select the **Buttons** tab on the Customize Dialog. The Buttons page will allow you to drag toolbar options to toolbars that are currently being displayed. In addition, options on toolbars that are currently being displayed can be dragged to new locations or removed.

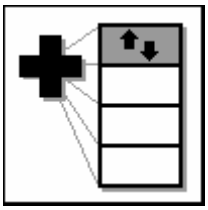
The TradingSolutions toolbar typically appears along the top of the TradingSolutions program window. It presents icons for common options you may want to perform while using TradingSolutions.

Note: Toolbars are typically displayed along the top of the program window, but can be moved elsewhere and even dismissed. If you are having trouble finding the TradingSolutions Toolbar at the top of the program window, look in other locations. If you think you may have dismissed it, select **Customize Toolbars…** from the **Tools** menu and make sure it is selected to be displayed.

Help with Wizards

Apply an Entry/Exit System Wizard

Apply an Entry/Exit System Wizard: Introduction



The Apply an Entry/Exit System Wizard allows you to create a new signal field. This page introduces you to the steps involved in creating this type of field.

If you have previously selected not to display this introductory page, the next page will be displayed automatically when advancing through the wizard.

For help with entry/exit systems, see Creating and Analyzing Entry/Exit Signals.

Skipping this Introduction Page

After you are familiar with the process of creating this type of field, you may want to cause this Introduction page not to be displayed each time you create a field. To do this, select the option at the bottom of this page labeled **Do not display this introductory page in the future.** Each time you create this type of field after this, the wizard will automatically advance to the next page in the wizard.

If you would like to restore this introduction page after selecting not to display it, exit any dialogs or wizards and select **Options…** from the **Tools** menu. This will display the Modify Options Dialog, where you can select the General Options property page. On this page, press the **Restore Hidden Information Panels** button to restore this page and any other information panels you previously selected not to display.

What Do I Do Next?

When you are ready to continue, press the **Next** button to continue on to the Select Entry/Exit System page. If you would like to exit the Wizard without creating a new field, press the **Cancel** button. If you would like to create a different type of field, such as a prediction, press the **Back** button to return to the Create a Field Wizard: Select Type page.

How Did I Get Here?

The Apply an Entry/Exit Wizard: Introduction page appears when you select to apply an entry/exit system from the Create a Field Wizard: Select Type page. It also appears when you select the **Add Entry/Exit System Field** button from the **Fields** toolbar.

Calculate a Value Wizard: Select Function

Apply an Entry/Exit System Wizard: Select Entry/Exit System

Generate an Alert Wizard: Select Alert Definition

Apply a Trading Solution Wizard: Select Trading Solution

Modify Field Dialog: Function, Entry/Exit System, or Alert Definition

This dialog appears in several forms.

The Calculate a Value Wizard allows you to create a new calculation field in a data series or in all data series in a portfolio or group. The Apply an Entry/Exit System Wizard allows you to create a new signal field. The Generate an Alert Wizard allows you to create a new alert field. The Apply a Trading Solution Wizard allows you to create one or more predefined fields that typically perform interrelated functions.

The Modify Field Dialog allows you to modify the properties of a previously created field. This page allows you to select which function, entry/exit system, or alert you would like to use.

Note: Fields that are currently being used by the Solution Service cannot be modified.

For help with calculated values, see Calculating Values and Financial Indicators.

For help with entry/exit systems, see Creating and Analyzing Entry/Exit Signals.

For help with alerts, see Using Alerts to Highlight Events.

For help with trading solutions, see Working with Complete Trading Solutions.

Selecting What to Perform

To select a function definition, entry/exit system, alert, or trading solution to use for a field, select a group from the group list, then select an entry from that group. If you know the name of the entry, but do not know what group it is in, you can use the group **<All Groups>** to display all of the entries available for this operation.

Note: If you are using the Modify Field Dialog and change the function or entry/exit system associated with a field, be sure to update the inputs as appropriate. In addition, you will be asked if the field name should be updated to reflect the new functionality.

The Apply a Trading Solution Wizard includes an additional group when applying a trading solution to a single data series. This group, called **<Trading Solutions For *ticker*>** contains all of the trading solutions that have been created based on the selected data series. If any trading solutions are available for this group, it will be selected by default.

Note: Only trading solutions that were created in TradingSolutions v2.0 or later will appear in this group. Trading solutions from earlier releases can still be used, but do not contain the information necessary to be sorted into this specialized group.

Additional Options

If you would like to create a new function definition, entry/exit system, alert, or trading solution to use, press the **Create…** button. This will display the appropriate creation wizard for the type of field you are creating. Similarly, you can also import new definitions by pressing the **Import…** button.

If you would prefer to see more entries in the lists, you can add or remove the description area using the **Display Descriptions** checkbox.

What Do I Do Next?

Press the **Next** button to continue. If you are applying a trading solution, this will present the Create Fields page. If you are using another method to create a new field, this will present the Select Inputs page.

If you would like to exit the Wizard without creating a new field, press the **Cancel** button. If you would like to create a different type of field, such as a prediction, press the **Back** button to return to the Create a Field Wizard: Select Type page.

Note: If you select a function that does not require any inputs, the **Next** button will proceed directly to the Select Name page.

If you are finished updating the properties of a previously created field, press the **OK** button to save your changes or select another property page. If you would like to exit from this dialog without performing any changes, press the **Cancel** button.

Additional Property Pages

The Modify Field Dialog has many different property pages that will be displayed as is appropriate for the type of field being modified. For information on the other property pages available, see the help for the Modify Field Dialog.

How Did I Get Here?

The Calculate a Value Wizard appears when you select to create a new field to calculate a value from the Create a Field Wizard: Select Type page. It also appears when you select the **Add Calculation Field** button from the **Fields** toolbar.

The Apply an Entry/Exit Wizard appears when you select to apply an entry/exit system from the Create a Field Wizard: Select Type page. It also appears when you select the **Add Entry/Exit System Field** button from the **Fields** toolbar.

The Generate an Alert Wizard appears when you select to create an alert from the Create a Field Wizard: Select Type page. It also appears when you select the **Add Alert Field** button from the **Fields** toolbar.

The Apply a Trading Solution Wizard appears when you select apply a trading solution from the Create a Field Wizard: Select Type page. It also appears when you select the **Apply A Complete Trading Solution** button from the **Fields** toolbar or select **Apply a Trading Solution…** from the context menu of an item in the Portfolio View.

The Modify Field Dialog appears when you select to modify or analyze the selected field from the Modify Data Series Dialog or the Modify Portfolio/Group Dialog. It is also displayed when you select **Modify Field…** from the context menu for a field in a chart or spreadsheet.

Note: After trading solutions are applied, the created fields cannot be modified as a solution. The individual fields are modified instead.

Calculate a Value Wizard: Select Inputs

Apply an Entry/Exit System Wizard: Select Inputs

Generate an Alert Wizard: Select Inputs

Modify Field Dialog: Function, Entry/Exit System, or Alert Inputs

Modify Trading Solution Input Assignments Dialog: Solution Inputs

This dialog appears in several forms. The Calculate a Value Wizard allows you to create a new calculation field in a data series or in all data series in a portfolio or group. The Apply an Entry/Exit System Wizard allows you to create a new signal field. The Generate an Alert Wizard allows you to create a new alert field. The Modify Field Dialog allows you to modify the properties of a previously created field. The Modify Trading Solution Inputs Dialog allows you to modify fields and data assigned to the inputs of a trading solution. This page allows you to select which fields and values you would like to use for the required inputs.

Note: Fields that are currently being used by the Solution Service cannot be modified.

For help with calculated values, see Calculating Values and Financial Indicators.

For help with entry/exit systems, see Creating and Analyzing Entry/Exit Signals.

For help with alerts, see Using Alerts to Highlight Events.

For help with trading solutions, see Working with Complete Trading Solutions.

Selecting Input Values

The inputs required by the selected function, entry/exit system, alert, or trading solution are displayed in a list. To select the value for an individual input, select the input you would like to specify, then select a value for it. When you select an input from the required input list, the current value associated with the input will be displayed in the lower portion of the dialog.

After selecting an input, the following controls are available for modifying its value:

- **Use the values in a selected field:**
  - **Select from fields for: Series**
    This option will cause the selection tree to contain all of the fields available in the selected data series. The selection tree can then be used to select a field to use for the input values or a new field can be created using the **Create a New Field…** button. This will display the Create a Field Wizard.
  - **Select from fields for: Entire Portfolio**
    This option will cause the selection tree to contain all of the fields available from all of the data series in the portfolio. This is useful for combining information in a data series with information from outside the data series. When this option is chosen, the selection tree can then be used to select a field to use for the input values.

  For help using the selection tree, see the help for Selection Trees.
- **Use a constant value:**
  This option allows you to specify a constant value for an input. When this option is selected, use the box next to the constant value to indicate the value of the field.

  Note: Some functions may require some input values to be integers, such as when a number of bars is being specified as a period.

  Note: Constant inputs can be optimized in some situations. See **Optimizing Constant Input Values** below for more information.

After selecting a value for an input, you advance to the next input by pressing the **Next Input…** button or selecting it from the input list.

Note: If you are using the Modify Field Dialog to change the inputs to an existing field, you will be asked if the field name should be updated to reflect the new inputs.

Optimizing Constant Input Values

Some types of inputs can be optimized to locate the best results. These include the following:

- Constant inputs to entry/exit systems
- Constant inputs to optimizable functions which are used as inputs to predictions

Inputs which can be optimized have the following additional settings:

☑ **Include this value in optimization.**

This setting indicates whether this input should be optimized when the field is being optimized. Removing the check from this box excludes this input from optimization, leaving it at the specified value.

▣ **Range**

These values indicate the minimum and maximum values which should be tried when this input is being optimized.

Note: If this input is restricted to integer values, only integer values will be tried. Otherwise, any floating point value may be tried within the range.

Optimization of entry/exit systems is controlled using the following controls:

☑ **Optimize Inputs Now**

This setting indicates whether to optimize the constant inputs for this prediction when this dialog is exited. This setting is selected by default when you first apply an entry/exit system.

Note: If no inputs are defined as constant values or no inputs are included in optimization, optimization will not be available.

Note: If this is a field defined for an entire group, optimization cannot be turned off for this field once it has been used.

Note: When modifying an existing field and optimization is selected, it cannot be deselected after leaving this page except by pressing the **Cancel** button to leave this dialog.

☐ **Optimization Options…**

This button displays the Signal Optimization Settings Dialog, where you can specify the settings which will be used to optimize the inputs.

Optimization of predictions and prediction inputs is controlled from the wizards and dialogs associated with the prediction.

For help with optimizing fields, see Optimizing Signals and Predictions.

What Do I Do Next?

If you are modifying the inputs of a trading solution, press the **OK** button to save your changes or select another property page. If you would like to exit from this dialog without performing any changes, press the **Cancel** button.

If you are creating a new field, press the **Next** button to continue on to the Select Name page. If you would like to exit the Wizard without creating a new field, press the **Cancel** button. If you would like to select a different function or entry/exit system, press the **Back** button to return to the previous page.

If you are finished updating the properties of a previously created field, press the **OK** button to save your changes or select another property page. If you would like to exit from this dialog without performing any changes, press the **Cancel** button.

Additional Property Pages

The Modify Field Dialog has many different property pages that will be displayed as is appropriate for the type of field being modified. For information on the other property pages available, see the help for the Modify Field Dialog.

The Modify Trading Solution Inputs Dialog may also contain an External Data page if the selected trading solution requires external data.

How Did I Get Here?

The Select Inputs page appears after the Select Function page in the Calculate a Value Wizard and after the Select Entry/Exit System page in the Apply an Entry/Exit System Wizard.

The Modify Field Dialog appears when you select to modify or analyze the selected field from the Modify Data Series Dialog or the Modify Portfolio/Group Dialog. It is also displayed when you select **Modify Field…** from the context menu for a field in a chart or spreadsheet.

The Modify Field Dialog: Function Inputs page appears by itself when you press the **Modify Input…** button on the Predict a Value Wizard: Select Inputs page for an input which is an optimizable function.

The Modify Trading Solution Input Assignments Dialog appears when you press the **Modify Input Assignments…** button on the Apply a Trading Solution Wizard: Create Fields page.

Note: After trading solutions are applied, the created fields cannot be modified as a solution. The individual fields are modified instead.

Field Creation Wizards: Select Name

The Select Name page allows you to select a name for the new field and where the field should be calculated. This page may appear at the end of several different field creation wizards.

For help with calculated values, see Calculating Values and Financial Indicators.

For help with entry/exit systems, see Creating and Analyzing Entry/Exit Signals.

For help with alerts, see Using Alerts to Highlight Events.

Selecting a Name for a New Field

The new field will default to being named based on the type of field being created and the inputs being used. To select a different name, use one of the selections from the combo box or enter a different name. The name of the new field must be unique for all of the data series it is being created in.

Selecting the Format of a Calculated Value

Fields based on functions will be formatted using the default format information specified in the function definition. This format can be overridden by changing the value under **Select a format for this field**. You can create new formats by pressing the **New…** button, which will display the Define Field Formats Dialog.

The format which is used to display a calculated value will not affect its actual value. However, only fields formatted as signals are analyzed for profitability and displayed on the Modify Data Series Dialog: Entry/Exit Signals Page.

Additional Options

If this field is being created for an entire group or portfolio, the following option is also available:

☑ **Add to portfolio display for this group.**

This option automatically adds this field to the display fields for this group which are displayed in the Portfolio View.

Note: If you later decide to add or remove this field from the Portfolio View, you can do so by selecting **Modify Display Fields…** from the context menu for this group in the Portfolio View.

What Do I Do Next?

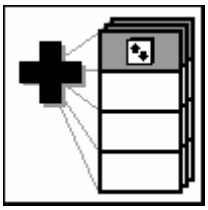
When you have confirmed the values for these options, press the **Finish** button to create the new field. If you would like to exit the Wizard without creating a new field, press the **Cancel** button. If you would like to modify the properties of the field being created, press the **Back** button to return to the previous page.

How Did I Get Here?

The Select Name page appears at the end of various field creation wizards. For information about the different types of field creation wizards, see the help for the Create a Field Wizard.

Apply a Trading Solution Wizard

Apply a Trading Solution Wizard: Introduction



The Apply a Trading Solution Wizard allows you to create one or more predefined fields that typically perform interrelated functions. This page introduces you to the steps involved in creating this type of field.

If you have previously selected not to display this introductory page, the next page will be displayed automatically when advancing through the wizard.

For help with trading solutions, see Working with Complete Trading Solutions.

Skipping this Introduction Page

After you are familiar with the process of creating this type of field, you may want to cause this Introduction page not to be displayed each time you create a field. To do this, select the option at the bottom of this page labeled **Do not display this introductory page in the future.** Each time you create this type of field after this, the wizard will automatically advance to the next page in the wizard.

If you would like to restore this introduction page after selecting not to display it, exit any dialogs or wizards and select **Options…** from the **Tools** menu. This will display the Modify Options Dialog, where you can select the General Options property page. On this page, press the **Restore Hidden Information Panels** button to restore this page and any other information panels you previously selected not to display.

What Do I Do Next?

When you are ready to continue, press the **Next** button to continue on to the Select Trading Solution page. If you would like to exit the Wizard without creating a new field, press the **Cancel** button. If you would like to create a different type of field, such as a prediction, press the **Back** button to return to the Create a Field Wizard: Select Type page.

How Did I Get Here?

The Apply a Trading Solution Wizard: Introduction page appears when you select to apply a trading solution from the Create a Field Wizard: Select Type page. It also appears when you select the **Add Complete Trading Solution** button from the **Fields** toolbar.

Apply a Trading Solution Wizard: Create Fields

The Apply a Trading Solution Wizard allows you to create one or more predefined fields that typically perform interrelated functions. This page allows you to confirm the fields that will be created by this trading solution.

For help with trading solutions, see Working with Complete Trading Solutions.

Confirming the Field to Be Created by the Trading Solution

This page has two different modes. By default, the advanced options and information associated with applying a trading solution are hidden. To display these options and information, press the **Show Advanced Options** button. Once displayed, these options can be hidden by pressing the **Hide Advanced Options** button that will appear.

In most cases, the default values will be acceptable. Press the **Finish** button to create the indicated field, along with any fields that are required for its calculation.

Notes about Training Weights in Trading Solutions

Trading solutions can be saved so that they include the training weights for the predictions included in the trading solution. Here are some notes about how these saved training weights are used:

- Trading solutions created with TradingSolutions v2.0 or later include information about the data series that was used to create them. If this information is available, the default is to only use the saved training weights if the trading solution is being applied to the same data series.
- Trading solutions created with versions before TradingSolutions v2.0 did not include this information. In this case, the default is to always use the saved trading weights if they were available. This can cause unusual results, as noted below.
- When applying a trading solution to an entire group, the option to use the saved training weights is not available. This overrides the defaults for using the saved training weights mentioned above.
- When applying a trading solution to a data series, you can determine whether the saved training weights are being used and adjust this setting by pressing the **Show Advanced Options** button on the Apply a Trading Solution Wizard: Create Fields page.
- It is important to note that because of these defaults, when applying a trading solution to a data series at both the data and group levels, that different defaults may be used. And, because of this, you may get different results.

Here are some things to consider concerning the use of saved training weights:

- When you use the saved training weights, the predictions in the trading solution will not be trained or optimized based on the data in the data series. You can force this training and optimization to occur from the Modify Data Series: Predictions page by pressing selecting the individual predictions and pressing the **Retrain** button.
- You will not typically want to use the training for one data series with the data for another data series. While this is a valid approach that can produce reasonable results, better results will typically be obtained by training specifically on the target data.

Viewing the Advanced Options Field List

The advanced mode for this page includes a complete list of the fields that will be created by applying this trading solution with the selected data and inputs, along with any informational messages associated with those fields.

It is important to note that all of the fields contained in a trading solution may not be listed here. If a field exists that has the same definition as a field that would be produced, the existing field will be used instead. For example, if a trading solution uses a 10-period moving average of the closing price in its calculation and a 10-period moving average field is already defined, it will not create a new one. The one exception to this rule is the final output of the trading solution (also known as the source field). The final output field will always be created.

The following informational messages may be displayed with the fields being created.

- **One or more inputs could not be resolved.**

  This message will appear if data or a raw value field required by the trading solution could not be located. Typically, it is accompanied by one or more inputs being indicated as being invalid. To resolve the problem,

press the **Modify Inputs…** button and select the data and/or fields to use. This will display the Modify Trading Solution Inputs Dialog.

- **Training range adjusted for available data.**

  Predicted fields are defined with a date range to use for training the prediction and validating the results. If this date range is larger than the available dates for the target data series, the training range will be adjusted to fit the new data. Specifically, if the start date of the training range is before the first date in the data series, the start date will be moved forward to the first available date. Likewise, if the end date is after the last date in the data series, it will be moved to the last available date.

- **Training weights available for this prediction.**

  Trading solutions that include predicted fields can be created to include the training weights associated with those predictions. This allows you use a prediction without having to train it again and makes it possible to get the same results as the trading solutions user that created the trading solution when using the same data. To use the training weights saved with a trading solution, select **Use prediction training weights saved with this trading solution.**

Understanding the Advanced Options

The following field creation options are available when the advanced options are being displayed.

☑ **Use default field names.**

By default, any fields created by the solution will be named the same as the fields used to create the solution. This option causes the fields to be named with their default generated names, which may or may not be different from the names stored in the trading solution.

☑ **Create redundant fields.**

By default, if a field exists that has the same definition as a field that will be produced, the existing field will be used instead. This option causes redundant fields to be created instead of reusing existing fields.

☑ **Use prediction training weights saved with this solution.**

This option indicates to use any training weights that are stored in the trading solution. Typically, this should only be used when a trading solution is being applied to the same data it was created with. This option is selected by default if training weights are available and the target data has the same symbol and periodicity as the original data.

> Note: If you select to use the training weights saved with a trading solution and later decide you do not want to use them, simply retrain the prediction.

☑ **Re-optimize previously optimized fields using target data.**

This option indicates to optimize any fields which were previously optimized before being stored in the trading solution. This allows you to optimize a trading solution based on the target data. This option is only available when saved training weights are not being used and the trading solution contains fields that were previously optimized.

> Note: The optimization will start with some of the current settings stored in the field. Therefore, it is possible to get different results from the original optimization when the solution is applied to the same data.

- **Modify Inputs Assignments…**

  This button will display the Modify Trading Solution Inputs Dialog, which allows you to modify the external data and fields being used to create the fields for the trading solution.

- **Hide Advanced Options**

  This button will hide the advanced options, returning this page to its normal state.

What Do I Do Next?

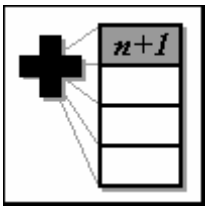
When you are ready to continue, press the **Finish** button to create the indicated fields. If you would like to exit the Wizard without creating a new field, press the **Cancel** button. If you would like to modify the properties of the field being created, press the **Back** button to return to the Select Trading Solution page.

How Did I Get Here?

The Create Fields page appears at the end of the Apply a Trading Solution Wizard, after the Select Trading Solution page.

Calculate a Value Wizard

Calculate a Value Wizard: Introduction



The Calculate a Value Wizard allows you to create a new calculated field in a data series or in all data series in a portfolio or group. This page introduces you to the steps involved in creating this type of field.

If you have previously selected not to display this introductory page, the next page will be displayed automatically when advancing through the wizard.

For help with calculated values, see Calculating Values and Financial Indicators.

Skipping this Introduction Page

After you are familiar with the process of creating this type of field, you may want to cause this Introduction page not to be displayed each time you create a field. To do this, select the option at the bottom of this page labeled **Do not display this introductory page in the future.** Each time you create this type of field after this, the wizard will automatically advance to the next page in the wizard.

If you would like to restore this introduction page after selecting not to display it, exit any dialogs or wizards and select **Options…** from the **Tools** menu. This will display the Modify Options Dialog, where you can select the General Options property page. On this page, press the **Restore Hidden Information Panels** button to restore this page and any other information panels you previously selected not to display.

What Do I Do Next?

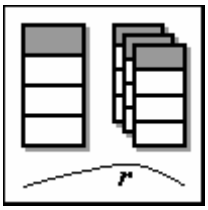
When you are ready to continue, press the **Next** button to continue on to the Select Function page. If you would like to exit the Wizard without creating a new field, press the **Cancel** button. If you would like to create a different type of field, such as a prediction, press the **Back** button to return to the Create a Field Wizard: Select Type page.

How Did I Get Here?

The Calculate a Value Wizard: Introduction page appears when you select to create a new field to calculate a value from the Create a Field Wizard: Select Type page. It also appears when you select the **Add Calculation Field** button from the **Fields** toolbar.

Correlation Analysis Wizard

Correlation Analysis Wizard: Analysis Type



The Correlation Analysis Wizard allows you to search for correlation between the data in one field and the previous or future values of one or more other fields.

Correlation Analysis is useful for searching for direct relationships between values of one data field and previous values of another field. Specifically, correlation analysis determines if the two sets of values move in the same direction by the similar amounts. If a strong relationship is found, the previous values of the second field may be useful for predicting new values of the first.

For example, if there is a high correlation between the closing price of ABC and the closing price of DEF on the previous day, then the changes in the price of DEF may make an effective input for predicting the price of ABC.

Selecting What Type of Correlation Analysis to Perform

Correlation analysis can be used to detect either of the following conditions.

- **Determine if other fields may be good inputs for predicting this field.**

  This type of analysis compares the values of this field to previous values of other fields. If a high correlation is detected between this field and the previous value of another field, the other field may make a good input for predicting this field.

- **Determine if this field may be a good input for predicting other fields.**

  This type of analysis compares the values of this field to future values of other fields. If a high correlation is detected between this field and the future value of another field, this field may make a good input for predicting the other field.

What Do I Do Next?

When you have selected the type of correlation analysis you would like to perform, press the **Next** button to continue to the Analysis Fields page. If you would like to exit the Wizard without performing any analysis, press the **Cancel** button.

How Did I Get Here?

The Correlation Analysis Wizard appears when you press the **Correlation Analysis** button on the Modify Field Dialog: Overview page.

Correlation Analysis Wizard: Analysis Fields

Correlation Analysis Dialog: Analysis Fields

The Correlation Analysis Wizard allows you to search for correlation between the data in one field and the previous or future values of one or more other fields. This is useful for determining if one field may be a good input for predicting another. The Analysis Fields page allows you to select which fields to perform the correlation analysis against.

Selecting Fields for Correlation Analysis

All of the fields in the portfolio are available for selection from the selection tree. To specify one or more fields for correlation analysis, select a group, data, or field from the selection tree and press the **Add Selected Fields** button.

The **Preprocessing** setting can be used to apply individual preprocessing to the fields as they are selected. By default, the percent change of each value will be analyzed. This is also the default when selecting inputs for creating a prediction.

- **Percent Change**
  This option uses the percent change in the value of the field. It is useful for analyzing fields that do not have a constant range, such a price data.

- **Change**
  This option uses the change in the value of the field. It is useful for analyzing fields that have both positive and negative values and those that include zero.

- **None**
  This option uses the actual value of the field. It is useful for analyzing fields that have a consistent range, such as entry/exit signals and some financial indicators.

  Note: Change and percent change preprocessing are done relative to the previous bar of the prediction data series. In most cases, this is the change from the previous bar of the input. However, when using data of other periodicities, it will be the change from the value at the previous bar of the prediction.

  For additional help with working with multiple periodicities, see Understanding Periodicity.

If you would like to add only one field from all of the selected data, press the **Add Field from Selection…** button. This will display a field selection dialog that will allow you to select a single field name to add from all of the selected data.

Example: To add the Close field from all of the data in the portfolio, select the portfolio in the field tree. Then, press the **Add Field from Selection…** button and select Close" on the field selection dialog.

You can also perform either of these operations by double-clicking on an entry in the field tree.

For help using the selection tree, see the help for Selection Trees.

Note: The selected fields must all share a common date range in order to be analyzed. Only one date range is used for each correlation analysis.

Changing or Replacing Fields from a Previous Correlation Analysis

The fields that are currently selected for analysis are displayed in a list on the dialog. To remove all of the previous fields and replace them with new ones, press the **Remove All Fields** button. To remove individual fields, select the fields you would like to remove from the list and press the **Remove Selected** button. New fields can then be added using the methods described above.

What Do I Do Next?

If you are creating a new correlation analysis, press the **Next** button to continue on to the Analysis Options page. If you would like to exit the wizard without performing any analysis, press the **Cancel** button. If you would like to change the type of analysis being performed, press the **Back** button to return to the Analysis Type page.

If you are modifying a previous correlation analysis, press the **OK** button to save your changes or select another property page. If you would like to exit from this dialog without changing the previous correlation analysis, press the **Cancel** button.

Additional Property Pages

The Correlation Analysis Wizard is displayed as a dialog with property pages when previous correlation analysis options are being modified. In addition to this page, the Analysis Options page is also available.

For help using property pages, see the help for Property Pages.

How Did I Get Here?

The Analysis Fields page appears after the Analysis Type page in the Correlation Analysis Wizard. It is also displayed when you press the **Change Analysis…** button from the Modify Field Dialog: Correlation Analysis page.

Correlation Analysis Wizard: Analysis Options

Correlation Analysis Dialog: Analysis Options

The Correlation Analysis Wizard allows you to search for correlation between the data in one field and the previous or future values of one or more other fields. This is useful for determining if one field may be a good input for predicting another. The Analysis Options page allows you to specify the date range and refine the type of analysis.

Selecting a Date Range for Correlation Analysis

Correlation analysis is performed over a series of contiguous dates in the data series of the selected fields and the field being analyzed. By default, the correlation analysis wizard will use all of the dates for which there is data in these data series. To select a subset of the available data, adjust the date or size values.

Start of Range / End of Range

These values specify the start and end of the data range. Use the date controls to increase or decrease these values. As these values are updated, the size will be updated automatically.

For help using the date controls, see the help for Date Selection Controls.

Note: The data available for the correlation will be limited by the date ranges available for all of the fields in the data being analyzed. If you would like to analyze a larger date range than is currently available, try removing the smaller data series. You can quickly identify the start and end dates of all data series by adding the start and end dates as display fields in the portfolio view.

Size

This value specifies the number of samples, days, or other length of data in the selected range. If this value is changed, the range will be updated to match the new size. If the End of Range is set to the last date, the Start of Range will be adjusted; otherwise, the End of Range will be adjusted.

Note: Size in samples is not available when analyzing group fields since the number of samples may be different for the various data series in the group.

Portion to Analyze

This value specifies the percentage of the specified range that should be analyzed for correlation. This allows you to specify the entire range that would be used for a prediction and exclude the portion that would be used for the test set. This value defaults to the default size for the accuracy testing range.

If you have an existing field that you would like to copy the date range from, press the **Copy Optimization Range from a Field…** button. This will display the Copy Optimization Range From Field Dialog.

Selecting Options to Use During Correlation Analysis

The following options can be set for the correlation analysis.

Field Being Analyzed

This value displays the name of the field being analyzed. It is repeated from the title of the dialog and can not be changed.

Note: To analyze a different field, exit the correlation analysis for this field. Then, select the field you would like to analyze.

Type of Analysis

This value displays the type that was selected on the Analysis Type page. It is repeated here so that the type of previous correlation analysis reports can be changed.

Field Preprocessing

This value indicates the type of preprocessing that should be applied to field being analyzed.

- **Percent Change**

  This option uses the percent change in the value of the field. It is useful for analyzing fields that do not have a constant range, such a price data.

- **Change**

  This option uses the change in the value of the field. It is useful for analyzing fields that have both positive and negative values and those that include zero.

- **None**

  This option uses the actual value of the field. It is useful for analyzing fields that have a consistent range, such as entry/exit signals and some financial indicators.

Note: The **Prediction Samples in Advance** value determines the number of samples included in the change or percent change preprocessing. For example, five samples in advance uses the change from the current value to the value five days in the future. Because of this, preprocessing is not available when Samples in Advance is set to 0.

Prediction Samples in Advance

This value indicates the number of samples in advance a prediction would be made for based on this analysis. It is used in addition to the lags to determine the number of samples between this field and the fields being analyzed. It is also modifies the Percent Change and Change field preprocessing.

Note: This value is restricted to 1 when analyzing this field as a potential inputs to other fields.

Input Lags to Analyze

These values indicate the potential lags to test for the field or fields being analyzed. This simulates the use of memory or lagged inputs in a prediction. Using a minimum lag of 0 includes the current value of each potential input being tested.

What Do I Do Next?

If you are creating a new correlation analysis, press the **Finish** button to start the correlation analysis. After it has completed, you will be returned to the Modify Field Dialog: Correlation Analysis page to view the results. If you would like to exit the Wizard without performing any analysis, press the **Cancel** button. If you would like to change the fields being analyzed, press the **Back** button to return to the Analysis Fields page.

If you are modifying a previous correlation analysis, press the **OK** button to save your changes or select another property page. If you would like to exit from this dialog without changing the previous correlation analysis, press the **Cancel** button.

Additional Property Pages

The Correlation Analysis Wizard is displayed as a dialog with property pages when previous correlation analysis options are being modified. In addition to this page, the Analysis Fields page is also available.

For help using property pages, see the help for Property Pages.

How Did I Get Here?

The Analysis Fields page appears after the Analysis Fields page in the Correlation Analysis Wizard. It is also available as a property page when you press the **Change Analysis…** button from the Modify Field Dialog: Correlation Analysis page.

Create an Alert Definition Wizard

Create an Alert Definition Wizard: Basic Information

The Create an Alert Definition Wizard allows you to create a new alert. Alerts are used highlight when specific events occur. Creating a new alert enables you to specify the logic behind the condition you would like to check, as well as the message to present when that condition is present. The Basic Information page allows you to enter a name and basic description for the new alert.

For help with alerts, see Working with Messages and Alerts.

Selecting a Name for the Alert

Unlike Function Definitions, alerts only have a display name. This display name is shown in the alert selection lists. It is also used to generate potential field names for fields using this alert. The name selected must be unique to all functions, entry/exit systems, alerts, and trading solutions.

It is a good idea to be as descriptive as possible when naming entry/exit system. Naming a system Dan's Alert" may remind you of where the system came from, but it won't help you remember what the system does or when you would want to use it. More useful names might be Alert when Signal Changes Position" or Alert when Reach New High".

Selecting a Group for the Alert

By default, TradingSolutions will select the system group that was selected on the Define Alerts Dialog. You can select a different group from the Alert Group combo box or create a new group by pressing the **New…** button. Alerts can also be moved to new system groups at any time after they are created from the Define Alerts Dialog.

Entering a Description for the Alert

The description for an alert can be useful as a reminder of what an alert does or when you would want to use it. Alert descriptions appear at the bottom of alert lists when the **Display Descriptions** option is selected. It is not necessary to have a description, just helpful. It is a good idea to limit descriptions to three lines of text. Additional descriptive text can be entered as notes later in the wizard.

Copying an Alert

If you are creating a new alert that is similar to an existing alert, you can copy the rules, message, description, and/or notes of another alert by pressing the **Copy another Alert…** button. This will display the Copy Alert Dialog, where you can select which alert to copy. You can also select whether to copy the rules, message, and/or descriptive text.

What Do I Do Next?

When you are ready to continue, press the **Next** button to continue on to the Enter Rules page. If you would like to exit the Wizard without creating a new entry/exit system, press the **Cancel** button.

How Did I Get Here?

The Create an Alert Definition Wizard: Basic Information page is displayed when you press the **New…** button on the Define Alerts Dialog from under the alerts list.

Modify Function Definition Dialog: Properties

Modify Entry/Exit System Dialog: Properties

Modify Alert Definition Dialog: Properties

Modify Trading Solution Dialog: Properties

This dialog appears in several forms to allow you to modify existing function definitions, entry/exit systems, alerts, and trading solutions. The Properties page allows you to specify the name, group, description, and locking of a definition.

For help with function definitions, see Calculating Values and Financial Indicators.
For help with entry/exit systems, see Creating and Analyzing Entry/Exit Signals.
For help with alerts, see Working with Messages and Alerts.
For help with trading solutions, see Working with Complete Trading Solutions.

Selecting a Name for the Definition

Function definitions, entry/exit systems, alerts, and trading solutions (collectively called definitions) are all identified by unique names that are used for displaying them in selection lists. Function definition names and entry/exit system names are also used to generate field names created with those definitions. In addition, function definitions have a short name that is an abbreviated version of the display name to use in formula definitions.

All names must be unique to all function definitions, entry/exit systems, alerts, and trading solutions. However, the display and short names for a function can be equal to each other.

It is a good idea to be as descriptive as possible when naming definitions. Naming a function Dan's Function" with a formula name of Dan" may remind you of where the function came from, but it won't help you remember what the function does or when you would want to use it. More useful names might be Double Moving Average" or Price Smoothing Function".

Moving the Definition to a Different Group

To move a definition to a different group, use the combo box to select the new group. Definitions can also be moved to new groups from the definition selection dialog used to reach this dialog.

Protecting the Definition from Changes

To protect a definition from unintentional changes, select the **Protect from changes and deletion** checkbox. This option disables the modifiable values in this dialog and disables the **Delete** button on the selection dialog.

Note: While this option is on, the other settings on the pages of this dialog cannot be modified.
Note: Definitions that come with the product are permanently locked and cannot be changed.

Entering a Description for the Definition

The description for a definition can be useful as a reminder of what a definition does or when you would want to use it. Descriptions appear at the bottom of selection lists when the **Display Descriptions** option is selected. It is not necessary to have a description, just helpful. It is a good idea to limit descriptions to three lines of text. If additional description information is needed, it can be entered on the Notes page.

For function definitions, you can select the **Display the formula instead of a description** checkbox. This option will replace the description with the formula on the formula entry page.

Copying Other Function Definitions or Entry/Exit Systems

If you would like to replace the formula, description, and/or notes of a function definition with those of another definition, press the **Copy another Function Definition…** button. This will display the Copy Function Definition Dialog where you can specify which definition what elements to copy.

Similar options are also available for entry/exit systems and alerts. For entry/exit systems, press the **Copy another Entry/Exit System…** button to display the Copy Entry/Exit System Dialog. For alerts, press the **Copy another Alert…** button to display the Copy Alert Dialog.

What Do I Do Next?

When you are finished making any changes, press the **OK** button to save your changes or select another property page. If you would like to exit from this dialog without saving any changes, press the **Cancel** button.

Additional Property Pages

These dialogs have the following property pages.

Properties

This page allows you to specify the name, group, and basic description of this definition.

Formula

This page allows you to modify the formula associated with the function. It is only available for function definitions.

Entry/Exit Rules

This page allows you to modify the entry/exit rules associated with the entry/exit system. It is only available for entry/exit systems.

Rules

This page allows you to modify the rules associated with an alert. It is only available for alerts.

Message

This page allows you to modify the message associated with an alert. It is only available for alerts.

Source Field

This page allows you to select a new source field for a trading solution. It can also be used to update a trading solution to match changes in the current source field. It is only available for trading solutions.

Inputs

This page allows you to edit and reorder the inputs for this definition.

Notes

This page allows you to enter notes associated with this definition.

For help using property pages, see the help for Property Pages.

How Did I Get Here?

The Modify Function Definition Dialog is displayed when you press the **Edit…** button on the Define Functions Dialog from under the Function Definitions list.

The Modify Entry/Exit System Dialog is displayed when you press the **Edit…** button on the Define Entry/Exit Systems Dialog from under the Entry/Exit Systems list.

The Modify Alert Dialog is displayed when you press the **Edit…** button on the Define Alerts Dialog from under the Alerts list.

The Modify Trading Solution Dialog is displayed when you press the **Edit…** button on the Define Trading Solutions Dialog from under the Trading Solutions list.

Modify Alert Definition Dialog: Rules

This dialog appears in several forms. The Create an Alert Definition Wizard allows you to create a new alert. The Modify Alert Definition Dialog allows you to modify an existing alert. This page allows you to create or modify the rules used to determine when to generate the alert.

For help with alerts, see Working with Messages and Alerts.

Specifying Rules for an Alert Definition

Rules are the conditions that alerts check for in order to determine when to issue messages. These are similar to the rules used in entry/exit systems except that there is only one set of rules.

An alert is generated based on a list of one or more rules. The rules are formulas which return non-zero values when a condition is true and zero when a condition is not true. To specify how these rules should be combined, use the **Generate this alert** combo box, which has the following values.

- **When all of these rules are true.**
  This value indicates that this alert should be generated only when all of the rules in the list return a non-zero value.
- **When any of these rules are true.**
  This value indicates that this alert should be generated when one or more of the rules in the list return a non-zero value.
- **When any of these rules are not true.**
  This value indicates that this alert should be generated when one or more of the rules in the list return zero.
- **When none of these rules are true.**
  This value indicates that this alert should be generated only when all of the rules in the list return zero.

Adding New Rules

To add a new rule for when to generate a signal, press the **Add…** button. This will display the Modify Rule Dialog where you can enter the formula for the rule.

Note: Typically, a rule should return a non-zero value in order for a signal to be generated. This can be modified by changing the value for when to generate this signal.

Modifying Existing Rules

To modify an existing rule, select the rule from the rule list, then press the **Edit…** button. This will display the Modify Rule Dialog where you can modify the selected rule.

To remove an existing rule, select the rule from the rule list, then press the **Remove** button. Your action will be confirmed and the rule will be removed.

What Do I Do Next?

If you are creating a new alert definition, press the **Next** button to continue on to the Enter Message page. If you would like to exit the wizard without creating a new alert definition, press the **Cancel** button. If you would like to change the name of the alert, press the **Back** button to return to the Basic Information page.

If you are finished updating the rules of a previously created alert definition, press the **OK** button to save your changes or select another property page. If you would like to exit from this dialog without performing any changes, press the **Cancel** button.

Note: Alert definitions require at least one value rule before they can be saved.

Additional Property Pages

The Modify Alert Definition Dialog has the following property pages.

Properties

This page allows you to specify the name, group, and basic description of this alert.

Rules

This page allows you to modify the rules associated with an alert. It is only available for alerts.

Message

This page allows you to modify the message associated with an alert. It is only available for alerts.

Inputs

This page allows you to edit and reorder the inputs for this alert.

Notes

This page allows you to enter notes associated with this alert.

For help using property pages, see the help for Property Pages.

How Did I Get Here?

The Enter Rules page appears after the Basic Information page in the Create an Alert Definition Wizard.

The Modify Alert Dialog is displayed when you press the **Edit…** button on the Define Alert Definitions Dialog from under the Alert Definitions list.

Modify Alert Definition Dialog: Message

This dialog appears in several forms. The Create an Alert Definition Wizard allows you to create a new alert. The Modify Alert Definition Dialog allows you to modify an existing alert. This page allows you to specify the message that should be generated when the conditions specified in the rules are true.

For help with alerts, see Working with Messages and Alerts.

Specifying the Alert Message

The message specified on this page is the message that will appear in the Messages and Alerts Window when the conditions on the Rules page are true. The message text is entered into the message area at the top of this page. Situational values can be inserted into the message text using the controls at the bottom of this page.

Inserting Situational Values Into The Alert Message

Alert messages typically contain one or more values that are specific to the situation for which the alert was generated. These are displayed in the message definition as values in brackets. For example: [Field Name of input: Signal]".

Situational values can be inserted into the message text using the controls at the bottom of this page. The following values are available for each input to the alert.

- **Field Name**

  This value is the name of the field specified for this input.

  Note: If the Primary, Secondary, or Service Signal is used for the selected input, that special name will appear rather than the name of the underlying field. For example: The **Primary Signal** has changed to Enter Long."

  Note: If a constant value is used for the selected input, the constant value will appear. For example: The Relative Strength Index has crossed above **80**."

- **Current Value**

  This value is the current value of the field specified for this input.

  Note: If a signal is specified for the selected input, the underlying value of the field will appear rather than the position associated with that value. If you would like the position reported, use the **Current Signal** value.

- **Current Signal**

  This value is the entry/exit signal position associated with the current value of this input. It is typically used for signal fields.

  Note: This displays the signal associated with the **current value** of the signal, which may vary between similar entry, exit, and hold signals during the course of a trade. Therefore, this value may not always display the current position of a signal.

- **Current Date**

  This value is the date associated with the current value.

- **Last Value**

  This value is the previous value of the field specified for this input.

  Note: If a signal is specified for the selected input, the underlying value of the field will appear rather than the position associated with that value. If you would like the position reported, use the **Last Signal** value.

- **Last Signal**

  This value is the entry/exit signal position associated with the last value of this input. It is typically used for signal fields.

  Note: This displays the signal associated with the **last value** of the signal, which may vary between similar entry, exit, and hold signals during the course of a trade. Therefore, this value may not always display the previous position of a signal.

- **Last Date**

This value is the date associated with the last value.

What Do I Do Next?

If you are creating a new alert definition, press the **Next** button to continue on to the Verify Inputs page. If you would like to exit the wizard without creating a new alert definition, press the **Cancel** button. If you would like to change the name of the alert, press the **Back** button to return to the Basic Information page.

If you are finished updating the message of a previously created alert definition, press the **OK** button to save your changes or select another property page. If you would like to exit from this dialog without performing any changes, press the **Cancel** button.

Note: Alert definitions require some type of message to be defined in order to be valid..

Additional Property Pages

The Modify Alert Definition Dialog has the following property pages.

Properties
This page allows you to specify the name, group, and basic description of this alert.

Rules
This page allows you to modify the rules associated with an alert. It is only available for alerts.

Message
This page allows you to modify the message associated with an alert. It is only available for alerts.

Inputs
This page allows you to edit and reorder the inputs for this alert.

Notes
This page allows you to enter notes associated with this alert.

For help using property pages, see the help for Property Pages.

How Did I Get Here?

The Enter Message page appears after the Enter Rules page in the Create an Alert Definition Wizard.

The Modify Alert Dialog is displayed when you press the **Edit…** button on the Define Alert Definitions Dialog from under the Alert Definitions list.

For help with alerts, see Working with Messages and Alerts.

Modify Definition Dialogs: Inputs

This dialog appears in several forms to allow you to create or modify existing function definitions, entry/exit systems, alerts, and trading solutions. This page allows you to modify the naming and order of the input parameters for the definition.

Note: Inputs are added to a definition while specifying its formula, rules, or source field. The Inputs page is used only to manage these inputs after they have been created.

For help with function definitions, see Calculating Values and Financial Indicators.

For help with entry/exit systems, see Creating and Analyzing Entry/Exit Signals.

For help with alerts, see Working with Messages and Alerts.

For help with trading solutions, see Working with Complete Trading Solutions.

Changing the Name or Type of an Input

To modify an existing input, select the input from input list, then press the **Edit…** button. This will display the Modify Input Dialog, where you can change the name and type associated with an input.

Note: The name and types of inputs for trading solutions cannot be modified. In addition, the types associated with these inputs may be restricted based on the function definitions in which they are used as parameters.

Changing the Order of the Inputs

To change the order of the inputs, select an input from the input list, then press the **Slide Up** or **Slide Down** buttons to move the selected input. You can also use the mouse to drag the inputs to a new position in the list.

For help changing the order of items in a list, see the help for Orderable Lists.

Selecting Options for the Output Value

Function definitions have default values which can be established for fields created with them.

Default Format

This value indicates the format that fields created with this function should use by default.

- **Base Format On Input Formats**

  This setting indicates to use the format of the inputs to this function. This is primarily used for allowing functions to produce signals or normal values, depending on which types of inputs are provided.

- **Signal**

  This setting indicates that the output of this function is a signal. This is primarily used for signal filtering functions which modify other signals to produce new values. Fields that are formatted as signals are automatically analyzed for profitability.

- **Other Formats**

  Other settings use a specific format for displaying numbers. In most cases, the Price format is used for displaying general numbers which can have one or more decimal places.

Default Preprocessing

This value indicates the type of preprocessing that should be used when fields which use this function are used as inputs to a prediction. In general, inputs to a prediction should be kept within a consistent range of values so that new values can be treated the same as old values.

- **None (outputs in fixed range or don't change bar-to-bar)**

  This setting indicates that the output of this function does not need to be preprocessed for predictions since it is typically in a consistent range, such as between -1 and 1, or 0 and 100. It should also be used for values which don't change often, causing change-based measures to frequently be 0.

- **Change (general values not in fixed range)**

This setting indicates that the change in the value of this function should be used for predictions. It should be used for values where the value does not remain in a fixed range and may contain positive or negative values. It should also be used when the scale of the value is not as important as the change in the value.

- **Percent Change (positive values not in fixed range)**

  This setting indicates that the percent change in the value of this function should be used for predictions. It should be used for price values and other data where the value is always positive, but does not have a maximum value.

Entering Additional Notes about New Definitions

If you are creating a new function definition, entry/exit system, alert, or trading solution and would like to enter additional notes about the definition before saving it, select **Enter additional notes about this definition before saving it**. This option will change the **Finish** button to a **Next** button, providing you with an additional page for entering notes.

Note: The Notes page will be available when you edit this definition whether or not you select to enter notes at this time.

What Do I Do Next?

If you are creating a new definition and have not selected to enter additional notes, press the **Finish** button to finish creating the definition. If you have selected to enter additional notes, press the **Next** button to continue on to the Enter Notes page. If you would like to exit the wizard without creating this definition, press the **Cancel** button. If you would like to change any aspect of the definition before creating it, press the **Back** button to return to a previous page.

If you are finished updating the inputs of a previously created definition, press the **OK** button to save your changes or select another property page. If you would like to exit from this dialog without performing any changes, press the **Cancel** button.

Additional Property Pages

These dialogs have the following property pages.

Properties

This page allows you to specify the name, group, and basic description of this definition.

Formula

This page allows you to modify the formula associated with the function. It is only available for function definitions.

Entry/Exit Rules

This page allows you to modify the entry/exit rules associated with the entry/exit system. It is only available for entry/exit systems.

Rules

This page allows you to modify the rules associated with an alert. It is only available for alerts.

Message

This page allows you to modify the message associated with an alert. It is only available for alerts.

Source Field

This page allows you to select a new source field for a trading solution. It can also be used to update a trading solution to match changes in the current source field. It is only available for trading solutions.

Inputs

This page allows you to edit and reorder the inputs for this definition.

Notes

This page allows you to enter notes associated with this definition.

For help using property pages, see the help for Property Pages.

How Did I Get Here?

The Verify Inputs page appears after the Enter Formula page in the Create a Function Definition Wizard, the Enter Rules page in the Create an Entry/Exit System Wizard, the Enter Message page in the Create an Alert Definition Wizard, and the Select Source Field page in the Create a Trading Solution Wizard.

The Modify Function Definition Dialog is displayed when you press the **Edit…** button on the Define Functions Dialog from under the Function Definitions list.

The Modify Entry/Exit System Dialog is displayed when you press the **Edit…** button on the Define Entry/Exit Systems Dialog from under the Entry/Exit Systems list.

The Modify Alert Dialog is displayed when you press the **Edit…** button on the Define Alerts Dialog from under the Alerts list.

The Modify Trading Solution Dialog is displayed when you press the **Edit…** button on the Define Trading Solutions Dialog from under the Trading Solutions list.

Modify Definition Dialogs: Notes

This dialog appears in several forms to allow you to create or modify existing function definitions, entry/exit systems, alerts, and trading solutions. This page allows you to enter additional notes associated for the definition. These notes appear on the Function Information Dialog when you press the **More** button that appears next to descriptions.

Note: This page will only appear during the definition creation wizards if you select to enter additional notes about the definition from the Verify Inputs page.

For help with function definitions, see Calculating Values and Financial Indicators.

For help with entry/exit systems, see Creating and Analyzing Entry/Exit Signals.

For help with alerts, see Working with Messages and Alerts.

For help with trading solutions, see Working with Complete Trading Solutions.

Entering Notes about a Definition

There are many types of information that can be entered for a definition that may be useful. Typically, this information would be for other people using the functions, entry/exit systems, and trading solutions you create. However, this page can also be useful for entering observations and things you want to watch for.

Some types of additional information that be useful:

- Any restrictions or observations on the input parameter values.
- How to interpret the output value.
- How the output value is calculated.
- Where additional information about the definition can be found.

What Do I Do Next?

If you are creating a new definition, press the **Finish** button to finish creating the definition. If you would like to exit the wizard without creating this definition, press the **Cancel** button. If you would like to change any aspect of the definition before creating it, press the **Back** button to return to a previous page.

If you are finished updating the notes of a previously created definition, press the **OK** button to save your changes or select another property page. If you would like to exit from this dialog without performing any changes, press the **Cancel** button.

Additional Property Pages

These dialogs have the following property pages.

Properties

This page allows you to specify the name, group, and basic description of this definition.

Formula

This page allows you to modify the formula associated with the function. It is only available for function definitions.

Entry/Exit Rules

This page allows you to modify the entry/exit rules associated with the entry/exit system. It is only available for entry/exit systems.

Rules

This page allows you to modify the rules associated with an alert. It is only available for alerts.

Message

This page allows you to modify the message associated with an alert. It is only available for alerts.

Source Field

This page allows you to select a new source field for a trading solution. It can also be used to update a trading solution to match changes in the current source field. It is only available for trading solutions.

Inputs

This page allows you to edit and reorder the inputs for this definition.

Notes

This page allows you to enter notes associated with this definition.

For help using property pages, see the help for Property Pages.

How Did I Get Here?

The Enter Notes page appears after the Verify Inputs page in the Create a Function Definition Wizard, the Create an Entry/Exit System Wizard, and the Create a Trading Solution Wizard.

The Modify Function Definition Dialog is displayed when you press the **Edit…** button on the Define Functions Dialog from under the Function Definitions list.

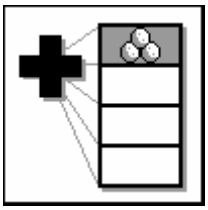
The Modify Entry/Exit System Dialog is displayed when you press the **Edit…** button on the Define Entry/Exit Systems Dialog from under the Entry/Exit Systems list.

The Modify Alert Dialog is displayed when you press the **Edit…** button on the Define Alerts Dialog from under the Alerts list.

The Modify Trading Solution Dialog is displayed when you press the **Edit…** button on the Define Trading Solutions Dialog from under the Trading Solutions list.

Create a Committee Wizard

Create a Committee Wizard: Introduction



The Create a Committee Wizard allows you to combine the signals or values of several fields into one value for a data series or for all data series in a portfolio or group. This page introduces you to the steps involved in creating this type of field.

If you have previously selected not to display this introductory page, the next page will be displayed automatically when advancing through the wizard.

Skipping this Introduction Page

After you are familiar with the process of creating this type of field, you may want to cause this Introduction page not to be displayed each time you create a field. To do this, select the option at the bottom of this page labeled **Do not display this introductory page in the future.** Each time you create this type of field after this, the wizard will automatically advance to the next page in the wizard.

If you would like to restore this introduction page after selecting not to display it, exit any dialogs or wizards and select **Options…** from the **Tools** menu. This will display the Modify Options Dialog, where you can select the General Options property page. On this page, press the **Restore Hidden Information Panels** button to restore this page and any other information panels you previously selected not to display.

What Do I Do Next?

When you are ready to continue, press the **Next** button to continue on to the Select Fields page. If you would like to exit the Wizard without creating a new field, press the **Cancel** button. If you would like to create a different type of field, such as a prediction, press the **Back** button to return to the Create a Field Wizard: Select Type page.

How Did I Get Here?

The Create a Committee Wizard: Introduction Page appears when you select to create a committee field from the Create a Field Wizard: Select Type page. It also appears when you select the **Add Committee Field** button from the **Fields** toolbar.

Modify Field Dialog: Committee Fields

This dialog appears in several forms. The Create a Committee Wizard allows you to combine the signals or values of several fields into one value for a data series or for all data series in a portfolio or group. The Modify Field Dialog allows you to modify the properties of a previously created field. This page allows you to select the fields that make up the committee.

The output of a committee is a field that represents the average value of all of the member fields. The average can be weighted by giving individual member fields multiple votes, causing it to have more influence on the final value.

Note: Fields that are currently being used by the Solution Service cannot be modified.

Adding Fields to a Committee

To add a new field to the committee, use the following settings, then press the **Add To Committee** button. This will cause the new field to appear in the current field list with the specified number of votes and allow you enter additional fields. You can also add a field to the committee by double-clicking a field name in the selection tree.

Selection Tree

Use the selection tree to select a field from this data series or any data series in the portfolio.

For help using the selection tree, see the help for Selection Trees.

Number of Votes

This value indicates the number of votes that a field should receive in the committee. Giving a field multiple votes has the same effect as adding the field multiple times.

Note: If you add the same field multiple times, the number of new votes will be added to the current number of votes for the existing entry.

Changing Committee Members

To modify the number of votes a specific committee member has, select the field in the current field list, then press the **Modify Selection…** button. This will display the Modify Committee Member Dialog. This dialog can also be used to modify the processing of signals in committees.

To remove a field from the committee, select the field in the current field list, then press the **Remove Selection** button.

Optimizing Committees of Signals

Committees of signal fields can have the votes associated with each member optimized using genetic optimization. This option sets the number of votes for each signal to have the best results over a given optimization range, which should provide improved results for other data, as well.

☑ **Optimize Voting Now**

This option indicates that optimization should be run. If this is a new committee, the optimization will begin when the wizard is completed. If this is an existing committee, the optimization will begin when the OK button is used to exit the dialog.

Note: If this is a field defined for an entire group, optimization cannot be turned off for this field once it has been used.

Note: When modifying an existing field and optimization is selected, it cannot be deselected after leaving this page except by pressing the **Cancel** button to leave this dialog.

☐ **Optimization Options…**

This button will display the Signal Optimization Settings Dialog which allows you to set the date range and criteria to use for optimizing the committee.

For help with optimizing fields, see Optimizing Signals and Predictions.

What Do I Do Next?

If you are creating a new field, press the **Next** button to continue on to the Select Name page. If you would like to exit the Wizard without creating a new field, press the **Cancel** button. If you would like to create a different type of field, such as a calculation or prediction, press the **Back** button to return to the Create a Field Wizard: Select Type page.

Note: At least one field must be in the committee before you can continue.

If you are finished updating the properties of a previously created field, press the **OK** button to save your changes or select another property page. If you would like to exit from this dialog without performing any changes, press the **Cancel** button.

Additional Property Pages

The Modify Field Dialog has many different property pages that will be displayed as is appropriate for the type of field being modified. For information on the other property pages available, see the help for the Modify Field Dialog.

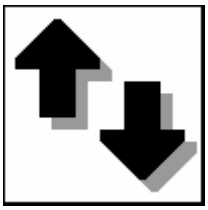
How Did I Get Here?

The Create a Committee Wizard appears when you select to create a committee field from the Create a Field Wizard: Select Type page. It also appears when you select the **Add Committee Field** button from the **Fields** toolbar.

The Modify Field Dialog appears when you select to modify or analyze the selected field from the Modify Data Series Dialog or the Modify Portfolio/Group Dialog. It is also displayed when you select **Modify Field…** from the context menu for a field in a chart or spreadsheet.

Create an Entry/Exit System Wizard

Create an Entry/Exit System Wizard: Basic Information



The Create an Entry/Exit System Wizard allows you to create a new entry/exit system. Entry/exit systems are used generate market entry and exit signals based on sets of rules. Creating a new entry/exit system enables you to evaluate conditions in one or more data fields to enter and exit the market at the best possible time based on the available information. The Basic Information page allows you to enter a name and basic description for the new entry/exit system.

For help with entry/exit systems, see Creating and Analyzing Entry/Exit Signals.

Selecting a Name for the Entry/Exit System

Unlike Function Definitions, entry/exit systems only have a display name. This display name is shown in the entry/exit system selection lists. It is also used to generate potential field names for fields using this system. The name selected must be unique to all functions, entry/exit systems, alerts, and trading solutions.

It is a good idea to be as descriptive as possible when naming entry/exit system. Naming a system Dan's System" may remind you of where the system came from, but it won't help you remember what the system does or when you would want to use it. More useful names might be Double Moving Average System" or Enter on Upward Trend".

Selecting a System Group for the Entry/Exit System

By default, TradingSolutions will select the system group that was selected on the Define Entry/Exit Systems Dialog. You can select a different system group from the System Group combo box or create a new group by pressing the **New…** button. Entry/Exit systems can also be moved to new system groups at any time after they are created from the Define Entry/Exit Systems Dialog.

Entering a Description for the Entry/Exit System

The description for an entry/exit system can be useful as a reminder of what a system does or when you would want to use it. Entry/Exit system descriptions appear at the bottom of entry/exit system lists when the **Display Descriptions** option is selected. It is not necessary to have a description, just helpful. It is a good idea to limit descriptions to three lines of text. Additional descriptive text can be entered as notes later in the wizard.

Copying an Existing Entry/Exit System

If you are creating a new entry/exit system that is similar to an existing system, you can copy the rule sets, description, and/or notes of another system by pressing the **Copy another Entry/Exit System…** button. This will display the Copy Entry/Exit System Dialog, where you can select which entry/exit system to copy. You can also select whether to copy the descriptive text, rule sets, or both.

What Do I Do Next?

When you are ready to continue, press the **Next** button to continue on to the Enter Rules page. If you would like to exit the Wizard without creating a new entry/exit system, press the **Cancel** button.

How Did I Get Here?

The Create an Entry/Exit System Wizard: Basic Information page is displayed when you press the **New…** button on the Define Entry/Exit Systems Dialog from under the Entry/Exit Systems list.

Modify Entry/Exit System Dialog: Entry/Exit Rules

This dialog appears in several forms. The Create an Entry/Exit System Wizard allows you to create a new entry/exit system. The Modify Entry/Exit System Dialog allows you to define an entry/exit system. The Entry/Exit Rules page allows you to enter or change the entry and exit rules associated with an entry/exit system.

For help with entry/exit systems, see Creating and Analyzing Entry/Exit Signals.

Note: If this page appears empty or does not appear at all, some of the Windows system files on your computer may be corrupted or missing. Specifically, the RICHED20.DLL or the RICHED32.DLL file may be missing from your system. If you encounter this problem and need help resolving it, please contact NeuroDimension technical support.

Specifying Entry/Exit Rules for an Entry/Exit System

To modify the rules for when to enter and exit the market, select a sub-page and define rules for when to generate the associated signal. The following sub-pages are available.

Enter Long

This sub-page specifies when to enter a long position. This is equivalent to buying a stock or commodity and optimally should come before a rise in price.

Exit Long

This sub-page specifies when to exit a long position. This is equivalent to selling a stock or commodity bought when the long position was entered and optimally should come at the end of a rise in price.

Enter Short

This sub-page specifies when to enter a short position. This is equivalent to borrowing a stock or commodity at a current price and selling it with the intent of replacing it when the price decreases. It should optimally come before a drop in price.

Exit Short

This sub-page specifies when to exit a short position. This is equivalent to replacing the stock or commodity borrowed when the short position was entered and optimally should come at the end of a drop in price.

Note: The rule sets are checked in the order: Enter Long, Enter Short, Exit Long, Exit Short.

Specifying How Entry/Exit Rules Should Be Combined

Each signal can be generated based on a list of one or more rules. The rules are formulas which return non-zero values when a condition is true and zero when a condition is not true. To specify how these rules should be combined, use the **Generate this signal** combo box, which has the following values.

- **Never.**
  This value indicates that this signal should never be generated, even if rules are specified.
- **When all of these rules are true.**
  This value indicates that this signal should be generated only when all of the rules in the list return a non-zero value.
- **When any of these rules are true.**
  This value indicates that this signal should be generated when one or more of the rules in the list return a non-zero value.
- **When any of these rules are not true.**
  This value indicates that this signal should be generated when one or more of the rules in the list return zero.
- **When none of these rules are true.**
  This value indicates that this signal should be generated only when all of the rules in the list return zero.

Adding Entry/Exit Rules

To add a new rule for when to generate a signal, press the **Add…** button. This will display the Modify Rule Dialog where you can enter the formula for the rule.

Note: Typically, a rule should return a non-zero value in order for a signal to be generated. This can be modified by changing the value for when to generate this signal.

For help with entering specific types of rules, see the help for the Modify Rule Dialog.

Modifying an Entry/Exit Rule

To modify an existing rule, select the rule from the rule list, then press the **Edit…** button. This will display the Modify Rule Dialog where you can modify the selected rule.

To remove an existing rule, select the rule from the rule list, then press the **Remove** button. Your action will be confirmed and the rule will be removed.

What Do I Do Next?

If you are creating a new entry/exit system, press the **Next** button to continue on to the Verify Inputs page. If you would like to exit the wizard without creating a new entry/exit system, press the **Cancel** button. If you would like to change the name of the entry/exit system, press the **Back** button to return to the Basic Information page.

If you are finished updating the rules of a previously created entry/exit system, press the **OK** button to save your changes or select another property page. If you would like to exit from this dialog without performing any changes, press the **Cancel** button.

Note: Entry/exit systems require at least one value entry rule before they can be saved. In addition, they require either an exit rule or an entry rule in the opposite direction.

Additional Property Pages

The Modify Entry/Exit System Dialog has the following property pages.

Properties

This page allows you to specify the name, group, and basic description of this entry/exit system.

Entry/Exit Rules

This page allows you to modify the entry/exit rules associated with the entry/exit system.

Inputs

This page allows you to edit and reorder the inputs for this entry/exit system.

Notes

This page allows you to enter notes associated with this entry/exit system.

For help using property pages, see the help for Property Pages.

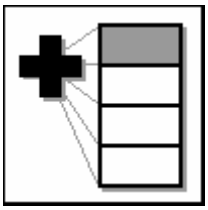
How Did I Get Here?

The Enter Rules page appears after the Basic Information page in the Create an Entry/Exit System Wizard.

The Modify Entry/Exit System Dialog is displayed when you press the **Edit…** button on the Define Entry/Exit Systems Dialog from under the Entry/Exit Systems list.

Create a Field Wizard

Create a Field Wizard: Select Type



The Create a Field Wizard allows you to create a new field in a data series or in all of the data series in a portfolio or group. The Select Type page allows you to select what type of field to create based on what activity you would like to perform.

Selecting What Type of Field to Create

From this dialog, select what action you would like the new field to perform.

Calculate an indicator or value.

Calculation fields allow you to calculate new values using a function definition. A function can be something simple, like the addition or two numbers, or something more complex, like a specialized financial indicator. For example, a calculation field could be used to calculate the difference between the high and low prices for a stock over each trading day. Pressing the **Next** button will display the Calculate a Value Wizard.

For help with function definitions, see Calculating Values and Financial Indicators.

Generate an optimal signal.

Optimal signal fields allow you to generate an entry/exit by analyzing the price of stock over a given number of days into the future and deciding the best market position to be in. This is useful for analyzing market timing and may also be used as a desired output for predictions. Pressing the **Next** button will display the Generate an Optimal Signal Wizard.

For more help with this feature, see Generating an Optimal Signal.

Predict or model a value.

Prediction fields allow you to predict the future value of one or more existing fields using a neural network. Neural networks use known values of a data series to model the behavior of other data series. For example, the closing price of a stock could be predicted by modeling how the closing price typically relates to the closing price of the previous five days. Pressing the **Next** button will display the Predict a Value Wizard.

For help with predictions, see Predicting and Modeling Financial Data.

Generate an alert.

Alert fields allow you to watch for certain conditions by generating a message whenever an event takes place. For example, an alert can be used to issue a message whenever an entry/exit signal has a change in position requiring a new trade. Pressing the **Next** button will display the Generate an Alert Wizard.

Note: Alerts are only available in the real time version of TradingSolutions.

For help with alerts, see Using Alerts to Highlight Events.

Analyze a signal.

Signal analysis fields allow you to analyze how an entry/exit signal would have been traded using historical data. The data from this analysis can be displayed in a chart, allowing you to view an equity curve. It can also be used for comparing or rating multiple stocks, helping you to identify your own hot prospects. Pressing the **Next** button will display the Create Signal Analysis Fields Wizard.

For more help with signal analysis, see Creating and Analyzing Entry/Exit Signals.

Apply a rule-based entry/exit system.

Entry/exit system fields allow you to generate an entry/exit signal using an entry/exit system. Entry/exit systems produce market timing signals based on rules for when to enter and exit the market. For example, you could create an entry/exit system that produces a buy (enter long) signal when the closing price of a stock crosses a 30-day moving average of its value. Pressing the **Next** button will display the Apply an Entry/Exit System Wizard.

For help with entry/exit systems, see Creating and Analyzing Entry/Exit Signals.

Combine values with a committee.

Committee fields allow you to combine signals or values in other fields into one value by allowing the fields to vote" for a combined value. This is useful for combining the outputs of multiple predictions or entry/exit systems into a single value to watch. Pressing the **Next** button will display the Create a Committee Wizard.

For more help with committees, see Combining Multiple Predictions in a Committee or Combining Multiple Signals in a Committee.

Apply a trading solution.

Trading solutions allow you apply a complete set of fields to a data series. For example, a trading solution could be used to create all of the fields necessary to preprocess, predict, and analyze a stock. Trading solutions can also be used to try working entry/exit signals on new data series or share them with other TradingSolutions users. Pressing the **Next** button will display the Apply a Trading Solution Wizard.

For more help with trading solutions, see Working with Complete Trading Solutions.

Store manually entered values.

Manual fields allow you to enter data directly into the spreadsheet for the data series. These entered values are treated the same as data that is imported from other sources. Pressing the **Next** button will display the Select Name page.

Note: Raw data fields cannot be created directly in portfolios or groups.

What Do I Do Next?

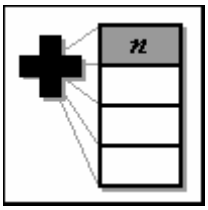
When you have selected the type of field you would like to create, press the **Next** button to continue entering information about the new field. If you would like to exit the Wizard without creating a new field, press the **Cancel** button.

How Did I Get Here?

The Create a Field Wizard: Select Type page appears whenever you request to create a new field, including:

- Selecting **Add New Field…** from the context menu of an item in the Portfolio View.
- Selecting the **Add New Field** button on the toolbar.
- Pressing the **New…** button on the Data Fields page of the Modify Data Series Dialog or the Modify Group Dialog.
- Pressing the **Create Field…** button on the Select Desired Outputs page of the Predict a Value Wizard.
- Pressing the **Create a New Field…** button on the Select Inputs page of the Predict a Value Wizard.
- Pressing the **Create a New Field…** button on the Display Fields in Chart Dialog.
- Pressing the **Create a New Field…** button on the Display Fields in Spreadsheet Dialog.
- Selecting **Add New Field…** from the context menu of the field names of the Spreadsheet View.

Create a Field Wizard: Select Name



The Create a Field Wizard allows you to create a new field in a data series or in all data series in a portfolio or group. The Select Name page allows you to specify a name for a new field that will contain raw data that will be entered manually.

Creating a Raw Data Field

The following settings are required for this new field.

- **Enter a name for this field.**

  Enter a name for the new field in the provided box. The name of the new field must be unique for the data series it is being created in.

- **Select a format for this field.**

  Select a format to display the values of this new field in. The format which is used to display a calculated value will not affect its actual value. However, only fields formatted as signals are analyzed for profitability and displayed on the Modify Data Series Dialog: Entry/Exit Signals Page. You can create new formats by pressing the **New…** button, which will display the Define Field Formats Dialog.

What Do I Do Next?

When you have specified a name, press the **Finish** button to create the new field. If you would like to exit the Wizard without creating a new field, press the **Cancel** button. If you would like to create a different type of field, such as a calculation or entry/exit signal, press the **Back** button to return to the Select Type page.

How Did I Get Here?

The Select Name page appears when you select to create a new field to store manually entered values from the Create a Field Wizard: Select Type page. It also appears when you select the **Add Raw Data Field** button from the **Fields** toolbar.

Create a Function Definition Wizard

Create a Function Definition Wizard: Basic Information

The Create a Function Definition Wizard allows you to create a new function definition. Function definitions can be used to calculate values, such as financial indicators and preprocessed prediction inputs. Creating a new function definition enables you to combine multiple existing functions into a single function definition. The Basic Information page allows you to enter a name and basic description for the new function definition.

For help with function definitions, see Calculating Values and Financial Indicators.

Selecting a Name for the Function Definition

Function definitions have two names – a display name and a formula name. The display name is shown in the function definition selection lists. The formula name is an abbreviated name displayed when the function is used in the formula definition of another function. Both names are used to generate potential field names for fields using this function.

The names selected must be unique to all functions, entry/exit systems, alerts, and trading solutions. However, they can be equal to each other.

It is a good idea to be as descriptive as possible when naming functions. Naming a function Dan's Function" with a formula name of Dan" may remind you of where the function came from, but it won't help you remember what the function does or when you would want to use it. More useful names might be Double Moving Average" or Price Smoothing Function".

Selecting a Function Group for the Function Definition

By default, TradingSolutions will select the function group that was selected on the Define Functions Dialog. You can select a different function group from the Function Group combo box or create a new group by pressing the **New…** button. Function definitions can also be moved to new function groups at any time after they are created from the Define Functions Dialog.

Entering a Description for the Function Definition

The description for a function definition can be useful as a reminder of what a function does or when you would want to use it. Function descriptions appear at the bottom of function definition lists when the **Display Descriptions** option is selected. It is not necessary to have a function description, just helpful. If you do not enter a description of the function, you will be asked if you would like to use the formula as the function description. It is a good idea to limit descriptions to three lines of text. Additional descriptive text can be entered as notes later in the wizard.

Copying an Existing Function Definition

If you are creating a new function that is similar to an existing function definition, you can copy the formula, description, and/or notes of another function by pressing the **Copy another Function Definition…** button. This will display the Copy Function Definition Dialog, where you can select which function definition to copy. You can also select whether to copy the descriptive text, formula, or both.

What Do I Do Next?

When you are ready to continue, press the **Next** button to continue on to the Enter Formula page. If you would like to exit the Wizard without creating a new definition, press the **Cancel** button.

How Did I Get Here?

The Create a Function Definition Wizard: Basic Information page is displayed when you press the **New…** button on the Define Functions Dialog from under the Function Definitions list.

Modify Function Definition Dialog: Formula

This dialog appears in several forms. The Create a Function Definition Wizard allows you to create a new function definition. The Modify Function Definition Dialog allows you to modify an existing function definition. This page allows you to enter or modify the formula associated with the function.

For help with function definitions, see Calculating Values and Financial Indicators.

Note: If this page appears empty or does not appear at all, some of the Windows system files on your computer may be corrupted or missing. Specifically, the RICHED20.DLL or the RICHED32.DLL file may be missing from your system. If you encounter this problem and need help resolving it, please contact NeuroDimension technical support.

Entering a Formula

To enter a formula, use the formula entry sub-pages. For help with these sub-pages, see the help for Formula Entry.

What Do I Do Next?

If you are creating a new function definition, press the **Next** button to continue on to the Verify Inputs page. If you would like to exit the wizard without creating a new function definition, press the **Cancel** button. If you would like to change the name of the function definition, press the **Back** button to return to the Basic Information page.

If you are finished updating the formula of a previously created function, press the **OK** button to save your changes or select another property page. If you would like to exit from this dialog without performing any changes, press the **Cancel** button.

Note: Function definitions require valid formulas before they can be saved.

Additional Property Pages

The Modify Function Definition Dialog has the following property pages.

Properties
This page allows you to specify the name, group, and basic description of this function.

Formula
This page allows you to modify the formula associated with this function.

Inputs
This page allows you to edit and reorder the inputs for this function.

Notes
This page allows you to enter notes associated with this function.

For help using property pages, see the help for Property Pages.

How Did I Get Here?

The Enter Formula page appears after the Basic Information page in the Create a Function Definition Wizard.

The Modify Function Definition Dialog is displayed when you press the **Edit…** button on the Define Functions Dialog from under the Function Definitions list.

Create a Prophet Financial Systems Account

Create a Prophet Financial Systems Account Wizard: Introduction

The Create a Prophet Financial Systems Account Wizard allows you to create an account with Prophet Financial Systems for downloading data from the Prophet.net data source. This page introduces you to the steps involved in creating an account through TradingSolutions.

For help importing data, see Importing and Exporting Data.

Creating an Account via Telephone

If you would prefer to create your TradingSolutions account with Prophet Financial Systems by providing your information over a telephone, you can call Prophet Financial Systems directly at (800) 772-8040. When you speak to the sales representative, be sure to ask for an account to use with TradingSolutions.

After providing your information to the operator, you will be asked to select an account name and password. These are used to identify you when you access your account. After the operator has confirmed your account name and password, press the **Cancel** button to leave the Create a Prophet Financial Systems Account Wizard, then press the **Modify Settings…** button and enter these values on the Modify Data Source Settings Dialog.

Updating Your Prophet Account from a New Computer

If you have already created a TradingSolutions account with Prophet Financial Systems and would like to update the information associated with that account, but did not create the account through TradingSolutions on this computer, you will need to proceed through the Create a Prophet Financial Systems Account Wizard as if you are creating a new account.

In order to update the existing account, be sure to enter the same account name and password on the Account Name page. Also, select **Check here if you have already registered this username** on that page.

What Do I Do Next?

If you would like to create your TradingSolutions account with Prophet Financial Systems by entering your information into TradingSolutions, press the **Next** button. This will display the Terms and Conditions page. If you would prefer not to create an account or have already done so, press the **Cancel** button.

How Did I Get Here?

The Create a Prophet Financial Systems Account Wizard appears when you press **Sign Up For Service…** button on the Configure Data Sources Dialog with the Prophet.net data source selected.

Create a Prophet Financial Systems Account Wizard: Terms and Conditions

Update Prophet Account Information Dialog: Terms and Conditions

The Create a Prophet Financial Systems Account Wizard allows you to create an account with Prophet Financial Systems for downloading data from the Prophet.net data source. The Update Prophet Account Information Dialog allows you to update this information or cancel your account. This page displays the terms and conditions associated with this type of account.

For help importing data, see Importing and Exporting Data.

For help contacting Prophet Financial Systems by telephone, see the help for the Introduction page.

Note: If this page appears empty or does not appear at all, some of the Windows system files on your computer may be corrupted or missing. Specifically, the RICHED20.DLL or the RICHED32.DLL file may be missing from your system. If you encounter this problem and need help resolving it, please contact NeuroDimension technical support.

Accepting the Terms and Conditions

It is necessary to read and accept the terms and conditions associated with this type of account before signing up for this service. In order to indicate that you accept the terms and conditions, check the box labeled **I accept these terms and conditions**.

Note: The **Next** button will not be available unless this box is checked.

Note: This box cannot be unchecked when the information is being reviewed as part of the Update Prophet Account Information Dialog.

What Do I Do Next?

If you are creating a new account, press the **Next** button to continue to the Billing Information page. If you would prefer not to create an account at this time, press the **Cancel** button. You may also review the overview for creating an account by pressing the **Back** button and returning to the Introduction page.

If you are reviewing the terms and conditions after creating an account, press the **OK** button or select another property page.

Additional Property Pages

The Update Prophet Account Information Dialog has the following property pages.

Billing Information

This page allows you to update your billing information, as well as select your billing options.

Password

This page allows you to change your password.

Terms and Conditions

This page allows you to review the terms and conditions of using a Prophet Financial Systems account.

Messages

This page displays any messages returned from Prophet in response to requests for changes.

How Did I Get Here?

This page is displayed after the Introduction page in the Create a Prophet Financial Systems Account Wizard.

This page is also available for review as part of the Update Prophet Account Information Dialog, which appears when you press the **Update Account…** button for the Prophet.net data source on the Configure Data Sources Dialog.

Create a Prophet Financial Systems Account Wizard: Billing Information

Update Prophet Account Information Dialog: Billing Information

The Create a Prophet Financial Systems Account Wizard allows you to create an account with Prophet Financial Systems for downloading data from the Prophet.net data source. The Update Prophet Account Information Dialog allows you to update this information or cancel your account. This page allows you to enter or update your billing information, as well as select your billing options.

For help importing data, see Importing and Exporting Data.

For help contacting Prophet Financial Systems by telephone, see the help for the Introduction page.

Entering Your Billing Information

Prophet Financial Systems requires a name, mailing address, and e-mail address in order to create an account. In addition, they require credit card information for billing your account charges.

Note: If you have previously entered a credit card number on this dialog, only the last four digits of this value will be displayed. If you would like to change this previously entered value, press the **< Update** button. This will allow you to enter a new credit card number. If you would like to restore the previous number, press the **< Restore** button that replaces the Update button.

Note: The **Next** button will not be available unless all of the required information is entered.

Selecting a Billing Option

There are three types of billing options available for TradingSolutions accounts through Prophet Financial Systems. They differ only in the information that is made available to your account.

	Stocks	Indices	Mutual Funds	Options	Futures
Basic	✓	✓	✓		
+ Options	✓	✓	✓	✓	
+ Futures	✓	✓	✓	✓	✓

The prices of these options as of this release of TradingSolutions are listed on the dialog. These prices are subject to change, so please take the time to verify them on the TradingSolutions web site by pressing the **View Current Pricing Information on Web Site** button. Using this button will also verify that your Internet connection is currently operational.

Updating or Canceling Your Account

After you have created your account, you can update your billing information or select a different billing option using the Update Prophet Account Information Dialog: Billing Information page. Simply modify the values on this page and press the **Update Information** button. This will display the Messages page with any messages returned from Prophet.

Note: Your information will not be updated with Prophet Financial Systems unless you press **Update Information**.

If you would like to cancel your account, press the **Cancel This Account** button. This will display the Messages page with any messages returned from Prophet.

Note: You can also update or cancel your account by calling Prophet Financial Systems directly at (650) 322-4183.

What Do I Do Next?

If you are creating a new account, press the **Next** button to continue to the Account Name page. If you would prefer not to create an account at this time, press the **Cancel** button. You may also review the terms and conditions by pressing the **Back** button and returning to the Terms and Conditions page.

If you are updating your account, press the **OK** button or select another property page after pressing the **Update Information** button.

Additional Property Pages

The Update Prophet Account Information Dialog has the following property pages.

Billing Information

This page allows you to update your billing information, as well as select your billing options.

Password

This page allows you to change your password.

Terms and Conditions

This page allows you to review the terms and conditions of using a Prophet Financial Systems account.

Messages

This page displays any messages returned from Prophet in response to requests for changes.

How Did I Get Here?

This page is displayed after the Terms and Conditions page in the Create a Prophet Financial Systems Account Wizard.

This page is also available for updating as part of the Update Prophet Account Information Dialog, which appears when you press the **Update Account…** button for the Prophet.net data source on the Configure Data Sources Dialog.

Create a Prophet Financial Systems Account Wizard: Create Account Name

The Create a Prophet Financial Systems Account Wizard allows you to create an account with Prophet Financial Systems for downloading data from the Prophet.net data source. This page allows you to enter a name and password for your account that will uniquely identify you to Prophet.

For help importing data, see Importing and Exporting Data.

For help contacting Prophet Financial Systems by telephone, see the help for the Introduction page.

Selecting a Username and Password

Your Prophet Financial Systems account for TradingSolutions is identified by a username and password. These values are case-sensitive. This means that any letter entered as a capital letter on this dialog will need to be typed as a capital letter if you need to retype these values.

Note: The **Next** button will not be available unless a username and password have been entered.

If you are updating an existing account from a new computer, select **Check here if you have already registered this username**. Also, be sure to enter the same account name and password that you used previously.

What Do I Do Next?

If you are creating a new account, press the **Next** button to continue to submit this information and create your account. If there are any problems with your application, any messages will be displayed from Prophet on the Messages page. If you need to modify any of your information, you can return to this page and the Billing Information page by pressing the **Back** button.

Note: After receiving messages from Prophet, you will need to press the **Resubmit My Information** button on the Messages page to resubmit your information. This is to allow you to view the messages without automatically resubmitting your information each time you return to view them.

How Did I Get Here?

This page is displayed after the Billing Information page in the Create a Prophet Financial Systems Account Wizard.

Create a Prophet Financial Systems Account Wizard: Messages

Update Prophet Account Information Dialog: Messages

The Create a Prophet Financial Systems Account Wizard allows you to create an account with Prophet Financial Systems for downloading data from the Prophet.net data source. The Update Prophet Account Information Dialog allows you to update this information or cancel your account. This page displays any messages that were returned by Prophet in response to your request. It also allows you to resubmit your information if there were any errors.

For help importing data, see Importing and Exporting Data.

For help contacting Prophet Financial Systems by telephone, see the help for the Introduction page.

Understanding Messages Returned from Prophet

Prophet will return one or more messages in response to requests to create, update, or cancel an account. Here is some additional information for some common messages.

- **Your account has been created successfully.**

  Your request to create an account was successful. You should receive an e-mail message from Prophet in the near future with information about your account and ways you can contact them. No additional action is required.

- **Your account has been updated successfully.**

  Your request to update an existing account was successful. No additional action is required.

- **That username is already taken. Please choose another.**

  You have requested to create an account with a username that another user has already selected. Press the **Back** button to return to the Create Account Name page and select a new username, then resubmit your information.
  If you are trying to update an existing account on a new computer, press the **Back** button to return to the Create Account Name page and select **Check here if you have already registered this username**, then resubmit your information.

- **Invalid username and password combination.**

  The password you have entered for this account is not correct. If you are attempting to update or cancel an account, the username and password being supplied to Prophet are on the Modify Data Source Settings Dialog for the Prophet.net data source.
  You may also receive this message when the account name that you are attempting to update or cancel does not exist. This may be because it has previously been canceled.
  If you receive this message while creating a new account and selected **Check here if you have already registered this username** on the Create Account Name page, this account may no longer be in the Prophet database. Press the **Back** button to return to this page and deselect this option, then resubmit your information. If the account does exist, you will receive a message indicating the username is already taken, in which case, the password you have entered for that username is not correct.

  Note: If you have forgotten your password, you will need to call Prophet or visit their website for assistance.

- **Your credit card has expired.**

  The credit card expiration month and year combination entered on the Billing Information page is before the current month. Return to this page, update your credit card information, and resubmit your information.

- **No valid contract selected.**

  The type of account you have requested is currently not available. If you receive this message, please contact NeuroDimension to inquire about an update to TradingSolutions.

- **The Prophet Internet support library is not registered.**

  The Prophet Internet download could not be started because the Internet support library was not found on your computer. This file is typically installed automatically during TradingSolutions installation.

  The file ProphetConnect.dll should be found in the TradingSolutions directory. It also needs to be registered on the system using the Windows registration server (RegSvr32.exe in the Windows\System directory). Contact NeuroDimension if this message appears and you need help locating or registering this DLL.

What Do I Do Next?

If your account was created successfully, press the **Done** button. You can now use your account to download data directly from Prophet into your portfolio.

If your account was not created successfully, press the **Back** button to modify any information that needs to be changed. Then, return to this page by pressing the **Next** button and press **Resubmit My Information**. If you would prefer to not create an account after not being successful, press the **Cancel** or **Finish** buttons.

If you are updating or canceling an existing account, press the **OK** button or select another property page.

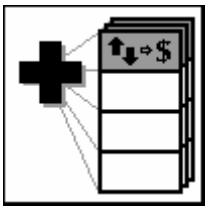
How Did I Get Here?

This page is displayed after the Account Name page in the Create a Prophet Financial Systems Account Wizard.

For existing accounts, this page is displayed after you press the **Update Account…** button for the Prophet.net data source on the Configure Data Sources Dialog.

Create Signal Analysis Fields Wizard

Create Signal Analysis Fields Wizard: Introduction



The Create Signal Analysis Fields Wizard allows you to analyze the simulated trading of an entry/exit signal for use in display fields and other calculations. This page introduces you to the steps involved in creating this type of field.

If you have previously selected not to display this introductory page, the next page will be displayed automatically when advancing through the wizard.

Skipping this Introduction Page

After you are familiar with the process of creating this type of field, you may want to cause this Introduction page not to be displayed each time you create a field. To do this, select the option at the bottom of this page labeled **Do not display this introductory page in the future.** Each time you create this type of field after this, the wizard will automatically advance to the next page in the wizard.

If you would like to restore this introduction page after selecting not to display it, exit any dialogs or wizards and select **Options…** from the **Tools** menu. This will display the Modify Options Dialog, where you can select the General Options property page. On this page, press the **Restore Hidden Information Panels** button to restore this page and any other information panels you previously selected not to display.

What Do I Do Next?

When you are ready to continue, press the **Next** button to continue on to the Trading Parameters page. If you would like to exit the Wizard without creating a new field, press the **Cancel** button. If you would like to create a different type of field, such as a prediction, press the **Back** button to return to the Create a Field Wizard: Select Type page.

How Did I Get Here?

The Create Signal Analysis Fields Wizard: Introduction Page appears when you select to analyze the simulated trading of an entry/exit signal from the Create a Field Wizard: Select Type page. It also appears when you select the **Add Signal Analysis Fields** button from the **Fields** toolbar.

Modify Field Dialog: Trading Parameters

This dialog appears in several forms. The Create Signal Analysis Fields Wizard allows you to analyze the simulated trading of an entry/exit signal for use in display fields and other calculations. The Modify Field Dialog allows you to modify the properties of a previously created field. This page allows you to specify the parameters associating with the simulated trading for a set of signal analysis fields.

Note: Fields that are currently being used by the Solution Service cannot be modified.

Specifying Parameters for Simulated Trading

Signal analysis operates on a single entry/exit signal to determine when to enter and exit the market. Use the following field to specify which signal to trade.

Entry/Exit Signal

This is the entry/exit signal to analyze. You can specify to analyze any signal in the current data series or group, including the Primary, Secondary, or Service signals.

Note: To analyze a signal from another data series applied to this data series, create a calculated field and use the Identity function to copy that signal to this data series. Then, use that calculated field as the signal to analyze.

For information about special signals, see Primary, Secondary, and Service Signals.

Trading Style

This is the trading style to use for the analysis. In addition to currently defined trading styles, the following values are available:

- **Trading style used for default analysis of signal.**

  This setting causes the trading style used for the definition of the selected signal to be used. For entry/exit systems and calculations, the default trading style is the current trading style for the data series. For group fields, the default trading style is the global default.

- **Trading style used for current analysis of signal.**

  This setting causes the trading style currently being used for the analysis of the selected signal to be used.

To create a new trading style or edit existing styles, press the **Edit Styles…** button. This will display the Define Trading Styles Dialog.

For information about trading styles, see Using Trading Styles.

Analysis Range

This is the date range over which the analysis will be performed. With the exception of custom ranges where an end date is specified, all analysis ranges go through the end of the data.

Note: Multiple ranges cannot be specified for one group of fields. To specify multiple ranges, you will need to create the fields separately.

The following types of ranges are available:

- **Since beginning of data**

  This setting includes all available data in the data series.

- **Since beginning of most recent *period***

  This setting begins the range at the start of the most recent *period*. For example, year-to-date analyses begin on January 1st of the last year in the data series. When a new year is imported into the data series, the start date of the analysis is updated.

  Note: Only the values for the most recent period will be calculated.

  Note: If the data series does not contain data at or before the start of the period, no values will be calculated.

- **Most recent *period* (adjusted)**

This setting begins the range a given period of time before the last record in the data series. Each time new data is imported into the data series, the start date of the analysis is updated.

Note: Only the value for the last record will contain data for the entire period.

Note: If the data series does not contain enough data to fill the period, no values will be calculated.

- **Since beginning of testing set**

  This setting begins the range at the beginning of the testing set of the currently selected signal.

  Note: This setting is not available for group analyses and is only available if a prediction or model is currently selected.

- **Since end of testing set**

  This setting begins the range on the record immediately after the end of the testing set of the currently selected signal.

  Note: This setting is not available for group analyses and is only available if a prediction or model is currently selected.

- **Since *date* / From *date* to *date***

  This setting selects the current custom range if that range specifies specific dates.

  Note: If an end date is specified, the values on the end date will be held after that date has passed. This is useful for comparing values from different date ranges.

- **Create custom range…**

  This setting displays the Custom Analysis Range Dialog, which allows you to specify a custom analysis range. You can also display this dialog by pressing the **Custom Range…** button.

Adding and Removing Analysis Fields

One or more signal analysis fields can be generated with information about the simulated trading. For example, the percent gain and percent wins of the simulated trading can be reported. New analysis fields can be added in several different ways.

Common analyses are available from a list on the dialog. For one of these analyses, simply select one and press the **Add Selection** button.

- **Account Equity**

  This value tracks the amount of money in the simulated trading account.

- **Percent Gain**

  This value tracks the change in the account equity from the initial amount invested.

- **Buy/Hold Percent Gain**

  This value tracks the change in the account equity if the initial amount invested had been used to purchase the stock on the first bar of the simulation.

- **Percent Gain Over Buy/Hold**

  This value tracks the difference between the Percent Gain and the Buy/Hold Percent Gain.

- **Number of Trades**

  This value tracks the number of trades that have entered since the beginning of the simulation.

- **Percent Winning Trades**

  This value tracks the percent of the trades that have generated a profit. It includes the state of the current trade.

- **Current Position**

  This value tracks the current position held by the simulation – long, short, or out of market.

  Note: The current position can be affected by stops, limits, and other settings in the selected trading style.

- **Current Position Length**

  This value tracks how long the current position has been held by the simulation.

- **Current Position Percent Gain**

This value tracks the change in account equity relative the amount invested in the current trade.

- **Recommended Limit/Entry Price**

  This value reports the entry price used by the simulation. It is useful for determining the limit price that should be used when entering a trade.

  Note: In order to produce a value for the current bar, the trading style being used cannot use a trading value from the next bar, such as the default value of tomorrow's open.

  Note: A recommended limit/entry price is only available when the signal analysis encounters an entry signal that it is not told to ignore. For example, if the analysis stops out and the trading style indicates to wait until an exit occurs, any new entries before that exit will be ignored.

- **Recommended Stop Price**

  This value reports the trailing stop price used by the simulation. It is useful for maintaining trailing stops while trading.

  Note: The trading style being used for the analysis must have stops activated for this value to be available.

  Note: In order to produce a value for the current bar, the trading style being used cannot use a Basis for Trailing Stop from the next bar, such as tomorrow's open.

  Note: The recommended stop price is only available while the current position is in the market. If the signal analysis has already stopped out of the current trade, it will not continue to calculate the trailing stop price.

Other analyses can be created by pressing the **Add Other…** button. This will display the Create Custom Signal Analysis Dialog.

You can also add new analysis fields by copying a set of fields from another signal analysis field definition. This copy can be from another signal in the same data series, or from a signal in a different data series. To perform a copy, press the **Copy** button and select one of the fields from the set of fields you would like to copy.

If you are creating a new signal analysis and decide you do not want to create a field that is listed, select the unwanted field from the list and press the **Remove** button.

Note: The **Copy** and **Remove** buttons are only available when new signal analysis fields are being created. After a signal analysis field set has been created, individual fields cannot be removed from the list.

What Do I Do Next?

If you are creating new fields, press the **Finish** button to create the selected fields. If you would like to exit the Wizard without creating a new field, press the **Cancel** button. If you would like to create a different type of field, such as a prediction, press the **Back** button to return to the Create a Field Wizard: Select Type page.

If you are finished updating the properties of a previously created field, press the **OK** button to save your changes or select another property page. If you would like to exit from this dialog without performing any changes, press the **Cancel** button.

Additional Property Pages

The Modify Field Dialog has many different property pages that will be displayed as is appropriate for the type of field being modified. For information on the other property pages available, see the help for the Modify Field Dialog.

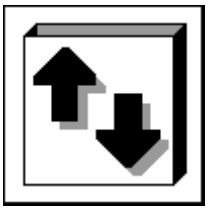
How Did I Get Here?

The Create Signal Analysis Fields Wizard appears when you select to analyze the simulated trading of an entry/exit signal from the Create a Field Wizard: Select Type page. It also appears when you select the **Add Signal Analysis Fields** button from the **Fields** toolbar or when you select **(Create an analysis of this signal…)** from the Modify Group Dialog: Display page.

The Modify Field Dialog appears when you select to modify or analyze the selected field from the Modify Data Series Dialog or the Modify Portfolio/Group Dialog. It is also displayed when you select **Modify Field…** from the context menu for a field in a chart or spreadsheet.

Create a Trading Solution Wizard

Create a Trading Solution Wizard: Basic Information



The Create a Trading Solution Wizard allows you to create a new trading solution. Trading solutions are used to generate market entry and exit signals based on multiple calculations or predictions. Creating a new trading solution enables you to copy complex multi-field calculations and apply them to other data series or share them with other TradingSolutions users. The Basic Information page allows you to enter a name and basic description for the new trading solution.

For help with trading solutions, see Working with Complete Trading Solutions.

Selecting a Name for the Trading Solution

Unlike Function Definitions, trading solutions only have a solution name. This solution name is shown in the trading solution selection lists. The name selected must be unique to all functions, entry/exit systems, alerts, and trading solutions.

It is a good idea to be as descriptive as possible when naming trading solutions. Naming a solution Dan's Solution" may remind you of where the solution came from, but it won't help you remember what the solution does or when you would want to use it. More useful names might be Multiple Moving Average System" or Enter on Upward Trend".

Selecting a Solution Group for the Trading Solution

By default, TradingSolutions will select the solution group that was selected on the Define Trading Solutions Dialog. You can select a different system group from the Solution Group combo box or create a new group by pressing the **New…** button. Trading solutions can also be moved to new solution groups at any time after they are created from the Define Trading Solutions Dialog.

Entering a Description for the Trading Solution

The description for a trading solution can be useful as a reminder of what a solution does or when you would want to use it. Trading solution descriptions appear at the bottom of trading solution lists when the **Display Descriptions** option is selected. It is not necessary to have a description, just helpful. It is a good idea to limit descriptions to three lines of text. Additional descriptive text can be entered as notes later in the wizard.

What Do I Do Next?

When you are ready to continue, press the **Next** button to continue on to the Select Source Field page. If you would like to exit the Wizard without creating a new trading solution, press the **Cancel** button.

How Did I Get Here?

The Create a Trading Solution Wizard: Basic Information page is displayed when you press the **New...** button on the Define Trading Solutions Dialog from under the Trading Solutions list.

Modify Trading Solution Dialog: Source Field

This dialog appears in several forms. The Create a Trading Solution Wizard allows you to create a new trading solution. The Modify Trading Solution Dialog allows you to modify an existing trading solution. This page allows you to select a new source field for a trading solution. It can also be used to update a trading solution to match changes in the current source field.

For help with trading solutions, see Working with Complete Trading Solutions.

Selecting a Source Field for a Trading Solution

Trading solutions are collections of one or more fields that are combined together into a single package to produce a value that may take several fields to create. Typically, they are used to bundle all of the steps required to generate an entry/exit signal. However, they can also be used for non-signal calculations, as well.

To create a trading solution, select the field with the result you are trying to recreate from the selection tree. This field is called for the source field for the trading solution. For example, if you have an entry/exit signal that takes several fields to calculate, select the entry/exit signal field as the source field. All of the fields that were used to create that signal field will be included in the trading solution automatically.

For help using the selection tree, see the help for Selection Trees.

The following options are also available when selecting a source field.

☑ **Display non-signals in the list of potential source fields.**

By default, only entry/exit signal fields are listed in the selection tree. Since trading solutions are typically used to recreate entry/exit signals, this makes the list easier to use for the majority of the cases. To display other calculated fields in the selection tree, select this option.

☑ **Include training weights of predictions with this trading solution.**

Normally, trading solutions will be created to duplicate processing on multiple sets of data. Typically, when you apply a trading solution to a new data series, you will want to retrain any predicted fields in the trading solution based on this new data. However, there are times when you may want to store the current training weights of these fields with the trading solution. To store the training weights with the solution, select this option.

Note: There are no negative effects to including training weights with the trading solution, except that the solution will take slightly more disk space to store. If training weights are included in a trading solution, you will be notified that they are available when you are applying the solution.

Updating the Source Field for a Trading Solution

If you are updating the processing for an existing trading solution, there are some additional controls available on this dialog. To prevent a trading solution from accidentally being overwritten, you will need to select the **Update the processing for this trading solution** option to enable the selection controls. Then, to actually update the processing, press the **Update** button.

You can update the processing for a trading solution to a new source field or to the same source field if it is still available. If you select the same source field, any changes in the processing will be included in the trading solution.

For help and insights on bundling multiple fields in a single trading solution, see Creating Your Own Trading Solutions.

What Do I Do Next?

If you are creating a new trading solution, press the **Next** button to continue on to the Verify Inputs page. If you would like to exit the wizard without creating a new trading solution, press the **Cancel** button. If you would like to change the name of the trading solution, press the **Back** button to return to the Basic Information page.

If you are finished updating the source field of a previously created trading solution, press the **OK** button to save your changes or select another property page. If you would like to exit from this dialog without performing any changes, press the **Cancel** button.

Additional Property Pages

The Modify Function Definition Dialog has the following property pages.

Properties

This page allows you to specify the name, group, and basic description of this trading solution.

Source Field

This page allows you to select a new source field for a trading solution. It can also be used to update a trading solution to match changes in the current source field.

Inputs

This page allows you to edit and reorder the inputs for this trading solution.

Notes

This page allows you to enter notes associated with this trading solution.

For help using property pages, see the help for Property Pages.

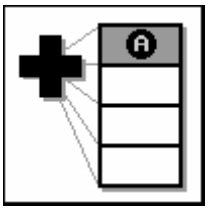
How Did I Get Here?

The Select Source Field page appears after the Basic Information page in the Create a Trading Solution Wizard.

The Modify Trading Solution Dialog is displayed when you press the **Edit…** button on the Define Trading Solutions Dialog from under the Trading Solutions list.

Generate an Alert Wizard

Generate an Alert Wizard: Introduction



The Generate an Alert Wizard allows you to create a new alert field. This page introduces you to the steps involved in creating this type of field.

If you have previously selected not to display this introductory page, the next page will be displayed automatically when advancing through the wizard.

For help with alerts, see Using Alerts to Highlight Events.

Skipping this Introduction Page

After you are familiar with the process of creating this type of field, you may want to cause this Introduction page not to be displayed each time you create a field. To do this, select the option at the bottom of this page labeled **Do not display this introductory page in the future.** Each time you create this type of field after this, the wizard will automatically advance to the next page in the wizard.

If you would like to restore this introduction page after selecting not to display it, exit any dialogs or wizards and select **Options…** from the **Tools** menu. This will display the Modify Options Dialog, where you can select the General Options property page. On this page, press the **Restore Hidden Information Panels** button to restore this page and any other information panels you previously selected not to display.

What Do I Do Next?

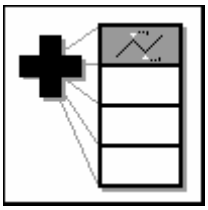
When you are ready to continue, press the **Next** button to continue on to the Select Alert page. If you would like to exit the Wizard without creating a new field, press the **Cancel** button. If you would like to create a different type of field, such as a prediction, press the **Back** button to return to the Create a Field Wizard: Select Type page.

How Did I Get Here?

The Generate an Alert Wizard: Introduction page appears when you select to generate an alert from the Create a Field Wizard: Select Type page. It also appears when you select the **Add Alert Field** button from the **Fields** toolbar.

Generate an Optimal Signal Wizard

Generate an Optimal Signal Wizard: Introduction



The Generate an Optimal Signal Wizard allows you to generate an entry/exit signal by analyzing the price of the commodity a given number of days into the future for a data series or for all data series in a portfolio or group. This page introduces you to the steps involved in creating this type of field.

If you have previously selected not to display this introductory page, the next page will be displayed automatically when advancing through the wizard.

Skipping this Introduction Page

After you are familiar with the process of creating this type of field, you may want to cause this Introduction page not to be displayed each time you create a field. To do this, select the option at the bottom of this page labeled **Do not display this introductory page in the future.** Each time you create this type of field after this, the wizard will automatically advance to the next page in the wizard.

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What Do I Do Next?

When you are ready to continue, press the **Next** button to continue on to the Signal Parameters page. If you would like to exit the Wizard without creating a new field, press the **Cancel** button. If you would like to create a different type of field, such as a prediction, press the **Back** button to return to the Create a Field Wizard: Select Type page.

How Did I Get Here?

The Generate an Optimal Signal Wizard: Introduction page appears when you select to generate an optimal entry/exit signal from the Create a Field Wizard: Select Type page. It also appears when you select the **Add Optimal Signal Field** button from the **Fields** toolbar.

Modify Field Dialog: Signal Parameters

This dialog appears in several forms. The Generate an Optimal Signal Wizard allows you to generate an entry/exit signal by analyzing the price of the commodity a given number of days into the future for a data series or for all data series in a portfolio or group. The Modify Field Dialog allows you to modify the properties of a previously created field. This page allows you to select the parameters to use when generating this entry/exit signal.

This type of field is typically used as a desired output for predictions. It can also be useful for displaying key trading points in charts.

Note: Fields that are currently being used by the Solution Service cannot be modified.

Parameters for the Optimal Signal

To set the parameters for how the optimal signal is generated, modify the following values.

Trading Style to use for simulating trades.

This value specified the trading style that should be used when generating the optimal signal. It is used primarily for investment and commission values, but is also used to determine if stops will be a factor. To create, view, or modify the styles, press the **Edit Styles…** button. This will display the Define Trading Styles Dialog.

Note: The evaluation values for the trading style are not used in the calculation of optimal signals.

Minimum profit per trade

This value specifies the profit requirements required for a signal to be generated. Specifically, entry signals are only generated if they will result in a trade which generates this amount of profit within the given number of bars.

Note: See below for notes on this parameter.

☑ **Maximum drawdown before profit**

This value specifies the maximum amount of drawdown from the initial investment that a trade can have. Specifically, entry signals are only generated if they will result in a trade which does not produce the maximum drawdown prior to achieving the minimum profit.

Note: Checking for drawdown can be turned off completely. Optimal signals created in TradingSolutions v2.1 or earlier did not have this option, so it will be turned off.

Note: See below for notes on this parameter.

Maximum number of bars to look into the future for profit

This value specifies the number of bars into the future that can be included to determine if a trade is profitable. In other words, entry signals are only generated if they will result in the given profit within this number of bars.

Example: If you would like to analyze the next two weeks from a data series with daily trading data, this value should be set to 10.

Note: See below for notes on this parameter.

Advanced Settings…

This button will display the Optimal Signal Advanced Settings Dialog where you can modify additional settings associated with the optimal signal.

Selecting Parameters for the Optimal Signal

When generating any type of optimal signal, the two most important parameters for an optimal signal are the **Minimum Profit Per Trade** and the **Number of Bars**. In general, for each bar, TradingSolutions looks ahead the specified number of samples to determine if the specified minimum profit can be reached, either by entering long or by entering short. Exits are generated if the price does not increase (or decrease) in the specified number of samples.

For more information on how an optimal signal is calculated, see Generating an Optimal Signal.

A good general rule for setting these two parameters is that the more signals or overall profit you generate, the harder the signal may be to model. Here is a case-by-case description of how adjusting these parameters affects the generated optimal signal.

- **Decreasing the Minimum Profit**

Decreasing the minimum profit will increase the number of signals since less profit is required to generate a trade. This will increase the overall profit of the signal. However, the lower the value, the more likely that any noise in the price will be included in the signal. This may make the signal harder to model.

- **Increasing the Minimum Profit**

  Increasing the minimum profit will decrease the number of signals since more profit is required to generate a trade. This will reduce the overall profit of the signal, but may make the signal easier to model since only highly profitable trades are highlighted.

- **Decreasing the Number of Bars**

  Decreasing the number of samples will decrease the number of signals since less time is available to reach the minimum profit. This will reduce the overall profit of the signal and concentrate more on quick price changes.

- **Increasing the Number of Bars**

  Increasing the number of samples will increase the number of signals since more time is available to reach the minimum profit. This will increase the overall profit of the signal, but may make the signal harder to model since it increases the likelihood that the minimum profit is reached due to cycles that begin in the middle of the samples, rather than before the start.

The other parameters can also affect the predictability of the optimal signal.

- **Selecting the Trading Style**

  Using a trading style with stops and limits may reduce the number of signals and profit. However, since stops and limits increase the complexity of the underlying rules associated with when to enter or exit, this signal may be harder to model.

- **Decreasing the Maximum Drawdown**

  Decreasing the maximum drawdown will typically delay entry signals so that they start closer to the bottom (or top) of any cycles or trends. This results in more profitable signals, but may make the prediction harder to model if the lowest price is set by noise in the price data.

- **Increasing the Maximum Drawdown**

  Increasing the maximum drawdown will cause entry signals to be started farther from the bottom (or top) of any cycles or trends. This results in less profitable signals, but may make it easier to predict larger cycles and trends.

What Do I Do Next?

If you are creating a new field, press the **Next** button to continue on to the Select Name page. If you would like to exit the Wizard without creating a new field, press the **Cancel** button. If you would like to create a different type of field, such as a calculation or prediction, press the **Back** button to return to the Create a Field Wizard: Select Type page.

If you are finished updating the properties of a previously created field, press the **OK** button to save your changes or select another property page. If you would like to exit from this dialog without performing any changes, press the **Cancel** button.

Additional Property Pages

The Modify Field Dialog has many different property pages that will be displayed as is appropriate for the type of field being modified. For information on the other property pages available, see the help for the Modify Field Dialog.

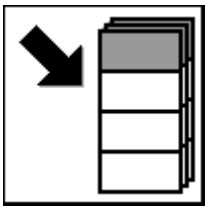
How Did I Get Here?

The Generate an Optimal Signal Wizard appears when you select to generate an optimal entry/exit signal from the Create a Field Wizard: Select Type page. It also appears when you select the **Add Optimal Signal Field** button from the **Fields** toolbar.

The Modify Field Dialog appears when you select to modify or analyze the selected field from the Modify Data Series Dialog or the Modify Portfolio/Group Dialog. It is also displayed when you select **Modify Field…** from the context menu for a field in a chart or spreadsheet.

Import Data Wizard

Import Data Wizard



The Import Data Wizard allows you to import data into your portfolio, as well as update existing data. Data can be downloaded directly from the Internet data sources. It can also be imported from a wide variety of text files and MetaStock data files. This page allows you to select which type of import you would like to perform.

For help importing data, see Importing and Exporting Data.

Indicating a Target Group for the Import

The target group is the portfolio group that new data will be imported into. By default, the target group is the group that was selected in the Portfolio View when the import was requested. It can be modified if desired by pressing the **Select…** button. This will display the Select Target Group Dialog.

Note: If you import or download data into a data series that is currently in your portfolio, but is not in the target group or one of its subgroups, a copy of that data series will be created in the target group.

Note: If there are no subgroups created in your portfolio, the **Select…** button will not be available.

Selecting What Type of Import to Perform

There are several types of ways to import data into your portfolio. These can be broken into two main groups, importing data from a file and downloading data directly from the Internet. Select from the following options to indicate which type of import you are trying to perform.

Note: The update and download options will not be available if no Internet data sources have been configured. To configure data sources, press the **Data Sources…** button. This will display the Configure Data Sources Dialog.

Update data in the target group.

This option allows you to update all of the data series in the target group with any new data that has occurred since the last date in the data series. It includes all of the data series in the target group and any subgroups in the target group unless that data is marked to not be included in updates.

Note: To modify the settings to use on this update, press the **Update Options…** button. This will display the Update Options Dialog.

Note: To modify the settings for all of the data series in the target group that may affect the update, press the **Group Settings…** button. This will display the Modify Group Dialog, where you can specify which data source to use and whether to update all of the data series.

Download new data from the Internet.

This option allows you to download data for one or more symbols for a specific periodicity and date range directly from an Internet data source. It can be used to create new data series or update existing ones.

Note: If you select to download symbols that are currently in your portfolio, duplicate dates will be overwritten with the downloaded data.

Import data from files on your computer.

This option allows you to import data from one or more text files or MetaStock data files. This includes files downloaded from the Internet and data exported from other programs. It can be used to create new data series or update existing ones.

What Do I Do Next?

After you have selected the type of import to perform and the target group, press the **Next** button to continue. If you are updating data from the Internet, the Start Import page will be displayed. If you are downloading new data from the Internet, the Select Data to Download page will be displayed. If you are importing data from files, the Select Files page will be displayed.

If you would prefer not to import any data at this time, press the **Cancel** button.

How Did I Get Here?

The Import Data Wizard appears when you select **Import Data…** from the **File** menu or the context menu for a group in the Portfolio View. It also appears if the **Import Data** button on the toolbar is selected. In addition, it can be accessed from the **Import Data** button on the Modify Group Dialog: Properties page.

Import Data Wizard: Select Data to Download

The Import Data Wizard allows you to import data into your portfolio, as well as update existing data. Data can be downloaded directly from the Internet. This page allows you to select the general characteristics of the data to be downloaded.

For help importing data, see Importing and Exporting Data.

Selecting an Internet Data Source

The **Data Source** combo box allows you to select where to import new data symbols from. It lists all of the data sources that have previously been configured. To configure a new data source, press the **Data Sources…** button. This will display the Configure Data Sources Dialog.

Note: The Solution Service data source cannot be used to import new data. It is only used to update data currently included in the Solution Service

Selecting a Periodicity

The **Periodicity** combo box allows you to select the periodicity of the data to import. This indicates the number of minutes or days to include in each High / Low / Open / Close bar. This box lists all of the periodicities available from the currently selected data source.

The following options may be available:

- Intraday
- End-of-day
- Weekly
- Monthly

Note: The periodicities available for each data source are specified on the Configure Data Source Dialog.

If **intraday** is selected, you will also be asked to specify the **Bar Size** in minutes. In addition, the following option will also be displayed:

☑ **Add the streaming tick price to the portfolio display for the target group.**

If this option is selected, the Tick Price will automatically be added to the display fields for the target group.

Note: The tick price will only be displayed when streaming is turned on.

Note: This option is only available in the real time version of TradingSolutions.

Note: If this option appears selected and grayed, the target group already has this display field.

The periodicity that you select is typically related to frequency with which you would like to trade. For example, end-of-day data can result in trades up to once a day, usually at the start of the next trading day. Intraday data is typically used if you plan to trade multiple times during the day.

Specifying the Amount of Data to Download

The **Amount of Data** control allows you to specify how much data to download. The default value for this control is based on the currently selected periodicity.

Typically, only the most recent data is desired. Therefore, the **End Date** defaults to the current day. The **Start Date** is adjusted based on the selected amount of data.

Note: The more data that you download, the more data that will be in your portfolio. It is a good idea to only download the data that you will actually use in the program. The default values should typically provide enough data for most operations.

What Do I Do Next?

After you have specified the general characteristics, press the **Next** button to continue. This will display the Select Symbols to Download page.

If you would prefer not to import any data at this time, press the **Cancel** button.

How Did I Get Here?

This page is displayed for Internet downloads in the Import Data Wizard.

Import Data Wizard: Select Symbols to Download

The Import Data Wizard allows you to import data into your portfolio, as well as update existing data. This page allows you to select specific ticker symbols to download from the Internet.

If you select symbols that are currently in your portfolio, any duplicate dates will be overwritten with the downloaded data.

For help importing data, see Importing and Exporting Data.

Selecting an Exchange

Exchange

This setting is used to set the default exchange associated with any new data series imported into TradingSolutions.

Selecting Symbols to Import

To select the symbols for the data to download, either enter the symbols in the box or select them from the list of available symbols.

- **Enter Symbols**

  To enter a symbol directly, simply type the name of the symbol in the box and press the **Add Symbol** button. More than one symbol can be added at a time by separating the symbols with commas or semi-colons. In addition, symbols can be separated by tabs if they are part of a list of symbols that are copied and pasted from another program, such as Microsoft Excel.

  After you add a symbol, it will appear in the list of currently selected symbols. If it can be resolved to a specific data name in either the portfolio or the symbol database, the name will be listed, as well.

- **Select from…**

  To select a symbol from the list of available symbols, select the type of symbol you would like to select. The list is divided into sections for Indices, Stocks, Mutual Funds, and Futures. Stocks and Mutual Funds are further divided by the first letter of the data name.
  After you click on a symbol in the list, press the Add Symbol button to select it. You can also select a symbol by double-clicking on it in the list.
  Futures data is separated into continuous and dated contracts. When you select Futures data, the type and/or delivery date of the contract must also be specified. See below for more information.

  Note: The lists of symbols included in TradingSolutions is only a subset of all of the symbols available from individual data services. New symbols and entire exchanges may not appear in the list. To import these symbols, simply enter them by hand. Complete lists of symbols available for each service are available from the websites of each data source.

Note: Individual data sources each have their own methods for specifying index, futures, and options symbols. Check the website of your data source if you require assistance specifying these data symbols.

To remove symbols from the currently selected symbol list, select the symbols you would like to remove from list and press the **Remove** button.

What Do I Do Next?

After you have selected the symbols that you would like to import, press the **Next** button to continue on to the Start Import page. If you would prefer not to import any data at this time, press the **Cancel** button. If you would like to change the type of import being performed, press the **Back** button.

How Did I Get Here?

This page is displayed for Internet downloads in the Import Data Wizard.

Import Data Wizard: Select Files

The Import Data Wizard allows you to import data into your portfolio, as well as update existing data. This page allows you to add and remove files from the list of files to be imported, as well as modify the options to use while importing those files.

For help importing data, see Importing and Exporting Data.

Selecting Files to Import

After selecting to import from files on the first page of the Import Data Wizard, this page will be displayed.

Press **Select New Files…** to select files from your computer or from a CD-ROM to import. A file selection dialog labeled **Select Files with Data to Import** will be displayed allowing you to select one or more files to import.

For help with the file selection dialog, see the help for the File Selection Dialog.

Press **Select Previous Files for Target Group** to update the data series in the target group with data in updated external files. The Import Data Wizard automatically remembers the last file that was imported for each data series, allowing it to reselect those files to import updated information. See below for the specific behavior based on the type of file that was last used.

- **Text Files**

  If the previous file was a text file, that file will be added to the list of files to import.

- **End-of-Day Files**

  If the previous file was an end-of-day file, the directory where the end-of-day file was located will be searched for more recent files with the same file extension. Any more recent files will be added to the list of files to import.

  Note: The automatic selection of end-of-day files is based on the file modification time. It is **not** based on the date in the file name.

- **MetaStock Files**

  If the previous file was a MetaStock file, the Master file in the MetaStock directory will be added to the list of files to import. Also, the data series will be automatically selected for import from that file.

Press **Remove Selected Files** to remove the selected files from the list of files to import.

Modifying the Default Import Options

By default, TradingSolutions will automatically determine the best options for importing all of the numeric data in the selected files. However, there are times when these options may need to be adjusted, either to handle non-standard formats or to select a subset of the data in the selected files. The following options are available.

☑ **View text file import options for each file being imported.**

This option allows you to view and modify the text file import options being used for each text file being imported. These options include which file delimiter and date format to use, as well as how many lines to skip for header information. This option is typically only used if a file is known to be in a non-standard format or if problems have been encountered with a file.

Note: File import options are not available for MetaStock data files.

☑ **Select individual ticker symbols or fields from the files.**

This option allows you to select which ticker symbols and fields from the files to import. For text files with daily data, the default is to import all of the data in the file. For text files with a date as a name, the default is to update the data series in the target group. For MetaStock files, no symbols are selected by default.

Note: If a MetaStock data file is selected, this option will be selected automatically.

☑ **Overwrite duplicate dates with data from the files.**

This option allows you to select to overwrite any existing data with the data that is being imported. By default, data will only be imported if the dates have not already been imported for the target data series.

▣ **Default Exchange for New Symbols**

When a new symbol is imported from a file, this option allows you to specify the exchange the symbol will be assigned to. This setting will not affect the way the data is imported.

- Note: You can change the exchange after it has been set here from the Modify Data Dialog: Properties page.
- Note: If the desired exchange is not listed in the combo box, you can add it by pressing the **Modify Exchanges…** button. This will display the Define Exchanges Dialog.

What Do I Do Next?

After you have selected the files you would like to import, press the **Next** button to continue. If you did not modify the import options, the Start Import page will be displayed. If you selected to view the file import options for each text file being imported, the Verify Text File Format page for the first text file will be displayed. If you indicated that you wanted to select individual ticker symbols or fields from the files, the Select Data page will be displayed.

- Note: At least one file must be in the list of files to import in order to continue.
- Note: If any problems are encountered determining an appropriate format for a text file, the Verify Text File Format page for that file will be displayed automatically.

If you would prefer not to import any data at this time, press the **Cancel** button. If you would like to change the type of import being performed, press the **Back** button.

How Did I Get Here?

This page is displayed for file imports in the Import Data Wizard.

Import Data Wizard: Verify Text File Format

The Import Data Wizard allows you to import data into your portfolio, as well as update existing data. This page allows you to verify and modify the text file format being used to import a specific text file that is being imported.

For help importing data, see Importing and Exporting Data.

Determining the Status of the File Being Processed

The top section of this page indicates the file being processed and the current status of that processing. The following are the messages that will typically appear in this window.

- **Default settings have been assigned for reading this text file.**

  This message appears if TradingSolutions has determined the settings to use for this file.

- **The formatting settings that were previously used for this file have been reloaded.**

  This message appears if the settings that were used for processing this file previously differ from the defaults that TradingSolutions would normally select. The previous settings are given precedence to allow you to modify the settings associated with a file and use them each time the file is updated.

  Note: Format settings are stored using the first half of the filename. If you import multiple files with the same name, even if they have different extensions, the format settings from the previous import will be used. This can cause problems if you are using data from multiple data sources.

  Example: If you import IBM.TXT from a CD-ROM and then download IBM.CSV (or IBM.TXT) as a file from the Internet and import it, the format settings used for the original IBM.TXT will be used by default.

  Note: To change the format settings to the TradingSolutions defaults, press the **Load Default Settings** button.

- **This file could not be opened. It may currently be opened by another application.**

  This message appears if the selected file could not be opened to read its information. This typically occurs when another application currently has the file open, preventing TradingSolutions from reading its contents.

  Example: If you create the file IBM.CSV using **Save As** for a spreadsheet in Microsoft Excel and still have that spreadsheet open, Excel will not allow that file to be read by other applications until the spreadsheet is closed.

  Note: To continue processing this file without canceling the import process, press the **Back** button until you return to the Select Files page and then use the **Next** button to reread the files.

- **The filename contains valid date information.**

  This informational message appears when the name of the file can be interpreted as a date. If the file does not contain a date field, all of the records in the file will be assumed to be for the date in the file name.

  Note: When the date information in the file name is used for the file, only symbols that already are in the portfolio will be updated. Symbols for data that is not already in the portfolio will be ignored.

Previewing Text File Processing

The Verify Text File Format page is divided into two sections. The upper section displays a field table of the individual fields found in the text file based on the selected options. The lower section allows you to modify the options used for importing the text file.

Note: One field must contain Date or Date/Time information unless valid date information is reported to have been found in the file name (indicating an end-of-day file). Only one field can contain date information and one field can contain time information.

The field table contains the following information.

- **Name**

  This value is the field name that will be assigned to this particular field. If the **First Row Contains Field Names** checkbox is checked, these field names will be taken from the values in the Row 1 column. Otherwise, generic field names will be generated for each field.

  Note: If field names are not found in the file, default names will be based on standard field orders found in text files. Specifically, the fields will be named Open, High, Low, Close, Volume, OpenInt. This format

assumes that the first integer field is the first field. If fewer than six fields exist, the most likely subset will be assigned.

Note: Typically, these names will not need to be changed. If you do want to change the field names, you can do so by modifying the table directly. If you choose the option to select individual ticker symbols or fields from the files on the Select Files page, you can also change the field names on the selection tree.

- **Type**

  This value is the type of data that this field contains. This can be one of the following settings.

  - **Numeric**

    This value indicates that the field contains numeric information.

    Note: If a field contains numeric information, but should be ignored, set it to Ignored.

  - **Date**

    This value indicates that the field contains date information.

  - **Date/Time**

    This value indicates that the field contains date and time information.

  - **Time**

    This value indicates that the field contains time information.

  - **Ticker**

    This value indicates that the field contains ticker information. Including a ticker column in a file allows you to import multiple symbols from a single file.

  - **Data Name**

    This value indicates the name of the security associated with the ticker in the ticker column. It is rarely used since it makes data files much larger.

  - **Ignored**

    This value indicates that the values in this field should be ignored.

  Note: Typically, these types will not need to be changed. If you do want to change the data type selected for a field, you can do so by selecting the type in the field table, then selection a new type using the data type combo box that appears in that cell.

- **Width**

  This value is the width of the field in characters. It is only displayed when the file record format is set to fixed width.

- **Row 1 / Row 2 / Row 3 / …**

  These rows display the first 25 rows of data following any skipped lines. If the Row 1 contains field names, the First Row Contains Field Names checkbox should be checked so that these names are used for the field names.

  Note: If **First Row Contains Field Names** is selected, Row 2 is permitted to be blank. Any other blank lines will be interpreted as the end of the data.

Continuing Without Making Any Changes

In most cases, the default processing for a text file should be acceptable. This can be verified by checking the field names and making sure each field has data in the displayed rows.

If the status window at the top of the page indicates that the formatting settings that were previously used for this file have been reloaded, it may be necessary to load the default processing for the text file. To do this, press the **Load Default Settings** button.

Note: The remaining options should only be adjusted if the text file does not appear to be processed correctly.

Note: If you frequently use a file type that requires you to make adjustments, please contact NeuroDimension technical support to determine if default processing for your files can be added to TradingSolutions.

Selecting a File Record Format for a Text File

Text files imported into TradingSolutions must have at least two fields – a date field and one or more fields with numeric data. These fields are typically separated in a text file using a field delimiter; however, they can also be separated by being placed into fixed-width columns. Most text files contain fields that are separated using a comma or a tab. TradingSolutions will automatically try to determine the correct file record format for every text file.

If only one or two fields appear in the field table and the values in the rows are made up the values of multiple fields, the default formatting for the text file may be incorrect. To fix this, use the **File Record Format** controls to specify a different format to use. When a new file record format is specified, the field table will be updated to reflect the new settings automatically.

Note: Only text files that have date-based information in a column format are supported. Other types of data in text files should be placed into this format externally before being imported into TradingSolutions.

If you have previously imported data from a text file with the same file name (even if the extension of the file was different), the settings used for that import will be displayed. If these settings do not appear to be appropriate for the current file, press the **Load Default Settings** button to have TradingSolutions determine the default settings.

The following controls are available for specifying the file record format:

- **Fixed Width**

  This format indicates that the fields in a text file are separated into fixed-width columns. In other words, a certain number of characters in each line will be used for the information in each field. The width of each field can be unique and is specified using the **Width** entry in the field table.

  Note: When TradingSolutions auto-detects field width, it assumes any information is right-justified.

- **Delimited**

  This format indicates that the fields in a text file are separated using a field delimiter. Once this option is selected, use the **Field Delimiter** box to select or enter the field delimiter character.

Lines to Skip

This setting allows header information before the beginning of the data to be skipped. Examples of this are source and copyright information for the file.

Note: Field name information is **not** considered to be header information as long as it is delimited in the same way as the data fields. Because of this, a row with field names should not be skipped over. Instead, it should be in Row 1 of the field table and the **First Row Contains Field Names** checkbox should be checked.

Field Delimiter

This value specifies the character that is used to separate the columns in a delimited file. It is not used for fixed width files.

☑ **First Row Contains Field Names**

This setting indicates that Row 1 of the field table contains the names of the fields. This row must be delimited in the same way as the other rows.

Note: if this option is selected, Row 2 is permitted to be blank.

Specifying the Data Format for a Text File

The following options are available for specifying the format of the individual pieces of data in the file.

Date Delimiter

This value specifies the character that separates the elements in a date field. If these elements are not separated by a delimiter, this value should be set to <none>".

Example: For dates in the form 08/30/66", this value should be the slash (/).

Date Order

This value specifies the order of the date elements.

D	Day
M	Month
Y	Year

Example: The value YMD" indicates the date elements will appear in the order: Year, Month, Day.

Note: The month field can be represented with a number or with the first three letters of the month. For example, 01” and Jan” are both valid, but January” is not.

☑ **Four Digit Years**

This setting indicates that dates include four digits for the year value. If it is not selected, dates are assumed to have two digit years.

Time Delimiter

This value specifies the character that separates the elements in a time field. If these elements are not separated by a delimiter, this value should be set to <none>”.

Example: For times in the form 10:30:00”, this value should be the colon (:).

Note: This setting is only available if a Date/Time or Time field is in the file.

Time Seconds

This value specifies the number of digits used for the seconds in a time value. Some programs, such as MetaStock, permit three digits to be used in the seconds column and use it to indicate the number of ticks in a minute.

Note: While the importing of three-digit seconds is supported, these values will be converted to normal seconds by removing the hundreds digit. Values over 59 may result in the file not being able to be imported.

Decimal Symbol

This value specifies the character being used as the decimal symbol in the file.

What Do I Do Next?

After verifying the formatting of the text file, press the **Next** button to continue. After all of the text files have been processed, the Start Import page will be displayed. If you indicated that you wanted to select individual ticker symbols or fields from the files, the Select Data page will be displayed.

Note: If a file cannot be opened or valid date information for a file cannot be found, the **Next** button may not be available.

If you would prefer not to import any data at this time, press the **Cancel** button. If you would like to change which files are being imported, press the **Back** button.

How Did I Get Here?

This page is displayed for text file imports after the Select Files page in the Import Data Wizard. It is only displayed if you select to view the text file import options for each file being imported on that page or if a problem is encountered processing a particular text file.

Import Data Wizard: Select Data

The Import Data Wizard allows you to import data into your portfolio, as well as update existing data. This page allows you to select which data to import from the selected files.

When you are importing from text files, it is typically not necessary to make any changes to this dialog. For MetaStock files, it will be necessary to select which data series to import.

For help importing data, see Importing and Exporting Data.

Understanding the Import Data Selection Tree

The data from the files selected for importing is displayed in a tree format. Each file is broken down into the different ticker symbols contained in the file. For text files, the ticker symbols are broken down further into the individual fields being imported. Each item in the tree has an icon indicating what it is.

Selection Tree Icons

	Text File
	MetaStock File
	Data Series
	Date Field
	Time Field
	Ticker Field
	Numeric Data Field
	Text Data Field

Next to each file, ticker symbol, and field is a checkbox that can be used to select whether to import this piece data. Items with a check will be imported, items without a check will be ignored.

Selection Tree Checkboxes

	Unselected Item
	Selected Item
	Partially Selected Item
	Required Item
	Unselectable Item

In addition, the **Import From** column provides information about the files, symbols, and field names each item will be imported from.

Selecting Ticker Symbols to Import

When you are importing data from text files, it is typically not necessary to make any changes to this dialog. All of the symbols available in a text file will be selected for import. If you would like to select a subset of the ticker symbols available in a text file, uncheck the symbols that you do not want to include.

Note: There is one exception to this processing. If a text file does not have a date field and there is date information in the file name, only the ticker symbols that are currently in the target group will be included in the import selection tree. However, all of those symbols will be selected.

For MetaStock files, it will be necessary to select which ticker symbols to import from the selected files. Simply select the checkbox next to each ticker symbol you would like to import. You can also select all of the symbols in the target group by pressing the **Select to Update Any Symbols in the Target Group** button.

Modifying Importing of Text Files

In addition to selecting which ticker symbols to import from text files, there are additional operations you can perform. Specifically, you can select individual fields to import or change the processing of the selected fields. By default, all of the numeric fields of each selected ticker symbol will be imported. The following operations can also be performed.

- **Rename a Field**

  Field names in the selection tree can be changed by clicking twice on the field name.

  Note: Common field names such as Close" and Volume" should not be changed. Common names are often used as inputs to formulas and chart fields. If these names are changed, you may need to perform some additional steps to use them normally.

  Note: Company names, or the names that are associated with data series, display the symbol in brackets. This symbol can modified by entering the symbol in brackets while modifying the name.

What Do I Do Next?

After selecting the data you would like to import, press the **Next** button to continue on to the Start Import page. If you would prefer not to import any data at this time, press the **Cancel** button. If you would like to change which files are being imported or how they are being processed, press the **Back** button.

How Did I Get Here?

This page is displayed for file imports after the Select Files page and Verify Text File Format pages in the Import Data Wizard. It is only displayed if you indicate to select individual ticker symbols or fields from the files on that page. By default, that option is selected if any MetaStock files are being imported.

Import Data Wizard: Start Import

The Import Data Wizard allows you to import data into your portfolio, as well as update existing data. This page allows you to verify the data that will be imported before beginning the actual import.

For help importing data, see Importing and Exporting Data.

Verifying the Data That Will Be Imported

This page lists all of the symbols that will be imported during this import operation, sorted by data symbol. This is primarily a confirmation page. After the **Finish** button is pressed, the selected data will be imported, followed by any processing required for the new data. If large amounts of data are being imported or many calculated fields need to be update, this process may take several minutes or longer.

Note: If a text file is not being processed as expected, press the **Back** button to return to the Select Files page and select **View text file import options for each file being imported** and **Select individual ticker symbols or fields from the files**. Then, press **Next** and verify that the selected fields are being processed correctly.

Handling Special Notes

Notes will appear at the top of the symbol list to alert you if any symbols are being skipped during the import.

- **Data Source is set to unchanged file.**

  Some data series in this group were imported from files that have not changed or are no longer available. These data series will not be included in an update until the previously imported file appears to have been modified.

  Note: If you would like to change to update data from the Internet, you can change this setting by selecting **Data Properties...** from the context menu for a data series or **Group Properties…** from the context menu for the entire group.

- **Data is set to not update with group.**

  Some data series in this group are marked to not be updated during import. You can override this setting by pressing **Update Options...** and selecting **Include data that is not marked for updating with this group.**

  Note: You can also change this setting by selecting **Data Properties...** from the context menu for a data series or **Group Properties…** from the context menu for the entire group.

Working with an External Data Downloader

Some data sources, such as Quotes Plus, use an external program called a Downloader" to download all available stock information to a database on your computer. TradingSolutions then reads this data directly from the database.

When you are importing data from a data source which uses a downloader, the following option will appear:

☑ **Invoke external downloader to request missing data.**

This option indicates to run the external Downloader" program associated with this data source prior to importing data for this data source.
TradingSolutions will automatically check this box if it appears that the database for this data source is missing data that should be available for the exchange and data source associated with the selected data.

Note: Since the database is being contacted prior to this page appearing, error messages may appear in the Messages and Alerts Window at this point if the data source is not properly configured.

What Do I Do Next?

When you are ready to import the selected data, press the **Finish** button. This will display the Status Dialog, indicating the status of the import process. Any messages associated with the import process will be displayed in the Messages and Alerts Window.

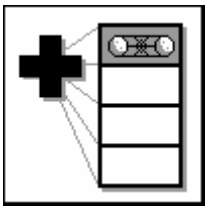
If you would prefer not to import any data at this time, press the **Cancel** button. If you would like to change the data being imported or type of import being performed, press the **Back** button.

How Did I Get Here?

This page is displayed after all of the selection and verification pages in the Import Data Wizard.

Predict a Value Wizard

Predict a Value Wizard: Introduction



The Predict a Value Wizard allows you to create a new prediction field in a data series or in all data series in a portfolio or group. This page introduces you to the steps involved in creating this type of field.

If you have previously selected not to display this introductory page, the next page will be displayed automatically when advancing through the wizard.

For help with predictions, see Predicting and Modeling Financial Data.

Skipping this Introduction Page

After you are familiar with the process of creating this type of field, you may want to cause this Introduction page not to be displayed each time you create a field. To do this, select the option at the bottom of this page labeled **Do not display this introductory page in the future.** Each time you create this type of field after this, the wizard will automatically advance to the next page in the wizard.

If you would like to restore this introduction page after selecting not to display it, exit any dialogs or wizards and select **Options…** from the **Tools** menu. This will display the Modify Options Dialog, where you can select the General Options property page. On this page, press the **Restore Hidden Information Panels** button to restore this page and any other information panels you previously selected not to display.

What Do I Do Next?

When you are ready to continue, press the **Next** button to continue on to the Select Desired Outputs page. If you would like to exit the Wizard without creating a new field, press the **Cancel** button. If you would like to create a different type of field, such as a prediction, press the **Back** button to return to the Create a Field Wizard: Select Type page.

How Did I Get Here?

The Predict a Value Wizard: Introduction page appears when you select to create a new field to predict a value from the Create a Field Wizard: Select Type page. It also appears when you select the **Add Prediction Field** button from the **Fields** toolbar.

Predict a Value Wizard: Select Desired Outputs

The Predict a Value Wizard allows you to create a new prediction field in a data series or in all data series in a portfolio or group. The Select Desired Outputs page allows you to select which fields to use as the desired outputs of the prediction. In effect, these are the values you are trying to predict.

For help with predictions, see Predicting and Modeling Financial Data.

Selecting a Value to Predict

To specify the value to predict, use the following options.

Value to Predict

This value specifies the name of the data series field to predict. If you would like to predict a value that you have not created a field for yet, press the **Create Field…** button to create that field before continuing.

Note: Only fields from the current data series or group are available for the desired outputs. If you would like to predict the value of a field in another data series, create a calculated field that is equal to the value of the field you want to predict, then use that calculated field for the desired output.

Note: This value will default to an optimal signal field if one is available.

Samples in Advance

This value specifies the number of values to look ahead in the desired output field.

Example: If you are trying to predict a value two trading days in advance from a data series with daily data, this value should be set to 2.

Note: If this value is zero, the prediction will be for the current value. This can be useful when predicting values like the optimal signal, which suggest actions based on future values.

Preprocessing

This value specifies the type of preprocessing that should be used on the desired output. Preprocessing is typically used to give the desired output a more uniform range, often it making it more predictable. TradingSolutions automatically postprocesses the predicted values when preprocessing is used.

Example: When **Percent Change** preprocessing is used, the percent change in value is the value that is sent to the neural network. Any values that are received from the neural network are treated as a percent change in value and converted automatically to what the value would be if that percent change occurred.

Note: This value is only available when the prediction is for at least one sample in advance.

- **Percent Change**

  This option is typically used when you are trying to predict a continuous, positive, non-zero value that does not have a constant range, such as price information.

- **Change**

  This option is typically used when you are trying to predict a continuous value that may not have a constant range, such as some momentum indices.

- **None**

  This option is typically used when you are trying to predict discrete values that have a constant range, such as entry/exit signals.

Note: Preprocessing on outputs is automatically reversed when values are produced by the neural network. For example, prices predicted using percent change preprocessing will result in prices which are determined by a predicted percent change from the appropriate previous value.

Signal Postprocessing Settings…

This button will display the Signal Postprocessing Settings Dialog, which allows you to modify how predicted signals are processed.

☑ **Predict multiple values with this prediction.**

This setting enables you to specify multiple outputs for a single prediction. For more information, see **Specifying Multiple Outputs for a Prediction**, below.

Specifying Multiple Outputs for a Prediction

Most predictions will have only one desired output and, therefore, only output one field. To predict multiple values at one time, select **Predict multiple values with this prediction.**

This option displays the list of outputs for this prediction. When this option is first selected, only the current desired output will be listed. To add an additional output, press the **Add New** button and specify the information for the selected output. To remove extra outputs from a prediction, press the **Remove** button to remove the selected output.

There are two ways to approach predicting multiple values in one data series:

- **Create individual predictions for each value being predicted.**

  This option will typically produce more specialized models of the values being predicted. This is typically preferable, especially with values that are hard to model. However, highly specialized models may have trouble generalizing results for new values. By default, a cross validation set is used to help prevent models from specializing on the training set.

- **Predict multiple values with one prediction.**

  This option will typically produce less specialized models of the values being predicted. This is useful for reducing the amount of specialization on the training data, which in turn may allow the models to generalize better on new values.

Note: Additional outputs can be added to a prediction at any time. However, once a prediction is created, individual outputs cannot be removed.

Note: Postprocessing of predicted signals is performed separately for each output.

What Do I Do Next?

When you have selected the desired outputs of the prediction, press the **Next** button to continue on to the Select Inputs page. If you would like to exit the Wizard without creating a new field, press the **Cancel** button. If you would like to create a different type of field, such as a calculation or an entry/exit signal, press the **Back** button to return to the Create a Field Wizard: Select Type page.

How Did I Get Here?

The Predict a Value Wizard: Select Desired Outputs page appears when you select to create a new field to predict a value from the Create a Field Wizard: Select Type page. It also appears when you select the **Add Prediction Field** button from the **Fields** toolbar.

Modify Field Dialog: Prediction Inputs

This dialog appears in several forms. The Predict a Value Wizard allows you to create a new prediction field in a data series or in all data series in a portfolio or group. The Modify Field Dialog allows you to modify the properties of a previously created field. This page allows you to select which fields to use as inputs to the prediction.

In general, you should list any available data that you believe affects the value of the desired outputs. However, irrelevant inputs or too many inputs may make it harder to train the prediction. In addition, more data samples may be required to train the prediction effectively when a large number of inputs are used.

Note: Fields that are currently being used by the Solution Service cannot be modified.

For help with predictions, see Predicting and Modeling Financial Data.

Adding New Inputs to a Prediction

To add a new input to the prediction, use the following settings, then press the **Add Selected Input** button. This will cause the new input to appear in the current input list and allow you enter additional inputs. You can also add a field to the input list by double-clicking a field name in the selection tree.

Available inputs:

Inputs for a prediction can be selected from the following lists:

Select from fields in this data series

This option will cause the selection tree to contain all of the fields available in the selected data series. The selection tree can then be used to select a field to use for the input values.

Select from fields in another data series

This option will cause the selection tree to contain all of the fields available from all of the data series in the portfolio. This is useful for combining information in a data series with information from outside the data series. When this option is chosen, the selection tree can then be used to select a field to use for the input values.

Select from optimizable functions

This option will cause the selection tree to contain all of the functions currently defined for use in the portfolio. Functions which are added as inputs are included as potential inputs when the prediction in optimized. Any constant values for these functions are also optimized.

Note: While functions are being displayed, you can get more information about a particular function by selecting it and pressing the **Function Information…** button.

For help using the selection tree, see the help for Selection Trees.

If you would like to create a new field to use as an input to this prediction, press the **Create a New Field** button.

Note: Default preprocessing will be used for each input when it is added. To modify the preprocessing or lag an input, select the input after it has been added and press **Modify Input…**.

Modifying Inputs to a Prediction

The inputs currently that are currently selected for this prediction are displayed in the **Currently selected inputs** list. The individual inputs may be listed with a checkbox control, allowing it to be included or excluded from training.

Input Checked

This input will be used for training and producing new values.

Input Not Checked

This input will not used as part for training or producing values. In most cases, it can be removed without requiring the network to be retrained. It will be tried as a potential input value when the prediction is optimized.

Note: Predictions created in previous versions of TradingSolutions included disabled inputs to determine which inputs values were available for each given date. Support for this behavior is controlled from the Modify Training Settings Dialog. If disabled inputs are included, removing disabled inputs may affect your results.

- **No Checkbox Available**

  This input is an optimizable function. It is only used when the prediction is being optimized. If it is selected as part of the best solution during optimization, a new field will be created based on the optimized parameters and added to the input list.

Fields that are added as inputs to a prediction are typically checked, indicating they will be used for training and producing values. Optimizing the prediction inputs can cause some inputs to be checked or unchecked.

After an input has been added, you can modify its behavior by selecting it and pressing the **Modify Input…** button. For fields, this will display the Modify Prediction Input Dialog, which enables you to change the preprocessing for the input or manually lag it. You can also indicate whether to try enabling and disabling it during optimization. For optimizable functions, this will display the Modify Field Dialog: Function Inputs page, which enables you to change the inputs to the optimizable function, including the fields and the ranges for the constant values being tried.

Note: Multiple inputs can be modified at one time by holding down the Ctrl key and selecting multiple inputs prior to selecting the **Modify Input…** button. This will display the Modify Prediction Input Dialog.

The following additional information may be displayed with the input names.

- **Keep:**

  This input will not be included in the optimization of the inputs. This value can be modified from the Modify Prediction Input Dialog setting **Allow optimization to include/exclude this input**.

  Note: This label will only be displayed if input optimization is currently enabled.

Removing Inputs from a Prediction

To remove an input from the prediction, select the input field in the current input list, then press the **Remove From Inputs** button. If you are only temporarily removing an input, you may want to disable the input until you are certain that you no longer need it.

Note: Predictions created in previous versions of TradingSolutions included disabled inputs to determine which inputs values were available for each given date. Support for this behavior is controlled from the Modify Training Settings Dialog. If disabled inputs are included, removing disabled inputs may affect your results.

Effects of Prediction Input Order

The order in which prediction inputs are added can affect the training of a prediction. This is not to say that one order is better" than another, just that different input orders can produce different results. This is because the training will start with different initial conditions.

At the beginning of the first training pass, TradingSolutions sets the initial weights in the neural network randomly based on a random number seed. Subsequent training passes are based on the same random number seed at later points in the random number cycle. As long as the same random number seed is used, the same sequence of initial conditions will be used for each set of training passes.

Note: The random number seed can be adjusted from the Advanced Topology Settings Dialog.

When the order of the inputs is changed, this causes the initial weights for each individual input to be different. This technically has the same effect as changing the random number seed since a different set of initial conditions is produced for each training pass.

Overall, changing the order of the inputs will typically not produce a large change in the normalized error or correlation after training, particularly if multiple training passes are used. However, slight variations in the predicted outputs can cause fairly large variations in the profitability of a signal. This is because even one modified trade can drastically affect the overall profitability.

Typically, it is not worth creating multiple predictions with the same inputs in different orders. A more effective way of trying different initial conditions is to create multiple copies of the prediction and change the random number seed of each to be different. Alternatively, you can try more initial conditions for each model you create by increasing the **Number of Training Passes** setting on the Modify Training Settings Dialog.

In general, trying additional initial conditions is not a good approach to modeling. A better approach is typically to try finding more informative inputs.

What Do I Do Next?

If you are creating a new field, press the **Next** button to continue on to the Select Options page. If you would like to exit the wizard without creating a new field, press the **Cancel** button. If you would like to change the desired outputs for this prediction, press the **Back** button to return to the Select Desired Outputs page.

If you are finished updating the properties of a previously created field, press the **OK** button to save your changes or select another property page. If you would like to exit from this dialog without performing any changes, press the **Cancel** button.

Additional Property Pages

The Modify Field Dialog has many different property pages that will be displayed as is appropriate for the type of field being modified. For information on the other property pages available, see the help for the Modify Field Dialog.

How Did I Get Here?

The Select Inputs page appears after the Select Desired Outputs page in the Predict a Value Wizard.

The Modify Field Dialog appears when you select to modify or analyze the selected field from the Modify Data Series Dialog or the Modify Portfolio/Group Dialog. It is also displayed when you select **Modify Field…** from the context menu for a field in a chart or spreadsheet.

Predict a Value Wizard: Select Options

The Predict a Value Wizard allows you to create a new prediction field in a data series or in all data series in a portfolio or group. This page allows you to modify how the prediction will be trained and/or optimized.

For help with predictions, see Predicting and Modeling Financial Data.

Selecting How the Model Should Be Trained

Neural networks require a training phase to learn" the relationship between the input values and the desired output values. Once this relationship is learned, an output value can be predicted based on the current input values. Each training phase takes some amount of time based on the amount of data being used for training and the amount of new information being gained in each iteration of the training process.

Genetic optimization can be used to try different sets of inputs and different settings in the neural network. This can be useful for finding the most informative set of inputs and/or the best neural network settings to extract information from a set of inputs. Extensive genetic optimization can take a significant amount of time since it can perform the neural network training phase several hundred times.

- **Train without optimizing the inputs (quick).**

  This option causes the neural networks to be trained without optimization. The currently enabled inputs and current neural network settings will be used for the training.

  Note: This option is not available if one or more optimizable functions have been added as inputs.

- **Briefly optimize the inputs and settings.**

  This option uses genetic optimization to try some different sets of inputs and neural network settings. Using the defaults, it will try training the neural network with about 100 different combinations of settings with a maximum time of 15 minutes.

- **Extensively optimize the inputs and settings (slow).**

  This option uses genetic optimization to try many different sets of inputs and neural network settings. Using the defaults, it will try training the neural network with about 2000 different combinations of settings with a maximum time of 5 hours.

☐ **Optimization Settings…**

This button displays the Training Optimization Settings Dialog, where you can select the neural network settings to optimize along with the criteria to use for evaluating each test.

☐ **Training Settings…**

This button displays the Modify Training Settings Dialog, where you can modify the settings used for training the neural network.

Selecting a Data Range for a Prediction

The data range associated with a prediction is used for several different things. Part of the data is used for training the neural network model. Part of the data is used as a validation step to make sure the training is improving the results. And, part of the data is left out of the training process to be used for only for testing. The ranges are also used for checking the results of the optimization.

⊡ **What data should be used to train this model?**

This setting displays the current data range being used for this prediction. It can be used to select from typical settings for the training range. Pressing the **Training Range…** button will display the Modify Optimization Range Dialog, which allows greater control over the date range.

By default, TradingSolutions will use the last five years of data for these tasks for end-of-day data series. For intraday data series, one week of data is used for each minute of data in each bar. These defaults can be adjusted on the Modify Default Range Dialog.

Note: For predictions being defined for an entire group or predictions that use external data as inputs, the data range is limited to the common date range for all of the data being used. For example, if the group for which you are defining a prediction has a data series with only one year of data, the prediction will only be able to use one year of data, even if the other data series in the group all have more data.

You can increase a limited data range by either importing more data into the shorter data series, or removing the data series from the prediction. You can quickly determine the first date available in your data series by adding the first date as a display field in the Portfolio View.

For help with display fields, see Using Display Fields.

There are no definitive rules for how much data should be used for training a prediction. Including more data is useful for improving results since it provides additional examples for training. However, older financial data may have been produced under different market conditions than more recent data, causing the training to focus on outdated or overly generalized principles.

Other Options Available From This Page

☑ **View or modify the neural network model for this prediction.**

By default, TradingSolutions will select an appropriate neural network for the data you are predicted. If you would like to view or modify these settings, select this option. This will cause the Configure Model page to be displayed when you press the **Next** button.

What Do I Do Next?

After reviewing these options, press the **Next** button to continue. This will display the Create Prediction page unless you select **View or modify the neural network model for this prediction**, in which case it will display the Configure Model page. If you would like to exit the Wizard without creating a new field, press the **Cancel** button. If you would like to change the inputs or desired output, press the **Back** button to return to the Select Inputs page.

How Did I Get Here?

The Select Prediction Model page appears after the Select Inputs page in the Predict a Value Wizard.

Predict a Value Wizard: Configure Model

Modify Field Dialog: Prediction Model

This dialog appears in several forms. The Predict a Value Wizard allows you to create a new prediction field in a data series or in all data series in a portfolio or group. The Modify Field Dialog allows you to modify the properties of a previously created field. This page allows you to specify the general characteristics of the neural network used for the prediction.

Note: Fields that are currently being used by the Solution Service cannot be modified.

For help with predictions, see Predicting and Modeling Financial Data.

Selecting a Model Type

TradingSolutions includes over 50 neural network topologies which can be infinitely customized from within the software. In addition, custom neural network topologies can be created with NeuroSolutions and generated for use with TradingSolutions using the Custom Solution Wizard. These two products are available in a bundle with TradingSolutions as the TradingSolutions Suite.

Model Type

This option allows you to select the source of the neural network.

- **Use built-in neural network.**

  This option uses a built-in neural network topology, which can be selected and configured using the **Neural Network Model** section.

- **Use a Custom Solution Wizard generated DLL.**

  This option uses a neural network that was created using NeuroSolutions, then generated for use with TradingSolutions using the Custom Solution Wizard.

Selecting a Built-in Neural Network Topology

The selection of a neural network topology is a relatively abstract process. In theory, a more complex topology should be capable of learning more complex relationships than a simple one, but it will also be harder to train effectively. In addition, some neural models contain memory elements or recurrent loops, which may allow them to better predict relationships between values in time series.

To select a neural network topology, specify the values listed below. A thumbnail diagram of the current topology will be displayed as the values are updated. This is reduced scale version of the topology diagram on the Advanced Topology Settings Dialog.

Neural Model

This value specifies the overall neural model of the topology. The topologies are listed by relative order of complexity.

- **Multilayer Perceptron (MLP)**

  These topologies are the most basic of the neural network topologies. The data in a multilayer perceptron follows a single path with no recursion or memory elements. Despite its simplicity, the multilayer perceptron can be used to solve the vast majority of problems solvable by supervised neural networks.

- **Modular Network**

  These topologies contain multiple processing paths. Each processing path has the potential of specializing on a different aspect of the incoming data, allowing it specialize on multiple conditions.

- **Jordan/Elman Network**

  These topologies, based on the research of Michael I. Jordan and Jeffrey Elman, include the concept of context in their processing. This allows them to use previous information without the complexity associated with dynamic networks with memory elements.

- **Time-Lag Recurrent Network (TLRN)**

  These topologies include memory elements that allow it to identify patterns that occur over multiple samples.

- **Recurrent Network**

  These topologies delay one or more of the processing values in the network so that they will be used in the calculation of the next output, rather than the current output. These are often combined with the memory elements found in time-lag recurrent networks.

Hidden Layers

This value specifies the number of hidden layers in the topology. Hidden layers are the layers of processing between the input and output layers. Increasing the number of hidden layers increases the complexity of the neural network.

Characteristics

This value specifies one or two additional elements specific to the chosen neural model. It includes such options as what type of memory elements to use and where to attach feed-forward elements. The following concepts are included in the selections.

- **Context Axon**

  This is one type of context used in Jordan/Elman networks.

- **Feedforward (FF)**

  This characteristic makes it so that values can bypass the processing in one or more hidden layers. Values that go through feedforward processing are combined with values that go through the hidden layers to produce a single value. Different feedforward characteristics determine which layers are bypassed.

- **Focused**

  Focused time-lag recurrent networks have memory only in the input axon. This differs from unfocused networks, which also have memory in each hidden layer.

- **Fully Recurrent**

  A recurrent neural network that does not include a non-recurrent feedforward processing path. Because of this, all data must flow through the recurrent processing.

- **Gamma Memory**

  Gamma memory is similar to an exponential moving average in that a percentage of each new value is combined with an opposing percentage of the previous value. Each additional memory tap does this with the value of the previous memory tap. This allows fewer memory values to be used to store more historical information, but may significantly water down the information in those values.

- **Integral Axon**

  This is one type of context used in Jordan/Elman networks.

- **Laguarre Memory**

  Laguarre memory is similar to gamma memory in that a percentage of each new value is combined with an opposing percentage of the previous value. However, Laguarre memory includes improvements that make the values of later memory taps include more specific information.

- **Partially Recurrent**

  A recurrent neural network that also includes a non-recurrent feedforward processing path.

- **TDNN Memory**

  In TDNN memory, short for time-delay neural network memory, the first memory taps contain the current value of each input to the memory. Each memory tap after that contains the last value of each previous memory tap for each input, effectively creating a buffer of the last several input values. Since the actual values of the inputs are stored, the memory depth of a TDNN memory is the same as the number of memory taps.

Memory Depth

This value specifies the relative amount of memory of previous values in Time-Lag Recurrent Networks and Recurrent Networks. For each unit of memory depth, the neural network topology effectively has one more previous value for each of the inputs.

Note: Some memory depths cannot be specified for Gamma and Laguarre memories since these memory types require fewer than one memory tap to produce each level of memory depth. For example, one memory tap produces a memory depth of 2 and two memory taps produce a memory depth of 4, therefore a memory depth of 3 cannot be specified.

Note: Since the memory depth is applied to all inputs to the neural network, increasing the memory depth can greatly increase the effective number of inputs to the system. This also increases the number of weights in the network. To simulate memory only on specific inputs, select to lag those specific inputs from the Prediction Inputs page.

For help with the individual neural models, see Configuring Neural Network Models.

After selecting a neural network topology, the individual elements of the network can be fine-tuned using the **Advanced Topology Settings…** button. This will display the Advanced Topology Settings Dialog.

Note: By default, TradingSolutions will automatically maintain the best estimates of settings to use.

Understanding the Data Ratio

The ratio of data samples in the training set to the weights in the neural network topology can greatly effect the ability of a neural network to model the data. While the neural network topology is being modified, TradingSolutions will automatically monitor the ratio of samples to weights and display it on this page.

- **Samples**

  This value is the approximate size of the training set, based on the training data distribution specified on the Modify Optimization Range Dialog.

- **Weights**

  This value is a count of the total number of weights in the selected neural network topology. The number of weights in the topology is dependent on the number of inputs and outputs, the memory depth, the number of internal processing elements, and the complexity of the topology.

  Note: If the number of weights is the minimum number it can be for the amount of inputs and memory selected, an * will appear next to this number.

- **Samples to Weights**

  This is a ratio of the number of samples to the number of weights.

By default, TradingSolutions will automatically adjust the number of internal processing elements so that the samples-to-weights ratio is as close to the target value as possible. For large numbers of samples, this ratio may be larger in order to keep the number of processing elements restricted to a reasonable number. A good rule of thumb is to keep this ratio to at least 10-to-1 as a starting point for creating the topology.

The target samples-to-weights ratio can be set on the Modify Training Settings Dialog. The option to automatically maintain the ratio can be turned off by pressing the **Advanced Topology Settings…** button and disabling the option to automatically maintain best estimates.

Note: In order to maintain a good samples to weights ratio, the number of samples must be adequate for the number of inputs and the memory depth selected. If a ratio of at least 5-to-1 cannot be maintained, try increasing the size of the training set by increasing the date range or decreasing the size of the cross validation or testing sets. Alternatively, try removing some inputs or reducing the memory depth.

Using a Custom Solution Wizard Generated DLL

After selecting **Use a Custom Solution Wizard generated DLL**, additional controls will be displayed allowing you to select the DLL to use.

- **Select DLL…**

  This button allows you to select which Custom Solution Wizard generated DLL to use.

  For help with the file selection dialog, see the help for the File Selection Dialog.

- **Adjust Seed…**

  This button displays the Adjust Random Number Seed Dialog which allows you to modify the seed used for generating random initial conditions in the DLL.

For help using Custom Solution Wizard DLLs, see Developing Models with NeuroSolutions.

TradingSolutions cannot modify the topologies associated with Custom Solution Wizard DLLs. However, it will modify the following settings for DLLs generated specifically for TradingSolutions.

- **Inputs**

The number of inputs will be set to the number of input fields.

- **Outputs**

  The number of outputs will be set to the number of desired output fields (typically 1).

- **Weight Update Samples per Exemplar**

  Dynamic networks will be trained using the Online/Batch and Samples Per Exemplar settings on the breadboard. However, if the number of samples per exemplar in the DLL is larger than the number of samples in the training set, the number of samples per exemplar will be lowered to the number of samples available. Static networks will be trained using the settings on the breadboard.

All other settings must be adjusted in the NeuroSolutions breadboard. This includes the number of hidden layers, number of processing elements in the hidden layers, memory taps, and learning rates.

Note: If the Custom Solution Wizard DLL is not generated for TradingSolutions, the number of inputs and outputs and the weight update samples also must be set in the NeuroSolutions breadboard.

What Do I Do Next?

If you are creating a new field, press the **Next** button to continue on to the Create Prediction page. If you would like to exit the Wizard without creating a new field, press the **Cancel** button. If you would like to change any of the options specified previously, including switching to a general model, press the **Back** button to return to the Select Options page.

If you are finished updating the properties of a previously created field, press the **OK** button to save your changes or select another property page. If you would like to exit from this dialog without performing any changes, press the **Cancel** button.

Additional Property Pages

The Modify Field Dialog has many different property pages that will be displayed as is appropriate for the type of field being modified. For information on the other property pages available, see the help for the Modify Field Dialog.

How Did I Get Here?

The Configure Model page appears after the Select Options page in the Predict a Value Wizard. However, it is only displayed when you select **View or modify the neural network model for this prediction**.

The Modify Field Dialog appears when you select to modify or analyze the selected field from the Modify Data Series Dialog or the Modify Portfolio/Group Dialog. It is also displayed when you select **Modify Field…** from the context menu for a field in a chart or spreadsheet.

Predict a Value Wizard: Create Prediction

The Predict a Value Wizard allows you to create a new prediction field in a data series or in all data series in a portfolio or group. The Create Prediction page allows you to specify a name for the predicted values.

For help with predictions, see Predicting and Modeling Financial Data.

Selecting Names for Predicted Values

By default, TradingSolutions will generate a name for each output being produced by this prediction. You can select an alternate name or enter a new name.

If multiple values are being predicted by this prediction, a list of the outputs will be displayed. To change the name of any of the outputs, select it in the list.

What Do I Do Next?

When you have selected the values for these options, press the **Finish** button to create the new field. If you would like to exit the Wizard without creating a new field, press the **Cancel** button. If you would like to change any of the previously selected properties for this prediction, press the **Back** button to return to the previous page.

How Did I Get Here?

The Create Prediction page appears one or more pages after the Select Options page in the Predict a Value Wizard.

Register for the Solution Service Wizard

Register for the Solution Service Wizard: Introduction

The Register for the Solution Service Wizard allows you register this installation of TradingSolutions with the Solution Service server. This will allow you to receive updates to your Solution Service data, models, and commentary. This page introduces you to this wizard and allows you to skip the wizard if you have previously registered for the Solution Service.

Note: You must be connected to the Internet to complete this wizard.

For more information about the Solution Service, see The TradingSolutions Solution Service.

Registering for the First Time

If this is the first time you are registering for the Solution Service, press the **Next** button to continue to the Terms and Conditions page.

Re-registering for the Solution Service

If you have already registered for the Solution Service, you can typically reuse the information you have already entered. To do this select **I have already registered for the Solution Service**. This will enable the options for re-registering.

To reuse your previous information, enter the e-mail address that you used to register previously. Then, enter the password that was provided to you when you registered. This password can be found on the Modify Solution Service Settings Dialog of a machine already registered with this e-mail address. You can also have this password e-mailed to the indicated e-mail address by pressing the **Remind Me** button.

After you have entered your e-mail address and password, press the **Finish** button. This will submit your request to register this machine to the Solution Service server.

What Do I Do Next?

If this is the first time you are registering for the Solution Service, press the **Next** button to continue to the Terms and Conditions page.

If you have already registered for the Solution Service and have entered your e-mail address and password on this page, press the **Finish** button. If you arrived at this wizard by requesting an update to the Solution Service, the Update Solution Service Dialog will be displayed after you are successfully registered.

If you do not want to register for the Solution Service at this time, press the **Cancel** button.

How Did I Get Here?

This wizard will only appear if this machine is not currently registered with the Solution Service server. If this machine was previously registered and a problem was encountered, you may be required to re-register this machine.

You will be required to register for the Solution Service if you request to update the Solution Service information. You can do this by pressing the **Update Solution Service** button on the toolbar, selecting **Update Solution Service** from the **File** menu, or selecting **Update Solution Service** from the context menu for the Solution Service groups that are created when the Solution Service is first updated.

You can also arrive at this dialog from the Configure Data Sources Dialog by selecting the **Solution Service** data source and pressing the **Sign Up for Service…** button.

Register for the Solution Service Wizard: Terms and Conditions

The Register for the Solution Service Wizard allows you register this installation of TradingSolutions with the Solution Service server. This will allow you to receive updates to your Solution Service data, models, and commentary. This page displays the terms and conditions associated with using the Solution Service.

Note: You must be connected to the Internet to complete this wizard.

For more information about the Solution Service, see The TradingSolutions Solution Service.

Note: If this page appears empty or does not appear at all, some of the Windows system files on your computer may be corrupted or missing. Specifically, the RICHED20.DLL or the RICHED32.DLL file may be missing from your system. If you encounter this problem and need help resolving it, please contact NeuroDimension technical support.

Accepting the Terms and Conditions

It is necessary to read and accept the terms and conditions associated with using the Solution Service before registering for the service. In order to indicate that you accept the terms and conditions, check the box labeled **I accept these terms and conditions**.

Note: The **Next** button will not be available unless this box is checked.

What Do I Do Next?

After you have read the terms and conditions and checked the box indicating you accept them, press the **Next** button to continue to the Enter Information page. If you do not accept the terms and conditions, or you do not want to register at this time, press the **Cancel** button. You may also review the overview or re-register by pressing the **Back** button and returning to the Introduction page.

How Did I Get Here?

This page is displayed after the Register for the Solution Service Wizard: Introduction page.

Register for the Solution Service Wizard: Enter Information

The Register for the Solution Service Wizard allows you register this installation of TradingSolutions with the Solution Service server. This will allow you to receive updates to your Solution Service data, models, and commentary. This page allows you to enter information required for registering for the Solution Service.

Note: You must be connected to the Internet to complete this wizard.

Note: If you have previously signed up for the Solution Service, use the **Back** button to return to the Introduction page and select **I have already registered for the Solution Service**.

For more information about the Solution Service, see The TradingSolutions Solution Service.

Entering Information

The following information should be entered to register for the Solution Service information.

Prefix, First Name, Last Name

These values indicate how you would like to be addressed.

E-mail Address

This value indicates a valid e-mail address where you can be contacted. Your e-mail address is used to identify you as a Solution Service user. If you request to have your password sent to you, it will be sent to this address. Also, if you have requested to be notified of product updates, these updates will be sent to this address.

Phone

This value indicates a phone number where we can reach you if we encounter any problems with your usage of the Solution Service. This setting is optional.

☑ **Notify me of product updates at this e-mail address.**

This box indicates that you would like to be notified of updates to TradingSolutions and the Solution Service. It is recommended that you receive these notifications to stay aware of changes that may affect your usage of the Solution Service.

What Do I Do Next?

After you have entered the required information, press the **Finish** button to submit your request to the Solution Service server. If you do not want to register at this time, press the **Cancel** button. You may also review the terms and conditions or return to re-register an e-mail address by pressing the **Back** button.

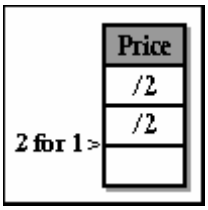
If you arrived at this wizard by requesting an update to the Solution Service, the Update Solution Service Dialog will be displayed after you are successfully registered.

How Did I Get Here?

This page is displayed after the Register for the Solution Service Wizard: Terms and Conditions page.

Stock Split Adjustment Wizard

Stock Split Adjustment Wizard



The Stock Split Adjustment Wizard allows you to adjust historical price and volume data when a stock split occurs. Following a stock split, previous price and volume data values are adjusted to match the new valuation. This allows the price and volume information to maintain a consistent scale with new data.

For example, when a 2-for-1 stock split occurs, all of the previous price data is divided by two and all of the previous volume data is multiplied by two.

Historical data from data providers is typically already adjusted to take into account any stock splits occurring within the timeframe of the data. However, there may be times when data needs to be adjusted manually. Some examples of this are:

- **When new price data is being entered manually.**

  If you are entering price data into a data series manually, such as from a newspaper, you will need to split adjust previous values when a stock split occurs.

- **When new data is being imported into an existing data series.**

  If you are importing new data into an existing data series and you are not overwriting all of the previous values in the data series, any values remaining previous data may need to be adjusted.

  Note: In this case, the date of adjustment is NOT the date of the stock split. Instead, the adjustment begins on the first date of the old data.

- **When older data is being imported into an existing data series.**

  If you are importing older data into an existing data series, these older values may need to be adjusted to reflect stock splits that are already handled in the newer data.

  Note: In this case, the date of adjustment is NOT the date of the stock split. Instead, the adjustment begins on the first date of the old data.

When new data is imported into an existing data series, TradingSolutions automatically checks to determine if split adjusted data may be being placed next to non-adjusted data. If a change in price of over 25% occurs at the edge of the new data, a warning is given indicating that the data may need to split adjusted and a suggested action is recommended.

Note: If non-split adjusted data is imported into the middle of previously split-adjusted data, two adjustments will be detected. The first adjustment will be from the end of the newly imported data to adjust it to match the data that comes after it. The second adjustment will be from the start of the newly imported data to de-adjust the data that comes before it. This second adjustment should be the reverse of the first ratio. In other words, an adjustment for a 2-for-1 split should be followed by an adjustment for a 1-for-2 split.

Specifying Split Adjustment Information

To specify a split adjustment, enter the information about the split adjustment on this page. The fields that will be adjusted can be changed on the next page of this wizard.

Split Adjustment

These values specify the ratio of the stock splits that have occurred. For example, if a 2-for-1 split has occurred, enter the numbers 2 and 1.

Date of Adjustment

This value indicates the last date of the adjustment. The data for this data and all dates prior to this date is adjusted to reflect the new value.

Note: When adjusting old data for split-adjusted data, this is almost never the actual date of the stock split. Instead, this is the last date of the old data that now needs to be adjusted.

For help using the date controls, see the help for Date Selection Controls.

Recovering from an Incorrect Split Adjustment

If you accidentally enter a split adjustment for the wrong amount or for the wrong date, you can reverse the process by entering a split of the opposite amount for the same date.

For example, if you enter an adjustment for a 2-for-1 split for a date and then want to undo it, enter an adjustment for a 1-for-2 split for the same date. This will reverse the price and volume changes and restore the original values.

What Do I Do Next?

When you are finished entering the split adjustment information, press the **Next** button to continue on to the Specify Fields page. If you would like to exit the wizard without performing any split adjustment at this time, press the **Cancel** button.

How Did I Get Here?

The Stock Split Adjustment Wizard appears when you select **Split Adjust Data…** from the context menu for a data series from the Portfolio View or **Split Adjust from this Date…** from the context menu for a date in the Spreadsheet View. It also appears when TradingSolutions detects that split adjusted data may be adjacent to non-split adjusted data following an import.

Stock Split Adjustment Wizard: Specify Fields

The Stock Split Adjustment Wizard allows you to adjust historical price and volume data when a stock split occurs. Following a stock split, previous price and volume data values are adjusted to match the new valuation. This allows the price and volume information to maintain a consistent scale with new data. This page allows you to specify which fields should be adjusted as price data and which fields should be adjusted as volume data.

Specifying the Data Fields to Adjust as Price Data

By default, TradingSolutions will select to adjust fields named Close", High", Low", and Open" to be adjusted as price data. If you would like to include other fields, select them from the list of other fields in the data series and press the **Adjust as Price Data** button. If you would prefer not to adjust any of these fields, select them from the list of fields to adjust as price data, and press the **Remove from Adjustment** button associated with that list.

Price data is adjusted by dividing the value of the field by the size of the split.

Specifying the Data Fields to Adjust as Volume Data

By default, TradingSolutions will select to adjust any field named Volume" to be adjusted as volume data. If you would like to include other fields, select them from the list of other fields in the data series and press the **Adjust as Volume Data** button. If you would prefer not to adjust this field, select it from the list of fields to adjust as volume data, and press the **Remove from Adjustment** button associated with that list.

Volume data is adjusted by multiplying the value of the field by the size of the split.

What Do I Do Next?

When you have selected the fields you would like to have adjusted, press the **Finish** button to begin the adjustment. If you would like to exit the wizard without performing any split adjustment at this time, press the **Cancel** button. If you would like to change the type or date of the adjustment being performed, press the **Back** button to return to the Information page.

How Did I Get Here?

The Specify Fields page appears after the Information page in the Stock Split Adjustment Wizard.

Help with Single Page (Non-tabbed) Dialogs

Single Page Dialogs A-E

Activate Software Dialog

The activate software dialog allows you to activate the full functionality of the TradingSolutions software using an activation code that you obtain through the purchase of the software.

When you purchase TradingSolutions, you will be provided with a username and password that you can use to log into the customer section of the TradingSolutions web site. From the customer section of the web site, you can obtain an activation code that can be used to convert the Evaluation Version of the software to the full version of the software.

Controls on this Dialog

The following information is displayed on this dialog:

- **Current Level**
  This value indicates the level the software is currently activated at (Evaluation, End-of-Day, or Real-Time).

- **Optional Hardware Key**
  This value indicates whether an optional hardware key is currently detected as being installed. For more information about hardware keys, see **Using Hardware Keys**, below.

- **Serial Number**
  This value indicates the unique serial number associated with this installation of TradingSolutions. Each computer TradingSolutions is installed on (or each optional hardware key) has its own serial number.

- **Activation Code**
  This box is used to enter the activation code used for activating TradingSolutions. Activation codes are unique to each serial number. For more information about activation codes, see **Activating TradingSolutions**, below.

Purchasing TradingSolutions

TradingSolutions can be converted from the Evaluation Version to the full version of the software without having to visit a store or wait for package delivery. For information on purchasing TradingSolutions, visit the TradingSolutions web site by pressing the **Order TradingSolutions** button.

Activating TradingSolutions

TradingSolutions can be converted from the Evaluation Version to the full version of the software by placing a valid value in the **Activation Code** box.

Important Note: If you are using TradingSolutions or NeuroSolutions (4.1 or later) with a hardware key, see the information on hardware keys below before continuing.

To obtain an activation code for TradingSolutions, you must first purchase the software. When you purchase TradingSolutions, you will be provided with a username and password. This username and password can be used to log into the customer section of the TradingSolutions web site. You can visit the customer section directly by pressing the **Obtain Activation Code** button.

Note: You must be connected to the Internet in order to visit the TradingSolutions web site.

In the customer section of the web site, enter the value from the **Serial Number** box of the Activate Software Dialog. You can copy the value directly from this box by selecting the value in the box and pressing **Ctrl Insert** to copy it. Then, on the web site, put the cursor in the Serial Number box and press **Shift Insert** to paste the value.

Note: The TradingSolutions web site will notify you if you enter an invalid serial number.

Now, request the activation code for TradingSolutions. Once this value is returned, copy the value from the web site into the **Activation Code** box on the Activate Software Dialog. Then, press the **Activate TradingSolutions** button. If everything has been done correctly, the **Current Level** will update to reflect the version of the activated software.

Using Hardware Keys

TradingSolutions and NeuroSolutions (v4.16 or later) support the option to use a hardware key to make it easier to transfer software registrations between multiple machines. A hardware key, also known as a dongle", is a small device that attaches to your computer via the USB connection or the parallel port. This device acts as a key" to unlock the purchased software.

Note: A hardware key is not necessary to use current NeuroDimension products. However, some customers find them to be a convenient way to transfer their registered software between multiple machines.

NeuroDimension software activation is based on a serial number. When you install NeuroDimension software, a serial number is stored on your computer identifying it to the software. Based on that number, software activation codes can be issued that are unique to your machine.

NeuroDimension hardware keys also have a serial number. When they are installed in your computer, NeuroDimension software will read the serial number from the hardware key rather than from the computer itself. It is important to understand this when using hardware keys since the hardware key temporarily changes" the serial number associated with a computer.

If you have requested to use a hardware key with the software, it is essential that this hardware key be installed on the computer when you request your activation code. This is so that the activation code you receive is based on the serial number on the hardware key rather than the serial number on that single computer.

Note: If the hardware key is properly installed on the computer, the Activate Software Dialog will display **Optional Hardware Key: Detected**. If you have the key inserted in your computer, but this does not appear, check the directions accompanying the key to ensure no additional drivers need to be installed. If you continue to encounter problems, please contact NeuroDimension.

After you have activated the software with the hardware key installed, you will only be able to run the software with the hardware key installed. To use the software on another machine, move the hardware key to that machine and activate the software on that machine using the same activation code.

Note: If you activate the software with the hardware key installed and then remove the key, the program will run in evaluation mode until the hardware key is replaced.

If you would like more information about using hardware keys with TradingSolutions or other NeuroDimension products, please contact NeuroDimension.

What Do I Do Next?

When you are finished with this dialog, press the **Done** button. If you arrived here from the evaluation panel, you will be returned to the Welcome Dialog. If you arrived here from the help menu, you will be returned to the program. In either case, once you have activated the software, you will now be able to import all of the data sources supported by TradingSolutions.

How Did I Get Here?

The Activate Software Dialog appears when you select **Activate/Purchase Software…** from the **Help** menu. It also appears if you select **Activate / Purchase** from the evaluation panel.

Add Prediction Input Dialog

The Add Prediction Input Dialog allows you to change the preprocessing associated with a prediction input which is being added.

For help with predictions, see Predicting and Modeling Financial Data.

Selecting Prediction Input Preprocessing

The following values are displayed on this dialog.

Field Name

This is the name of the field used for this input.

Data Series / Group

This is the data series or group which the field belongs to. In most cases, this will be the same data series or group in which the prediction is being created.

Preprocessing

This value specifies the type of preprocessing that should be used on the selected field. Preprocessing normally defaults based on the type of value contained in the input field.

- **Percent Change**

  This option uses the percent change in the values from the previous bar as the input. It is typically used for continuous, positive, non-zero values that do not have a constant range, such as price information.

- **Change**

  This option uses the change in the values from the previous bar as the input. It is typically used for continuous values that may not have a constant range, such as some momentum indices.

- **None**

  This option uses the actual value as the input. It is typically used for discrete values that have a constant range, such as entry/exit signals.

- **Conditional**

  This option causes this value not to be used as an input to the prediction. Instead, it is used to determine which bars are included for training. It the value is non-zero, the bar is included. If the value is zero, it is skipped.

  Note: If multiple conditional inputs are specified, all of the values must be non-zero for the bar to be included for training.

Note: Change and percent change preprocessing are done relative to the previous bar of the prediction data series. In most cases, this is the change from the previous bar of the input. However, when using data of other periodicities, it will be the change from the value at the previous bar of the prediction.

For additional help with working with multiple periodicities, see Understanding Periodicity.

What Do I Do Next?

If you would like to add this field as an input, select a different preprocessing and press **OK**. If you would not like to add this input again, press **Cancel**.

Note: You would not typically want to add the same input twice with the same preprocessing. This is presenting the same information to the neural network multiple times and does not aid in it is training.

How Did I Get Here?

The Add Prediction Input Dialog will appear if you attempt to add an input to a prediction which has already been added and has its default preprocessing on the Predict a Value Wizard: Select Inputs page and the Modify Field Dialog: Prediction Inputs page

Adjust Random Number Seed Dialog

The Adjust Random Number Seed Dialog allows you to change the seeding for the random numbers used to initialize values in TradingSolutions. Random numbers are used to initialize the weights in untrained neural networks and also used for many operations in genetic optimization.

Note: Fields that are currently being used by the Solution Service cannot be modified.

How the Random Number Seed Is Used

Random numbers generated by computers are typically not truly random. Computer-generated random numbers are produced by algorithms that simulate randomly generated series. The starting point of these series is determined using a seed.

In most cases, this seed is set using an available near-random number, such as the number of milliseconds into the current hour of the day. However, it can also be useful to reproduce the same series of computer-generated random numbers multiple times. To do this, the same random number seed can be used each time a series is generated.

There are up to three random number seeds associated with predictions. The first, available from the Advanced Topology Settings Dialog, is the seed used for the random numbers used to initialize the weights in untrained neural networks. This seed is set at the start of the first training pass, resulting in a different set of random weights for each training pass. During genetic training optimization, this seed is set at the start of each set of training passes, causing each set of parameters to be tested using the same starting conditions.

The other seeds, available from the Training Optimization Dialog and the Postprocessing Optimization Dialog, are used for the random numbers used to initialize the initial genetic populations. After the initial population is generated, the same random series is used for the probabilities of crossover and mutation, as well as determining the extent of mutation.

Setting the Random Number Seed

By default, TradingSolutions sets all random number seeds to 1. Setting the random number seed to the same value every time ensures that any training and postprocessing results will be repeatable given the same starting conditions.

If you would like to maintain this consistency but would like to try a different sequence of random numbers, enter a new seed, or press the **Jog** button to select a new seed at random.

If you would like to use a different random number seed every time, select **Use a random seed every time**.

Note: Deselecting this option will **not** restore the last randomly selected seed.

What Do I Do Next?

When you are finished modifying the settings, press the **OK** button to save any changes. If you would like to exit this dialog without saving your changes, press the **Cancel** button.

How Did I Get Here?

The Adjust Random Number Seed Dialog appears when you press the **Adjust Seed…** button on the Advanced Topology Settings Dialog, the Modify Field Dialog: Configure Model page for Custom Solution Wizard DLL's, or the Modify Genetic Algorithm Settings.

Configure Data Sources Dialog

The Configure Data Sources Dialog allows you to modify the settings associated with the data sources defined in TradingSolutions.

Data sources are providers and services that provide data for use in programs such as TradingSolutions. Settings associated with these services include user account settings and indicating times when new data is available.

For help with data sources, see Configuring Data Sources.

Selecting a Data Source to Modify

All of the data sources currently available in TradingSolutions are listed in the **Available Data Sources** list. Brief information about the selected data source is displayed in the **Additional Information For Selected Source** window.

The following buttons are available for working with the selected data source.

- **Sign Up For Service…**

  This button opens the wizard or website where you can register to use the selected data source.

- **Update/Delete Account…**

  This button opens the wizard or website where you can update your account information for the selected data source.

  Note: The **Update/Delete Account…** button will be displayed instead of the **Sign Up For Service…** button if the selected data source is already configured for use. For most data sources, either button will display the same wizard or website.

- **Modify Data Source Settings…**

  This button displays the Modify Data Source Settings Dialog, which allows you to modify settings, such as your username and password, associated with the selected data source.

  Note: Pressing this button for the Solution Service data source will display the Modify Solution Service Settings dialog.

Why Aren't All Of These Data Sources Listed in the Import Data Wizard?

While TradingSolutions can interact with all of the data sources listed on this dialog, only data sources that have the necessary information defined are listed in the Import Data Wizard: Select Data To Download page.

For example, if a data source requires a username and password to be accessed, that username and password must be entered on the Modify Data Source Settings Dialog before that data source can be used.

Note: It is not always necessary to enter this information manually. TradingSolutions may be able to access your username and password information and fill these values in fro you automatically.

What Do I Do Next?

When you are finished modifying data source settings, press the **Done** button.

How Did I Get Here?

This Configure Data Sources Dialog is displayed when you select **Define Data Sources…** from the **Data** menu. It also appears if the **Define Data Sources** button on the toolbar is selected. In addition, it can be displayed by pressing the **Data Sources…** button on the Import Data Wizard: Select Type page.

Copy Entry/Exit System Dialog

Copy Alert Definition Dialog

This dialog appears in several forms to allow you to copy elements of existing function definitions, entry/exit systems, and alert definitions.

For help with function definitions, see Calculating Values and Financial Indicators.
For help with entry/exit systems, see Creating and Analyzing Entry/Exit Signals.
For help with alerts, see Working with Messages and Alerts.

Selecting a Definition to Copy

To select a definition to copy, select a group from the groups list, then select an item from that group. If you know the name of the definition, but do not know what group it is in, you can use the group **All**, to display all of the items available for this operation.

Selecting What Elements to Copy

The following elements of a function or entry/exit system can be copied.

☑ **Formula / Rules**

For function definitions, this element includes the function formula, which can be specified on the Formula page.

For entry/exit systems, this element includes all of the entry and exit rules, which can be specified on the Entry/Exit Rules page.

For alerts, this element includes the rules, which can be specified on the Rules page.

☑ **Messages**

This element includes the message text for an Alert Definition from the Message page.

☑ **Notes & Description**

This element includes the description from the Properties page and the additional text from the Notes page.

Additional Options

If you would prefer to see more entries in the lists, you can add or remove the description area using the **Display Descriptions** checkbox.

What Do I Do Next?

When you have selected a function definition or entry/exit system to copy, press the **OK** button. If you would like to exit from this dialog without performing a copy, press the **Cancel** button. You can also activate the **OK** button by double-clicking the name of the desired item.

How Did I Get Here?

The Copy Function Definition Dialog appears when you press the **Copy another Function Definition…** button on the Create a Function Definition Wizard: Basic Information page or the Modify Function Definition Dialog: Properties page.

The Copy Entry/Exit System Dialog appears when you press the **Copy another Entry/Exit System…** button on the Create an Entry/Exit System Wizard: Basic Information page or the Modify Entry/Exit System Dialog: Properties page.

The Copy Alert Definition Dialog appears when you press the **Copy another Alert Definition…** button on the Create an Alert Definition Wizard: Basic Information page or the Modify Alert Definition Dialog: Properties page.

Copy Optimization Range From Field Dialog

The Copy Optimization Range From Field Dialog allows you to select a field with an optimization or training range in order to copy the associated date range.

Specifying a Prediction to Copy a Data Range From

To specify a field to copy a data range from, use the selection tree control.

Note: Group predictions are not listed under their associated groups in the selection tree. Instead, these predictions are listed under each data series that the prediction was applied to. This is because the date ranges associated with the training sets of each data series may be different depending on the number of samples that were available.

For help using the selection tree, see the help for Selection Trees.

Selecting the Data Range to Use

When you train a prediction or optimize a field, the data set aside for optimization is divided in up to three sets. Any contiguous group of these sets can be selected using the **Select Ranges to Include** combo box. In addition, the data before or after the training data can be selected.

- **Training Set**
  This data is used for the actual training or optimization of the field. The behavior of the field for this data has the largest effect on its training or optimization.

- **Cross Validation Set**
  This data is used for determining when to stop the training or optimization of the field. The training or optimization process will continue as long as the behavior of the field for this field continues to improve. This data has an effect on the training or optimization, but it is not as large as that of the training set.

- **Accuracy Testing Set**
  This data is set aside to not be part of the training or optimization process. By default, it is the most recent data at the time the field is trained or optimized.

- **Data Before All Training Sets**
  This option selects all data before the first date included in the training sets.

- **Data After All Training Sets (Production Data)**
  This option selects all data after the last date included in the training sets.

What Do I Do Next?

When you have selected the field and ranges to use, press the **OK** button. If you would like to exit from this dialog without copying a date range, press the **Cancel** button.

How Did I Get Here?

The Copy Optimization Range From Field Dialog appears when you select the **Copy Optimization Range from a Field…** button from the Modify Options Dialog: Signal Analysis page, the Signal Analysis Options Dialog, or the Correlation Analysis Wizard: Analysis Options page.

Create Custom Signal Analysis Dialog

The Create Custom Signal Analysis Dialog allows you to create a custom signal analysis field using a collection of settings. The analysis options on this page can be combined to create a wide array of analysis fields. In all, over 1000 different analysis fields can be created. This may seem like a confusing number of options at first, but the process for getting the value you want to analyze is fairly straightforward.

Specifying a Custom Signal Analysis

Begin by selecting what type of analysis you would like to perform, selecting from types such as overall equity, trade profitability, and trade lengths. Then, select a scope, or subset, of trades to analyze. For example, you can limit your analysis to only long trades (remember, this term does not refer to the length of the trade, it refers to buying the equity as opposed to selling it).

When you have selected a type and scope to analyze, select the specific value you would like to see. For many types, the current, last, average, maximum, and minimum values are all available. In addition, many values can be expressed as a raw value or as a useful percentage.

Finally, you can indicate whether to include the currently active trade in the analysis. This may or may not be favorable, depending on the type of analysis being performed.

The following list explains each option in more detail.

Type of Analysis

This value indicates the general type of analysis that this field should perform during the trading simulation. The following types of analysis are available.

- **Account Equity**

  This type of analysis tracks the amount of money in the trading account during the simulation. It can be expressed as a total dollar amount or as percentage of the original amount. The maximum and minimum values of this type can also be analyzed.

- **Account Profit**

  This type of analysis is exactly the same as **Account Equity**, except that the values represent the change from the original amount, rather than the total amount. It can be expressed as a total dollar amount or as percentage profit. The maximum and minimum values of this type can also be analyzed.

- **Comparison to Buy/Hold**

  This type of analysis is similar to **Account Equity**, except that the equity is compared to the equity that would be generated by simply buying the stock on the first bar and holding it. The actual value of buying and holding the stock can also be generated using this type.

- **Current Trading Values**

  This type of analysis reports the trading values for each bar. It can also be used to report the entry (limit) and stop prices currently being used in the analysis.

- **Number of Trades**

  This type of analysis tracks the number of trades in the given scope. It can be expressed as a count or as a percentage of all trades.

  Example: To calculate the percentage of winning trades, select **Number of Trades** with a scope of **All Winning Trades** and an analysis value of **Percentage of Trades that are in Scope**.

- **Sizes of Trades**

  This type of analysis tracks the number of shares that have been held in trades in the given scope. The average, maximum, and minimum values of this type can also be analyzed, as well as the current and last values.

- **Lengths of Trades**

  This type of analysis tracks the length of the trades in bars in the given scope. For end-of-day data, this is the number of trading days that a position is held. The average, maximum, and minimum values of this type can also be analyzed, as well as the current and last values.

Example: To calculate the average length of long trades, select **Trade Lengths** with a scope of **All Long Trades** and an analysis value of **Average Bars for Trades in Scope**.

- **Profitability of Trades**

  This type of analysis tracks the profit generated by trades in the given scope. It can be expressed as a total dollar amount or as a percentage profit. The average, maximum, and minimum values of this type can also be analyzed, as well as the current and last values.

  Example: To calculate the average percent profit of short trades, select **Trade Profitability** with a scope of **All Short Trades** and an analysis value of **Average Percent for Trades in Scope**.

- **Maximum Gains**

  This type of analysis is similar to **Trade Profitability**, except that it tracks the maximum gain for each trade in the given scope. This is useful for determining the effectiveness of exit signals since it can be compared to the actual profit to determine if a position was held too long. The average, maximum, and minimum values of this type can also be analyzed, as well as the current and last values.

- **Maximum Losses**

  This type of analysis is similar to **Trade Profitability**, except that it tracks the maximum loss for each trade in the given scope. This value is also known as the Maximum Draw Down" since it tracks the amount that an investment is drawn down from its original value. This is useful for determining the risk associated with positions. The average, maximum, and minimum values of this type can also be analyzed, as well as the current and last values.

  Example: To calculate the maximum loss for all trades, select **Maximum Losses** with a scope of **All Trades** and an analysis value of **Maximum Value for Trades in Scope**.

  Note: This value is not set on the first bar of a trade.

- **Entry Signals**

  This type of analysis tracks the entry signals that started the trades in the given scope. The strongest, weakest, and average signals of this type can be analyzed, as well as the current and last values.

- **Exit Signals**

  This type of analysis tracks the exit signals that caused trades in the given scope to be exited. The strongest, weakest, and average signals of this type can be analyzed, as well as the last value.

- **Strongest Signals**

  This type of analysis tracks the strongest signals that occurred during the trades in the given scope. The strongest, weakest, and average signals of this type can be analyzed, as well as the current and last values.

- **Weakest Signals**

  This type of analysis tracks the strongest signals that occurred during the trades in the given scope. The strongest, weakest, and average signals of this type can be analyzed, as well as the current and last values.

Scope of Analysis

This value indicates the subset of trades that this field should analyze during the trading simulation. This value may not be available for analyses that can only be run for all trades. The following subsets are available.

- **Current Trade**

  This scope returns the selected type of analysis for the currently active position to date. The value reflects state of the trade at that point in time; future values are not considered.

  Example: To calculate the length of the current trade to date, select the **Trade Lengths** type of analysis with a scope of **Current Trade**.

- **All Trades**

  This scope returns the selected type of analysis for all trades to date. The type and analysis value settings determine what value will be returned.

- **Other Scope Values**

  The other scope settings return the selected type of analysis for a subset of the trades to date. The type and analysis value settings determine what value will be returned.

Example: To calculate the percentage of winning trades, select the **Number of Trades** type of analysis with a scope of **All Winning Trades** and an analysis value of **Percentage of Trades that are in Scope**.

Example: To calculate the average length of losing trades, select the **Trade Lengths** type of analysis with a scope of **All Losing Trades** and an analysis value of **Average Bars for Trades in Scope**.

Analysis Value

This value indicates the type of value that should be produced for the selected type of analysis and scope. This value may not be available for analysis/scope combinations that only produce one value. The following values are available.

- **Total Equity** (under Account Equity)

  This value returns the total equity generated by the simulation. It can be viewed as a running total of how much money is in the trading account combined with the value of the current investment. This field is added by default when new signal analysis fields are being created. The percentage version of this value is relative to the initial investment.

- **Maximum / Minimum Equity** (under Account Equity)

  These values return the maximum or minimum equity generated to date. They can be viewed as running high and low water marks of the total equity value. The percentage versions of these values are relative to the initial investment.

- **Total Equity Minus Buy/Hold** (under Comparison to Buy/Hold)

  This value returns the total equity generated by the simulation minus the equity that would be generated by simply buying the stock on the first bar and holding it. Effective entry/exit signals should cause this value to be mostly positive. The percentage version of this value is relative to the initial investment.

- **Buy/Hold Equity** (under Comparison to Buy/Hold)

  This value returns the total equity that would be generated by simply buying the stock on the first bar and holding it. This value does not use the entry/exit signal and is provided only as a reference value.

- **Number / Percentage in Scope**

  These values return the cumulative count of the selected analysis for the selected scope as either a raw number or as a percentage of the total count for all trades to date.

- **Average / Maximum / Minimum in Scope**

  These values return the average, maximum, or minimum value for the selected analysis and scope to date. The **as percent of profit** versions of these values are relative to the equity at the beginning of each trade.

- **Value / Percent for Last Trade in Scope**

  These values return the selected analysis for the last trade that was in the selected scope. The **as percent of profit** value is relative to the equity at the beginning of each trade.

  Example: To calculate the percent profit from the last completed short trade, select the **Trade Profitability** type of analysis with a scope of **All Short Trades** and an analysis of **Percent for Last Trade in Scope**.

  Note: If **Include Current Position in Value** is selected, this value will return the selected analysis for the current trade if it is in the selected scope. Otherwise, only completed trades are included.

- **Strongest / Weakest / Average Value for Trades in Scope** (for Signal Types)

  These values return the strongest, weakest, or average value for the selected analysis and scope to date.

- **Recommended Entry Price** (for Trading Values)

  This value returns the entry price that would be requested by a new trade. If limits are being used, this is the limit price that is being used. When used as a portfolio display field, this can be useful for determining the price to enter new trades at.

- **Recommended Stop Price** (for Trading Values)

  This value returns the stop price that is being used by the current trade. If trailing stops are being used, it will be updated each day; otherwise, it will remain at the value set when the trade was entered. When used as a portfolio display field, this can be useful for determining the price that stop orders should be placed at.

- **Trading and Basis Values** (for Trading Values)

These values return the current trading values being used by the signal analysis. The values are determined by the fields specified in the trading style.

☑ **Include Current Position in Value**

This value indicates whether to include the current trade in the selected type of analysis and scope. For non-equity values, only the completed trades to date are included by default. Selecting this value includes the current state of the current trade in the analysis if it is in the selected scope.

Note: If the selected scope is limited to winning or losing trades, the current position may alternate between being included and not included as it changes from being profitable and non-profitable.

What Do I Do Next?

Press the **OK** button to add the newly specified analysis. If you would like to exit without adding a new analysis, press the **Cancel** button.

How Did I Get Here?

The Custom Analysis Range Dialog appears when you press the **Add Other…** button on the Create Signal Analysis Fields Wizard: Trading Parameters page or the Modify Field Dialog: Trading Parameters page.

Create Empty Data Series Dialog

The Create Data Empty Series Dialog allows you to create a new data series without importing data from an external source. This is useful for entering data manually. It can also be used to create a data series that will be updated during import update operations.

- **Note: This dialog is primarily used for creating empty data series that you will enter data into manually.**
- If you will be importing data from a file or the Internet, it is not necessary to use this dialog. The Import Data Wizard automatically creates any new data series when they are imported.
- If you will be streaming intraday data from the Internet, you can use this dialog to create a new data series to stream. However, if you plan to create models or trading signals for this data, it is recommended that you use the Import Data Wizard to create the data series instead.

- For help organizing your data with the Portfolio View, see Managing Data with the Portfolio View.
- For help importing historical data, see Importing Historical Data.
- For help with streaming intraday data, see Streaming Intraday Data.

Creating A Data Series

To create a new data series, enter the ticker and display names and press the **OK** button.

Ticker Symbol

The ticker symbol is a short designation used to identify a security or index. It is typically 3-6 characters in length. Any combination of letters or numbers can be used here; however, it must be unique to the other ticker names in your portfolio with the same periodicity.

Display Name

The display name is the name that will be displayed in the Portfolio View and other places throughout TradingSolutions. If this field is left blank, the ticker name will be used.

Exchange

This setting defines the exchange for which this data is associated. This is used primarily for determining when new data is available for updates. If this data is not based on a particular exchange, specify **<none>**.

- Note: If you would like to create a new exchange, press the **Edit…** button. This will display the Define Exchanges Dialog.

Data Source

This setting indicates where the data for this data series will be coming from. If you will be entering data by hand, select **Manual Entry**.

- Note: Typically, if you will be importing this data from files or the Internet, it is not necessary to use this dialog. The Import Data Wizard automatically creates any new data series when they are imported.

Periodicity

The periodicity indicates the number of minutes or days to include in each High / Low / Open / Close bar. If **intraday** is selected, you will also be asked to specify the **Bar Size** in minutes. In addition, the following option will also be displayed.

☑ **Include in intraday streaming updates.**

This option allows you to set this data series to be included in intraday streaming updates. This option can be turned on or off from the Modify Data Series Dialog: Properties page.

- Note: This option is only available when both an intraday periodicity is selected and the selected data source is configured to support streaming data.

The data series will be created with a Close field and an entry for the current date. Additional fields will be added based on the selected type of data. The Close field and any other fields can be removed or renamed from the Modify Data Series Dialog: Data Fields page. The entry for the current date can be modified or removed and additional dates can be added from the Spreadsheet View.

What Do I Do Next?

When you are finished entering the naming information, press the **OK** button to create the data series. If you would like to exit from this dialog without creating a new data series, press the **Cancel** button.

How Did I Get Here?

The Create Data Series Dialog appears if you select **Create Empty Data Series…** from the context menu of the portfolio or a portfolio subgroup from the Portfolio View.

Create Subgroup Dialog

The Create Subgroup Dialog allows you to create a new subgroup in the portfolio or another group. This is useful for organizing your data for comparison and processing.

For help organizing your data with the Portfolio View, see Managing Data with the Portfolio View.

What Do I Do Next?

To create the new subgroup, enter the name of the new subgroup and press the **OK** button. If you would like to exit from this dialog without creating a new subgroup, press the **Cancel** button.

Note: If you later change your mind and want to use a different name for the subgroup you are creating, you can rename it at any time using **Rename…** from the context menu of the subgroup on the Portfolio View.

How Did I Get Here?

The Create Subgroup Dialog appears when you select to add a new subgroup from the Subgroups page of the Modify Portfolio Dialog or Modify Group Dialog. It is also displayed when you select **Add New Subgroup…** from the context menu of a portfolio or subgroup in the Portfolio View.

Custom Analysis Range Dialog

The Custom Analysis Range Dialog allows you to specify a custom date range for signal analysis fields.

Specifying a Date Range to Analyze

The following options are available for specifying an analysis range:

- **Continuously adjust starting point so range is always same length.**

  This setting begins the range a given period of time before the last record in the data series. Each time new data is imported into the data series, the start date of the analysis is updated.

  Example: To specify the range to get a six-month return, select **6** and **Months**.

  Note: The time periods associated with this option are in calendar units and are used only to adjust the starting date of the analysis. For example, the **Days*** setting is in calendar days, not trading days.

  Note: Only the value for the last record will contain data for the entire period.

  Note: If the data series does not contain enough data to fill the period, no values will be calculated.

- **Adjust starting point so range begins at start of most recent period.**

  This setting begins the range at the start of the most recent *period*. For example, year-to-date analyses begin on January 1st of the last year in the data series. When a new year is imported into the data series, the start date of the analysis is updated.

  Example: To specify the range to get a year-to-date return, select **Beginning of Year**.

  Note: Only the values for the most recent period will be calculated.

  Note: If the data series does not contain data at or before the start of the period, no values will be calculated.

- **Do not adjust starting point, use the following range.**

  This setting allows you to use date controls to specify a fixed range.

  If you would like to analyze the range associated with a field, use the **Copy Optimization Range from a Field..** button. This will display the Copy Optimization Range From Field Dialog.

  For help using the date controls, see the help for Date Selection Controls.

  Note: If an end date is specified, the values on the end date will be held after that date has passed. This is useful for comparing analysis fields from different date ranges.

What Do I Do Next?

Press the **OK** button to accept the newly specified range. If you would like to exit without specifying a new range, press the **Cancel** button.

How Did I Get Here?

The Custom Analysis Range Dialog appears when you press the **Custom Range…** button on the Create Signal Analysis Fields Wizard: Trading Parameters page or the Modify Field Dialog: Trading Parameters page.

Define Alert Definitions Dialog

The Define Alert Definitions Dialog allows you to add new alerts and modify existing ones.

For help with alerts, see Working with Messages and Alerts.

Creating a New Alert

To create a new alert, select an alert group to add the new alert to, then press the **New…** button under the Alerts in Selected Group list. This will display the Create an Alert Definition Wizard where you can specify the characteristics of the new alert.

Note: You can create your own alert groups to store your alerts in. Keeping your own alerts separate from those provided with TradingSolutions often makes them easier to find later.

Viewing or Modifying an Alert

To modify an existing alert, select the alert you want to modify and press the **Edit…** button. This will display the Modify Alert Definition Dialog where you can edit the characteristics of this alert.

Moving an Alert to a Different Group

To move an alert to a different alert group, drag the alert from the Alert list to the desired group in the Alert Groups list. This action can also be performed from the Modify Alert Dialog: Properties page.

Deleting an Alert

To delete an existing alert, select the alert you want to delete and press the **Delete** button. Your action will be confirmed and the alert will be deleted.

Note: The **Delete** button is not available for locked alerts. To delete a locked alert, press the **Edit…** button and unlock the alert before trying to delete it. Alerts provided with TradingSolutions cannot be unlocked or deleted.

Warning: Before you delete an alert, make sure that you no longer need it. After you delete an alert, you will not be able to get it back without using the steps you used to create it.

Creating a New Alert Group

To create a new alert group, press the **New…** button under the Alert Groups list. This will display the Modify Alert Group Dialog where you can enter the name and a brief description of the group to be created.

Modifying an Alert Group

To modify the name or description of an alert group, select the group in the Alert Groups list, then press the **Edit…** button under that list. This will display the Modify Alert Group Dialog. You can also modify a group by double-clicking the group name in the list.

Changing the Display Order of Alert Groups

To change the display order of the alert groups, select a group in the group list, then press the **Slide Up** or **Slide Down** buttons to move the selected group. You can also use the mouse to drag the groups to a new position in the list.

Note: The All" entry cannot be moved from the top of the list.

For help changing the order of items in a list, see the help for Orderable Lists.

Deleting an Alert Group

To delete an alert group, select the group in the Alert Groups list, then press the **Delete** button under that list. Your action will be confirmed and the group will be deleted, along with any alerts in it.

Note: The **Delete** button is not available for locked groups. To delete a locked group, select the **Edit…** button and unlock the group before trying to delete it.

Warning: Before you delete an alert group, make sure that you no longer need the alerts in that group. After you delete an alert group, you will not be able to get its contents back without using the steps you used to create it.

Additional Options

If you would prefer to see more entries in the lists, you can add or remove the description area using the **Display Descriptions** checkbox.

What Do I Do Next?

When you are finished making any changes, press the **Close** button.

How Did I Get Here?

The Define Alert Definitions Dialog is displayed when you select **Define Alerts…** from the **Tools** menu. It also appears when the **Define Alerts** button on the toolbar is selected.

Define Entry/Exit Systems Dialog

The Define Entry/Exit Systems Dialog allows you to add new entry/exit systems and modify existing ones.

For help with entry/exit systems, see Creating and Analyzing Entry/Exit Signals.

Creating a New Entry/Exit System

To create a new entry/exit system, select an entry/exit system group to add the new function to, then press the **New…** button under the Entry/Exit Systems list. This will display the Create an Entry/Exit System Wizard where you can specify the characteristics of the new entry/exit system.

Note: You can create your own system groups to store your entry/exit systems in. Keeping your own entry/exit systems separate from those provided with TradingSolutions often makes them easier to find later.

Viewing or Modifying an Entry/Exit System

To modify an existing entry/exit system, select the system you want to modify and press the **Edit…** button. This will display the Modify Entry/Exit System Dialog where you can edit the characteristics of this entry/exit system.

Moving an Entry/Exit System to a Different Group

To move an entry/exit system to a different entry/exit system group, drag the entry/exit system from the Entry/Exit System list to the desired group in the Entry/Exit System Groups list. This action can also be performed from the Modify Entry/Exit System Dialog: Properties page.

Deleting an Entry/Exit System

To delete an existing entry/exit system, select the system you want to delete and press the **Delete** button. Your action will be confirmed and the system will be deleted.

Note: The **Delete** button is not available for locked entry/exit systems. To delete a locked entry/exit, press the **Edit…** button and unlock the entry/exit before trying to delete it. Entry/Exit systems provided with TradingSolutions cannot be unlocked or deleted.

Warning: Before you delete an entry/exit system, make sure that you no longer need it. After you delete an entry/exit system, you will not be able to get it back without using the steps you used to create it.

Creating a New Entry/Exit System Group

To create a new entry/exit system group, press the **New…** button under the Entry/Exit System Groups list. This will display the Modify Entry/Exit System Group Dialog where you can enter the name and a brief description of the group to be created.

Modifying a Entry/Exit System Group

To modify the name or description of an entry/exit system group, select the group in the Entry/Exit System Groups list, then press the **Edit…** button under that list. This will display the Modify Entry/Exit System Group Dialog. You can also modify a group by double-clicking the group name in the list.

Changing the Display Order of Entry/Exit System Groups

To change the display order of the entry/exit system groups, select a group in the group list, then press the **Slide Up** or **Slide Down** buttons to move the selected group. You can also use the mouse to drag the groups to a new position in the list.

Note: The All" entry cannot be moved from the top of the list.

For help changing the order of items in a list, see the help for Orderable Lists.

Deleting an Entry/Exit System Group

To delete an entry/exit system group, select the group in the Entry/Exit Systems Groups list, then press the **Delete** button under that list. Your action will be confirmed and the group will be deleted, along with any function definitions in it.

Note: The **Delete** button is not available for locked groups. To delete a locked group, select the **Edit…** button and unlock the group before trying to delete it.

Warning: Before you delete an entry/exit system group, make sure that you no longer need the entry/exit systems in that group. After you delete an entry/exit system group, you will not be able to get its contents back without using the steps you used to create it.

Additional Options

If you would prefer to see more entries in the lists, you can add or remove the description area using the **Display Descriptions** checkbox.

What Do I Do Next?

When you are finished making any changes, press the **Close** button.

How Did I Get Here?

The Define Entry/Exit Systems Dialog is displayed when you select **Define Entry/Exit Systems…** from the **Tools** menu. It also appears when the **Define Entry/Exit Systems** button on the toolbar is selected.

Define Exchanges Dialog

The Define Exchanges Dialog allows you to define and/or modify the settings associated with exchanges in TradingSolutions.

For help with exchanges, see Working with Different Exchanges.

Adding New Exchanges

Defining exchanges is useful for specifying the days and times that sets of stocks and other financial instruments are expected to have new data. These settings are primarily used for the time information associated with intraday data.

To add a new exchange to TradingSolutions, press the **Add New…** button. This will display the Specify Exchange Characteristics Dialog.

After you define a new exchange, it will be made available in the lists of exchanges available throughout TradingSolutions.

Modifying Current Exchanges

To modify the settings associated with currently defined exchanges, select an exchange and press the **Edit…** button. This will display the Specify Exchange Characteristics Dialog.

User-defined exchanges can be deleted by selecting the exchange and pressing the **Delete** button.

Note: Exchanges required by TradingSolutions cannot be deleted.

What is the Major U.S. Exchanges" exchange?

The Major U.S. Exchanges" exchange is a single definition used for the NYSE, NASDAQ, and other U.S. exchanges that trade during the same days and times of day. These symbols can typically be treated as one group despite being handled in different physical exchanges.

What Do I Do Next?

When you are finished modifying data source settings, press the **Done** button.

How Did I Get Here?

This Define Exchanges Dialog is displayed when you select **Define Exchanges…** from the **Data** menu. It also appears if the **Define Exchanges** button on the toolbar is selected.

In addition, it can be displayed by pressing the buttons associated with the **Exchange** settings on numerous dialogs, such as the Modify Data Dialog: Properties page and the Import Data Wizard: Select Symbols to Download page.

Define Field Formats Dialog

The Define Field Formats Dialog allows you to define new field formats and modify existing ones. These formats are used when displaying fields in the Spreadsheet View and the Portfolio View. The format that will be used to display a field can be selected on the Modify Field Dialog: Overview page.

For help with the Portfolio View, see Managing Data with the Portfolio View.

For help with the Spreadsheet View, see Displaying Data in a Spreadsheet.

Understanding the Pre-defined Field Formats

TradingSolutions includes several pre-defined field formats that can handle the majority of the data that will be displayed in TradingSolutions fields. These pre-defined field formats can be edited, but they cannot be deleted or renamed.

- **Price**
  This is the default format for all non-signal data fields. It is used for displaying decimal values that typically display price data in TradingSolutions.
- **Integer**
  This format is primarily used for displaying volume and open interest values.
- **Currency**
  This format is primarily used for displaying monetary amounts in signal analysis fields.
- **Percentage**
  This format is primarily used for displaying percentage values in signal analysis fields.
- **Signal**
  This format is used for displaying entry/exit signals. This is the only format that includes signal arrow information. The signal arrow portion of the format cannot be removed, but the numeric portion of the signal can be modified.

Adding or Modifying Field Formats

To add a new field format, press the **Add…** button. This will display the Specify Format Characteristics Dialog, allowing you to name and specify a new field format. After you have created a new field format, it will be available from the list of field formats on the Modify Field Dialog: Overview page.

Note: User-defined field formats will not be selected by default when new fields are created. Therefore, in order for the new field format to be used, you must select it for each field you would like it to be applied to.

To modify an existing field format, select the field format you would like to modify and press the **Edit…** button. This will display the Specify Format Characteristics Dialog. You can also double-click on the field format you would like to modify.

To delete a field format that you have created, select the field format you would like to delete and press the **Delete** button.

What Do I Do Next?

When you are finished making any changes, press the **Done** button.

How Did I Get Here?

The Define Field Formats Dialog is displayed when you select **Define Field Formats…** from the **Tools** menu or the **Define Field Formats** button on the **General** toolbar. It can also be displayed by pressing **New…** button next to the **Format** selection on the Modify Field Dialog: Overview page.

Define Functions Dialog

The Define Functions Dialog allows you to add new function definitions and modify existing ones.

For help with function definitions, see Calculating Values and Financial Indicators.

Creating a New Function Definition

To create a new function definition, select a function group to add the new function to, then press the **New…** button under the Function Definition list. This will display the Create a Function Definition Wizard where you can specify the characteristics of the new function.

Note: You can create your own function groups to store your function definitions in. Keeping your own functions separate from those provided with TradingSolutions often makes them easier to find later.

Viewing or Modifying a Function Definition

To modify an existing function definition, select the function you want to modify and press the **Edit…** button. This will display the Modify Function Definition Dialog where you can edit the characteristics of this item.

Moving a Function Definition to a Different Function Group

To move a function definition to a different function group, drag the function definition from the Function Definition list to the desired group in the Function Groups list. This action can also be performed from the Modify Function Definition Dialog: Properties page.

Deleting a Function Definition

To delete an existing function definition, select the function you want to delete and press the **Delete** button. Your action will be confirmed and the function will be deleted.

Note: The **Delete** button is not available for locked function definitions. To delete a locked function, press the **Edit…** button and unlock the function before trying to delete it. Function definitions provided with TradingSolutions cannot be unlocked or deleted.

Warning: Before you delete a function definition, make sure that you no longer need it. After you delete a function definition, you will not be able to get it back without using the steps you used to create it.

Creating a New Function Group

To create a new function group, press the **New…** button under the Function Groups list. This will display the Modify Function Group Dialog where you can enter the name and a brief description of the group to be created.

Modifying a Function Group

To modify the name or description of a function group, select the group in the Function Groups list, then press the **Edit** button under that list. This will display the Modify Functions Group Dialog . You can also modify a group by double-clicking the group name in the list.

Changing the Display Order of Function Groups

To change the display order of the function groups, select a group in the group list, then press the **Slide Up** or **Slide Down** buttons to move the selected group. You can also use the mouse to drag the groups to a new position in the list.

Note: The All" entry cannot be moved from the top of the list.

For help changing the order of items in a list, see the help for Orderable Lists.

Deleting a Function Group

To delete a function group, select the group in the Function Groups list, then press the **Delete** button under that list. Your action will be confirmed and the group will be deleted, along with any function definitions in it.

Note: The **Delete** button is not available for locked groups. To delete a locked group, select the **Edit…** button and unlock the group before trying to delete it.

Warning: Before you delete a function group, make sure that you no longer need the functions in it. After you delete a function group, you will not be able to get its contents back without using the steps you used to create it.

Additional Options

If you would prefer to see more entries in the lists, you can add or remove the description area using the **Display Descriptions** checkbox.

What Do I Do Next?

When you are finished making any changes, press the **Close** button.

How Did I Get Here?

The Define Functions Dialog is displayed when you select **Define Functions…** from the **Tools** menu. It also appears when the **Define Functions** button on the toolbar is selected.

Define Trading Solutions Dialog

The Define Trading Solutions Dialog allows you to add new trading solutions and modify existing ones.

For help with trading solutions, see Working with Complete Trading Solutions.

Creating a New Trading Solution

To create a new trading solution, select a trading solution group to add the new solution to, then press the **New…** button under the Trading Solutions list. This will display the Create a Trading Solution Wizard where you can specify the characteristics of the new trading solution.

Note: You can create your own solution groups to store your trading solutions in. Keeping your own trading solutions separate from those provided with TradingSolutions often makes them easier to find later.

Viewing or Modifying a Trading Solution

To modify an existing trading solution, select the solution you want to modify and press the **Edit…** button. This will display the Modify Trading Solution Dialog where you can update a trading solution or edit its characteristics.

Moving a Trading Solution to a Different Group

To move a trading solution to a different solution group, drag the trading solution from the Trading Solution list to the desired group in the Trading Solution Groups list. This action can also be performed from the Modify Trading Solution Dialog: Properties page.

Deleting a Trading Solution

To delete an existing trading solution, select the solution you want to delete and press the **Delete** button. Your action will be confirmed and the solution will be deleted.

Note: The **Delete** button is not available for locked trading solutions. To delete a locked trading solution, press the **Edit…** button and unlock the solution before trying to delete it. Trading Solutions provided with TradingSolutions cannot be unlocked or deleted.

Warning: Before you delete a trading solution, make sure that you no longer need it. After you delete a trading solution, you will not be able to get it back without using the steps you used to create it.

Creating a New Trading Solution Group

To create a new trading solution group, press the **New…** button under the Trading Solution Groups list. This will display the Modify Trading Solution Group Dialog where you can enter the name and a brief description of the group to be created.

Modifying a Trading Solution Group

To modify the name or description of a trading solution group, select the group in the Trading Solution Groups list, then press the **Edit…** button under that list. This will display the Modify Trading Solution Group Dialog. You can also modify a group by double-clicking the group name in the list.

Changing the Display Order of Trading Solution Groups

To change the display order of the trading solution groups, select a group in the group list, then press the **Slide Up** or **Slide Down** buttons to move the selected group. You can also use the mouse to drag the groups to a new position in the list.

Note: The All" entry cannot be moved from the top of the list.

For help changing the order of items in a list, see the help for Orderable Lists.

Deleting a Trading Solution Group

To delete a trading solution group, select the group in the Trading Solution Groups list, then press the **Delete** button under that list. Your action will be confirmed and the group will be deleted, along with any trading solutions in it.

Note: The **Delete** button is not available for locked groups. To delete a locked group, select the **Edit…** button and unlock the group before trying to delete it.

Warning: Before you delete a trading solution group, make sure that you no longer need the trading solutions in that group. After you delete a trading solution group, you will not be able to get its contents back without using the steps you used to create it.

Additional Options

If you would prefer to see more entries in the lists, you can add or remove the description area using the **Display Descriptions** checkbox.

What Do I Do Next?

When you are finished making any changes, press the **Close** button.

How Did I Get Here?

The Define Trading Solutions Dialog is displayed when you select **Define Trading Solutions…** from the **Tools** menu. It also appears when the **Define Trading Solutions** button on the toolbar is selected.

Define Trading Styles Dialog

The Define Trading Styles Dialog allows you to add new trading styles and modify existing ones.

For help with trading styles, see Using Trading Styles.

Creating a New Trading Style

To create a new trading style, press the **Add New…** button. This will display the Modify Trading Style Dialog where you can specify the characteristics of the new trading style.

You can also create a new trading style by pressing the **Copy** button, selecting the copy, and pressing the **Edit…** button to edit the copy.

Viewing or Modifying a Trading Style

To modify an existing trading style, select the style you want to modify and press the **Edit…** button. This will display the Modify Trading Style Dialog where you can change the settings associated with it.

Note: You may receive a warning that a trading style is in use when you press the **Edit…** button. Since trading styles are used when optimal signal fields and signal analysis fields are calculated, you need to be aware that changing a trading style may cause the values in these fields to change.

You can modify an existing trading style without affecting any fields that currently use it by first making a copy of it and editing the copy.

Deleting a Trading Style

To delete an existing trading style, select the style you want to delete and press the **Delete** button. Your action will be confirmed and the solution will be deleted.

Note: You will not be able to delete trading styles that are currently used to calculate fields.

What Do I Do Next?

When you are finished making any changes, press the **Done** button.

How Did I Get Here?

The Define Trading Styles Dialog is displayed when you select **Define Trading Styles…** from the **Tools** menu. It also appears when the **Define Trading Styles** button on the toolbar is selected or when you press the **Edit Styles…** button on a dialog or page where trading styles can be selected.

Demo Dialog

The Demo Dialog is a menu-based dialog that displays animated demonstrations of how to perform common operations in TradingSolutions. The demos can be displayed one at a time, in sections, or all at once.

For more help getting started with TradingSolutions, see Getting Started.

Using Rollover Menus

The Demo Dialog uses a graphical rollover menu to display a list of options. When the mouse pointer is moved over a menu option, that menu option is highlighted. Menu options can be distinguished from normal text by the shadow they have behind their letters. Normal text does not have a shadow.

Note: The Demo Dialog sometimes has two menus active at one time. A controls menu is in the upper left hand corner of the dialog at all times. In addition, a demo selection menu is available in the lower part of the dialog when a demo is not currently being displayed.

The keyboard can also be used to select menu options from the Demo Dialog. While the mouse device is not being moved, the current selection can be moved using the arrow keys on the keyboard. Pressing the Enter key selects the currently highlighted selection.

Displaying the Demos

To display a demo of a particular topic, simply select a topic from the rollover menu in the lower part of the dialog. All of the demos in the entire demo system can also be played by selecting **Play All Sections**. When using this option, the demo system will automatically continue on to the next demo until all demos in the section have been completed.

TradingSolutions demonstrations include a narration and are paced to automatically continue at the pace of the narration. However, for computers that do not have sound, it may be difficult to read the text and watch the animations at the same time. TradingSolutions can be set to pause during the demos by selecting **Change to Self-Paced Demos**. This will cause the demos to pause for you to hit the space bar so that you can watch the animations without having to worry about missing text. To return to having the demos automatically continue, select **Change to Auto-Play Demos**.

Controlling the Demos

While the demos are playing, the controls menu has several features to help you control the progress of the demos.

- **Forward/Back Arrows**
  The arrow buttons allow you to step between topics. Like a CD player, the back arrow will return to the beginning of the current topic if it is currently in the middle.

- **Pause/Play**
  While the demo is playing, the pause button allows you to pause the demo. Once the demo is paused, the pause button is replaced with a play button that allows you to resume the demo. You can also press the Escape key to pause the demo.

Controlling the Mouse

While the demos are playing, they will use the mouse pointer to illustrate how to use many of the features found in the program. This means that the mouse may not be immediately available for use while the demos are playing.

If the demo system detects that you are trying to move the mouse while it is using the mouse, it will automatically pause the demo so that the mouse is available for you to use. You can also press the Escape key to pause the demo, which releases the control of the mouse.

Since you are not moving the mouse, the screensaver on your computer may appear or may cause your monitor to turn off. In this case, simply move the mouse. If this causes the demo to pause, press the play button.

How Did I Get Here?

The Demo Dialog is displayed when you select **Introductory Demos** from the Welcome Dialog. It is also displayed when you select **Introductory Demos…** from the **Help** menu or press the **Introductory Demos** button on the toolbar.

Display Chart Dialog

Display Spreadsheet Dialog

The Display Chart and Display Spreadsheet dialogs allow you to select one or more fields to display in a chart or spreadsheet. They also allow you to modify the fields that are currently being displayed in a chart or spreadsheet.

For help with the chart view, see Displaying Data in a Chart.

For help with the spreadsheet view, see Displaying Data in a Spreadsheet.

Working with Views

When you indicate to display a new chart or spreadsheet, you can either display a previous view or select new fields to display. A view" is a collection of fields associated with a saved chart or spreadsheet. In addition to any charts or spreadsheets that you request to save, the most recent view for each chart and spreadsheet of a data series is saved automatically when you close them.

- **Display a previous view for this data series**

  This option allows you to display a previous chart or spreadsheet. This can be a chart or spreadsheet that you requested to save or the most recent view for this data series. While this option is selected, the contents of the selected view are displayed in the field list.
  The following options are available:

  - *** Most Recent View**

    This view is the most recent chart or spreadsheet displayed for this data series. Views are typically only saved when a chart or spreadsheet is closed.

    Note: This is the default value when it is available.

  - *** Default Chart / * Default Spreadsheet**

    This view is the default chart or spreadsheet for the portfolio. The fields included in the default chart can be set from the Modify Options Dialog: Charting page. The fields included in the default spreadsheet are the raw data fields and the Primary/Secondary/Service signals defined for the data series.

    Note: This is the default when no previous views are available.

  - ***Previously Saved Views***

    Charts and spreadsheets can be saved to be recalled here using **Save this Chart…** or **Save this Spreadsheet…** from the context menu for a chart or spreadsheet.
    Saved views can be renamed or deleted by pressing the **Manage Views…** button. This displays the Modify Data Series: Data Views page.

- **Select new fields to display.**

  This option allows you to select new fields to display in a chart or spreadsheet using the field selection tree on the lower portion of this dialog. While this option is select, the currently selected fields are displayed in the field list.

  Note: The fields included in a previous view can be added to the new display by selecting the desired view from the field selection tree.

Selecting Fields to Display

To select fields to display in a chart or spreadsheet, select the name of one or more fields from the selection tree and press the **Add Selected Fields** button. This will display these field names in the current display list. Entire subtypes of fields can be added by selecting the subtype name.

Example: Selecting **Raw Data** and then pressing the **Add Selected Fields** button will add all of the fields listed under the Raw Data heading.

In most cases, this dialog will begin by displaying only the fields of a selected data series. To select fields from another data series in the portfolio, use the radio button above the list display fields for the entire portfolio, then select from those fields in the selection tree.

To create a new field and add it directly to the display, press the **Create a New Field…** button. After you exit the Display Fields dialog, any calculations that are required by this new field will be performed.

New fields are always added to the bottom of the field list. When adding new fields to a chart, the added field can be added in a new sub-chart by selecting **Display added field in a new sub-chart.**

For help using the selection tree, see the help for Selection Trees.

Special Values in the Selection Tree

The selection tree for the Display Fields dialogs includes several special values that can be added to the display.

- **Composite Charts** (charts only)

  Composite charts are display fields that combine the values of several fields into a single chart element. Double-clicking on Composite Charts will add the most commonly used of these, the High/Low/Open/Close Chart.

  Note: This group is only available if fields named High", Low", and Close" are available. Some fields also require a field named Open".

  - **High/Low/Open/Close Chart**

    This chart uses a vertical line to represent the entire high/low range of the data. A horizontal line entering from the left represents the opening value. A horizontal line exiting to the right represents the closing value.

  - **Japanese Candlestick Chart**

    This chart uses a vertical bar to represent the range of prices between the opening and closing values. A vertical line extending above the bar represents the high range of values. A vertical line extending below the bar represents the low range of values. Bars in which the closing value is below the opening value are colored. Bars in which the closing value is above the opening value are left white.

  - **High/Low/Close Area Chart**

    This chart uses a line to represent the closing value. Bands above and below this line indicate the amount of area between the closing price and the high and low prices.

  - **High/Low/Close Bar Chart**

    This is the same as the area chart, except bars represent the range of values between the high and the close, and the close and the low.

- **Field Sub-values**

  In addition to displaying the actual value of a field, several sub-values can be calculated on the fly for the display.

  Note: These sub-values do not create new fields and, therefore, are not directly available for use as inputs to other fields.

  - **Value**

    This sub-value displays the actual value of the field. This is the same value that is displayed if the field name is selected.

  - **Change in Value**

    This sub-value displays the change in the value of the field from the previous bar.

    Note: If the previous value is null, the change is considered to be null.

  - **Percent Change in Value**

    This sub-value displays the percent change in the value of the field from the previous bar.

    Note: If the previous value is zero or null, the percent change is considered to be null.

  - **Raw Prediction Output**

    This sub-value displays the value of the neural network without postprocessing. In other words, if this field was predicted using percent change preprocessing, the value being displayed would be the predicted percent change. In addition, any postprocessing applied to predicted signals is removed.

  - **Error in Prediction Value**

    This sub-value displays the difference between the predicted value and the desired value.

    Note: If the desired value is null, the error will also be null.

- **Error in Raw Prediction Output**

  This sub-value displays the difference between the raw prediction output and the desired value without postprocessing. In other words, if this field was predicted using percent change preprocessing, the value being displayed would be the difference between the predicted percent change and the actual percent change.

  Note: If the desired value is null, the error will also be null.

- **Previous Views**

  This item allows you to select all of the fields associated with a previous view for a data series. This is useful for modifying previous views or displaying the same information in charts and spreadsheets. Double-clicking on the Previous Views category or the Chart or Spreadsheet category will select the most recent view of that category.

Changing the Order of the Fields

To change the order that the fields are displayed in, select a field from the list, then press the **Slide Up** or **Slide Down** buttons to move the selected field. You can also use the mouse to drag the fields to a new position in the list.

When adding or modifying the fields in a chart, dashed lines represent the beginning of a new sub-chart. These dashed lines can be moved in order similar to the fields in the list. In addition, the last field in the list can be slid downward to move it into a new sub-chart.

Individual fields can also be removed by selecting them and pressing the **Remove from Display** button.

For help changing the order of items in a list, see the help for Orderable Lists.

Setting Amount of Data to Display

The TradingSolutions Portfolio contains all of the data that has been imported for each stock. However, in most cases, you will only be interested in viewing the most recent data. So that charts and spreadsheets can be displayed more quickly, only the most recent data is loaded by default.

You can adjust how much data is loaded into the chart or spreadsheet with the following settings:

- **Load data for last: *period of time***

  This option restricts the chart or spreadsheet to only load the most recent values.

  Example: Setting this to 2 Years will cause the chart or spreadsheet to only load the most recent 2 Years worth of data.

  Note: You can load any remaining data from within a chart by selecting **Load Remaining Data** from the context menu for the date axis, or from within a spreadsheet by selecting **Load Remaining Data** from the context menu for the date column.

- **Load all available data.**

  This option loads all available data into the chart or spreadsheet.

You can also adjust the initial display size of charts when you first open the display:

- **Display chart for last: *period of time***

  This option indicates how much data to display in the chart when it is first opened.

What Do I Do Next?

When you are finished selecting the fields to display or changing an existing display, press the **OK** button. If you would like to exit from this dialog without making a new display or changing an existing display, press the **Cancel** button.

How Did I Get Here?

The Display Chart Dialog appears if you select to display a portfolio, data group, or data series in a chart. It is also displayed when changing an existing chart and when selecting to display the values of a spreadsheet in a chart.

The Display Spreadsheet Dialog appears if you select to display a portfolio, data group, or data series in a spreadsheet. It is also displayed when changing an existing spreadsheet and when selecting to display the values of a chart in a spreadsheet.

Export Field Selection Dialog

The Export Data/Field Selection Dialog allows you to select the data and fields you would like to export.

By default, all of the dates in each selected data series will be included. To export only a portion of the dates, press the **Restrict Date Range…** button. This will display the Export Date Range Dialog.

When you are finished making any changes, press the **OK** button. If you would like to exit from this dialog without importing any data, press the **Cancel** button.

For help exporting data, see Importing and Exporting Data.

Understanding the Selection Tree

The items available for importing or exporting are displayed in a tree format. Each major item may be broken down into several different elements contained within them. Each item in the tree has an icon indicating what it is.

Export Data / Field Selection Tree Icons

	Data Grouping
	Data Series
	Date Field
	Numeric Data Field

Next to each file, ticker symbol, and field is a checkbox that can be used to select whether to process this piece data. Items with a check will be imported or exported, items without a check will be ignored.

Selection Tree Checkboxes

	Unselected Item
	Selected Item
	Partially Selected Item
	Required Item
	Item Not Available

How Did I Get Here?

The Export Data Selection Dialog appears if you select **Export Data…** from the **File** menu or the context menu of the portfolio or a portfolio subgroup from the Portfolio View. It also appears if the **Export Data** toolbar button is selected when a portfolio or subgroup is selected.

The Export Field Selection Dialog appears if you select **Export Data…** from the **File** menu or the context menu of a data series in the Portfolio View. It also appears after the Export Data Selection Dialog and if the **Export Data** toolbar button is selected when a data series is selected.

Export Date Range Dialog

The Export Date Range Dialog allows you to specify a range of dates to export for the selected data series.

By default, all of the dates in each selected data series will be included.

For help exporting data, see Importing and Exporting Data.

Specifying a Range of Dates to Export

To specify a range of dates to export for the selected data series, use the date controls.

For help using the date controls, see the help for Date Selection Controls.

What Do I Do Next?

When you have selected a date range to export, press the **OK** button. If you would like to exit from this dialog without changing the date range, press the **Cancel** button.

How Did I Get Here?

The Export Date Range Dialog appears when you press **Restrict Date Range…** on the Export Data Selection Dialog or the Export Field Selection Dialog.

Export Function Selection Dialog

The Import / Export Function Selection Dialog allows you to select the functions and entry/exit systems you would like to import or export.

Note: Trading solutions are exported separately from function definitions and entry/exit systems. For information on exporting trading solutions, see the help for the Export Trading Solution Dialog.

When you are finished making any changes, press the **OK** button. If you would like to exit from this dialog without importing any data, press the **Cancel** button.

Understanding the Selection Tree

The items available for importing or exporting are displayed in a tree format. Each major item may be broken down into several different elements contained within them. Each item in the tree has an icon indicating what it is.

Function Selection Tree Icons

	TradingSolutions Function File
	Definition Group
	Function Definition
	Entry/Exit System
	Alert

Next to each file, ticker symbol, and field is a checkbox that can be used to select whether to process this piece data. Items with a check will be imported or exported, items without a check will be ignored.

Selection Tree Checkboxes

	Unselected Item
	Selected Item
	Partially Selected Item
	Required Item
	Item Not Available

Note: Functions or entry/exit systems with the same name as provided (seed) functions cannot be imported.

How Did I Get Here?

The Import Function Selection Dialog appears if you select **Import Functions…** from the **File** menu and select an appropriate function file. It also appears if the **Import Functions** toolbar button is selected.

The Export Function Selection Dialog appears if you select **Export Functions…** from the **File** menu. It also appears if the **Export Functions** toolbar button is selected.

Export Trading Solution Dialog

The Export Trading Solution Dialog allows you to select a trading solution to export to an external file. Exported trading solutions can be given to other TradingSolutions users for them to use on their systems.

For help with trading solutions, see Working with Complete Trading Solutions.

Selecting a Trading Solution to Export

To select a trading solution to export to a file, select a group from the groups list, then select an item from that group. If you know the name of the trading solution, but do not know what group it is in, you can use the group **<All Groups>**, to display all of the available trading solutions.

If you would like to create a new trading solution based on an existing field in your portfolio and then export that new solution, press the **Create a New Trading Solution…** button. This will display the Create a Trading Solution Wizard.

Using Trading Solutions in Previous Versions

By default, trading solutions will be exported in a format which contains all of the information associated with the most recent version of the software. This format will typically not be compatible with previous versions of the TradingSolutions software.

Export Format

This option enables you to export your trading solution in a format usable in a previous version of the TradingSolutions software.

If the fields created by the selected trading solution require features available only after the selected version in order to reproduce their value, a warning message will be displayed indicating that the export cannot be performed.

Note: Examples of features not supported in previous versions are optimal signals using maximum drawdown and entry/exit systems using profit/loss/length rules.

Additional Options

If you would prefer to see more entries in the lists, you can add or remove the description area using the **Display Descriptions** checkbox.

What Do I Do Next?

Once you have selected a trading solution to export, press the **OK** button. This will display a file selection dialog to select what to name the file and where it should be located. If you would prefer not to export a trading solution at this time, press the **Cancel** button.

For help with the file selection dialog, see the help for the File Selection Dialog.

How Did I Get Here?

The Export Trading Solution Dialog is displayed when you select **Export Trading Solution…** from the **File** menu.

File Selection Dialog

This dialog appears in several forms. During import operations, it allows you to select one or more files with data to import. During export operations, it allows you to specify the name of the file to create and what location to place it in. It is also used for selecting external files, such as Custom Solution Wizard DLLs.

What Do I Do Next?

When you have selected desired file, press the **Open** or **Save** button, as appropriate. If you would like to exit from this dialog without performing an action, press the **Cancel** button.

Genetic Settings Dialog

The Genetic Settings Dialog allows you to set the values associated with the genetic algorithm used for optimization.

Note: In general, it is not necessary to change these values. However, advanced users may want to experiment with different genetic algorithm parameters.

Note: Fields that are currently being used by the Solution Service cannot be modified.

For help with optimizing fields, see Optimizing Signals and Predictions.

Setting the Evolution Characteristics

Genetic optimization works by creation an initial population of potential settings, testing each one and storing its fitness. The best members of the population are then used to create a new population of potential settings.

Algorithm Type

This value indicates the type of genetic algorithm to use.

- **Generational**

  This type of algorithm creates a new population for each new generation. This causes the algorithm to concentrate the best solutions while still considering the information in other solutions.

- **Steady State**

  This type of algorithm replaces only the worst member in a population with a new member. This causes the algorithm to prune the worst solutions and concentrate on the best solutions.

  Note: Since steady state optimization only has one new member in each population, significantly more generations are needed to arrive at the best solution. However, since only one new member is needed, each generation after the first completes much more quickly.

Population Size

This setting indicates the number of chromosomes (groups of settings) to include in each population. The population size determines the number of tests performed in the first generation and the number of chromosomes kept in each subsequent generation.

Probability of Crossover

This value specifies the probability that a pair of groups of settings (chromosomes) will be crossed over. This means that part of the settings from one group are exchanged with the settings in the other group. Larger values increase the likelihood that new combinations of settings will be tried, but may also increase the likelihood that good combinations of settings will be separated.

Avg. Genes to Mutate

This value specifies the average number of genes (individual settings) that should be changed in each new chromosome (group of settings). This is in addition to the genes changed due to crossover. This value is converted into a probability for each gene to be mutated based on the total number of genes in each chromosome.

Setting the Termination Criteria

Genetic optimization is used to locate the best possible settings for a particular operation. Since the best values are not known ahead of time, it is not possible to know when they are reached. Therefore, termination criteria are used to establish when to stop looking at new settings.

The following options are available for terminating the genetic optimization phase.

Maximum Time (minutes)

This value specifies the maximum number of minutes that the genetic optimization can take.

Note: This time limit is checked before the beginning each new test, so the actual optimization may continue until the end of an individual test.

Maximum Generations

This value specifies the maximum number of generations the genetic optimization can attempt.

Note: If a steady state algorithm is selected, significantly more generations should be used than with a generational algorithm.

☑ **Max. Generations w/o Improvement**

This value specifies the maximum number of generations the genetic optimization can attempt after the best fitness has been found for the cross validation set.

Note: This setting is used for optimizing predictions only when the optimization date range is set to **Optimize Training Set, Checking Cross Val.**

Note: This setting is used for optimizing non-predicted signals only when a cross validation set is specified in the date range.

Other Options on This Dialog

The following options are also available.

☐ **Adjust Seed…**

This button displays the Adjust Random Number Seed Dialog, which allows you to modify the random number seed associated with the genetic optimization. Using the same seed for each optimization will allow you to reproduce the same results given the same initial conditions.

☐ **Restore Defaults…**

This button restores this dialog to its default values.

What Do I Do Next?

When you are finished modifying the settings, press the **OK** button to save your changes. If you would like to exit from this dialog without saving your changes, press the **Cancel** button.

How Did I Get Here?

The Modify Genetic Algorithm Settings Dialog is displayed when you press the **Genetic Algorithm Settings…** button on the Signal Optimization Settings Dialog, the Training Optimization Settings Dialog, or the Postprocessing Optimization Settings Dialog.

Import Trading Solution with Duplicate Name Dialog

This dialog appears when you have selected to import a trading solution file and that file contains a trading solution with a name that is already being used in your system.

For help with trading solutions, see Working with Complete Trading Solutions.

Selecting How to Handle the Duplicate Name

This dialog presents you with the following options.

- **Replace the existing trading solution with this new one.**

  This option will replace the indicated trading solution that is currently on your system with the trading solution being imported from the selected file.

- **Import this trading solution with a different name.**

  This option will allow you to enter a different name for the trading solution that is being imported from the selected file. By default, the duplicate name will be enumerated as a suggested alternate name. However, any name can be entered as a new name.

  Note: If the selected name is already in use on your system, this dialog will be redisplayed.

- **Skip importing this trading solution.**

  This option will cancel the importing of the indicated trading solution. If other files were selected from in the file selection dialog, they will be imported as normal.

What Do I Do Next?

After selecting how to proceed, press the **OK** button. If you would like to cancel the importing of the indicated trading solution, select **Skip importing this trading solution** before continuing.

How Did I Get Here?

This dialog appears when you have selected to import a trading solution file and that file contains a trading solution with a name that is already being used. Trading solutions can be imported by selecting **Import Trading Solutions…** from the **File** menu.

Information Dialog

The information dialog displays the description and additional notes for a function definition, entry/exit system, alert, or trading solution. It is displayed when you request information about a definition.

Understanding the Information Dialog

The Information Dialog contains the following information.

- **Definition**
  This is the display name of the function definition, entry/exit system, alert, or trading solution.

- **Abbreviation**
  This is the formula name of the function definition. This entry is not displayed for other definitions.

- **Description**
  This is the brief description that is displayed at the bottom of definition selection lists.

- **Notes**
  The main part of this dialog displays any additional notes that have been entered for the definition. For functions that are included with TradingSolutions, most of the following sections are contained in the notes.

  - **Parameters**
    This section contains information about the input parameters to the definition.

  - **Function / Indicator Value**
    This section contains information about how the value is calculated, including any special considerations at the start of a data series.

  - **Usage**
    This section contains information about how the value of this definition is typically used.

  - **Source**
    This section indicates where the definition was originally taken from. This gives you a starting place for any additional research you would like to do on this definition.

What Do I Do Next?

After you have finished reading the information, press the **Done** button.

How Did I Get Here?

This dialog is displayed when you request additional information about a function, entry/exit system, or trading solution. Specifically, it appears if you press the **More** button that appears next to the description box at the bottom of any definition selection list. It also appears if you select **Display Information about this Field…** from the context menu for a field in a chart or spreadsheet.

Insert Date Range Dialog

The Insert Date Range Dialog allows you to specify a range of dates to add to a data series. Times can also be included for intraday time series.

Note: This dialog should typically only be used when entering data by hand. When importing data from a file or the Internet, the Import Data Wizard will insert the imported data as appropriate.

For help with the spreadsheet view, see Displaying Data in a Spreadsheet.

Specifying a Range of Dates to Insert

To specify a range of dates to insert into a data series, use the date controls.

For help using the date controls, see the help for Date Selection Controls.

Note: The periodicity and exchange for the data series are used to determine which dates and times should be added in the specified date range. These settings can be found on the Modify Data Series Dialog: Properties page.

What Do I Do Next?

When you have selected a date range to add, press the **OK** button. If you would like to exit from this dialog without adding any new dates, press the **Cancel** button.

How Did I Get Here?

The Insert Date Range Dialog appears when you select **Insert New Dates…** from the context menu for the Date column in the Spreadsheet View.

Modify Committee Member Dialog

The Modify Committee Member Dialog allows you to modify the settings associated with one or more committee members. Typically, this is the number of votes associated with the selected members. For signals, it can also include the type of processing associated with held signals.

Modifying Committee Members

To modify a committee member, simply adjust the number of votes. If all of the selected committee members are signals with the same processing, you can also adjust the signal processing.

Number of Votes

This value indicates the number of votes that a field should receive in the committee. Giving a field multiple votes has the same effect as adding the field multiple times.

Note: If you add the same field multiple times, the number of new votes will be added to the current number of votes for the existing entry.

Signal

These settings indicate the value that a committee member which is a signal field will vote when it has a holding signal. A holding signal is signal that would not cause a change in position. For example, if the last signal was an enter long, it could be held until an enter short signal or an exit long signal is encountered. This allows you to combine systems that generate brief entry or exit signals with long hold periods.

The following types of processing are available for signals.

- **No Hold Processing**

  This setting votes with the actual value of the signal, unmodified.

- **Hold Signal Value**

  This setting votes with the last non-holding signal, unmodified.

  Example: If the last entry signal was an enter long (100%), and no exit longs have occurred since then, then the vote will be for enter long (100%).

- **Hold % of Value**

  This setting votes with the specified percentage of the last non-holding signal.

  Example: If the last entry signal was an enter long (100%), and no exit longs have occurred since then, then the vote will be for the specified percentage of the signal. In this case, if the percentage was 75%, the vote would be for 75% of 100%, or 75%.

- **Decay Value by %**

  This setting votes with the last non-holding signal, decayed by the specified percentage each sample. This is useful for voting with infrequent signals that may only be relevant for a few days after occurring.

  Example: If the last entry signal was an enter long (100%), and no exit longs have occurred since then, then the vote will be that signal, decayed. With a 5% decay, the day after the signal would vote 95%, then 90.25% on the next day, then 85.74%, continuing until a new non-holding signal was reached.

What Do I Do Next?

When you are done modifying the selected committee members, press the **OK** button. If you would prefer to exit this dialog without making modifications, press the **Cancel** button.

How Did I Get Here?

The Modify Committee Member Dialog appears when you press the **Modify Number of Votes** button on the Create a Committee Wizard: Select Fields page or the Modify Field Dialog: Committee Fields page.

Modify Data Source Advanced Settings Dialog

The Modify Data Source Advanced Settings Dialog allows you to view or modify advanced settings associated with a data source, such as what types of information are available.

Note: This dialog is currently not available in TradingSolutions. It will be made available in a later release.

For help with data sources, see Configuring Data Sources.

Configuring Data Source Settings

The following settings can be modified on this dialog.

Name

This setting modifies the name of the data source.

Information

This setting modifies the information that is displayed in the **Additional Information For Selected Source** window on the Configure Data Sources Dialog.

Requires Username/Password

This setting indicates whether a username and password is required in order for this data source to be considered configured. Only configured data sources are displayed on the Import Data Wizard: Select Data to Download page.

Requires Server Name

This setting indicates whether a server name is required in order for this data source to be considered configured. Only configured data sources are displayed on the Import Data Wizard: Select Data to Download page.

Historical End-of-Day

This setting indicates whether historical end-of-day data is available from this data source. This affects the periodicities available to download on the Import Data Wizard: Select Data to Download page.

Historical Weekly

This setting indicates whether historical weekly data is available from this data source. This affects the periodicities available to download on the Import Data Wizard: Select Data to Download page.

Historical Monthly

This setting indicates whether historical monthly data is available from this data source. This affects the periodicities available to download on the Import Data Wizard: Select Data to Download page.

Delay after Close

This setting indicates the number of minutes before this data source typically has end-of-day data available after the time of market close.

Example: If the data source typically has U.S. Stock data available at 6:00pm ET, this value would be set to 120 minutes since it is two hours after the U.S. market close.

Invoke External Downloader

This setting indicates that this data source uses an external downloader program to download data from the data source to your computer. It controls whether the **Invoke external data downloader to request missing data** option is displayed on the Import Data Wizard: Start Import page. If this option is selected, the downloader is called to update the data associated with this data source prior to importing.

Historical Intraday

This setting indicates whether historical intraday data is available from this data source. This affects the periodicities available to download on the Import Data Wizard: Select Data to Download page.

Streaming Intraday

This setting indicates whether streaming intraday data is available from this data source. This affects whether data can be selected to receive streaming updates.

Website for additional information.

This setting indicates the website or program that is displayed when the **View Website…** button on the Configure Data Sources Dialog is pressed.

- **Program or website to sign-up/modify account.**
  This setting indicates the website or program that is displayed when the **Sign Up For Service…** or **Update Account…** buttons on the Configure Data Sources Dialog are pressed.

What Do I Do Next?

When you are finished modifying the settings, press the **OK** button. If you would prefer not to change any options at this time, press the **Cancel** button.

How Did I Get Here?

Note: This dialog is currently not available in TradingSolutions. It will be made available in a later release.

Modify Data Source Settings Dialog

The Modify Data Source Settings Dialog allows you to modify settings associated with a data source, such as your username and password.

For help with data sources, see Configuring Data Sources.

Modifying Data Source Settings

The following settings can be modified on this dialog.

Username

This setting is the username that uniquely identifies you to this particular data source.

Password

This setting is the password that allows you to access the account associated with the username.

Note: Your username and password are typically assigned during the registration process. If you would like to request a new username or password, exit from this dialog and press the **Update Account…** button on the Configure Data Sources Dialog. However, usernames and passwords may not be modifiable for all data sources.

Note: A username and password are not required to be entered into TradingSolutions for some data sources. If a username and password are required for your account, they would be entered into the setup information for that data source directly.

Server Name

This setting allows you to identify a specific server associated with the data source from which to obtain data.

Note: This setting is typically not necessary for most data sources.

What Do I Do Next?

When you are finished modifying the settings, press the **OK** button. If you would prefer not to change any options at this time, press the **Cancel** button.

How Did I Get Here?

The Modify Data Source Settings Dialog is displayed when you press the **Modify Settings…** button on the Configure Data Sources Dialog.

Modify Default Range Dialog

The Modify Default Range Dialog allows you to set the default ranges for optimization of signals and training of predictions.

There are no definitive rules for how much data should be used for training or optimizing fields. Including more data is useful for improving results since it provides additional examples for training. However, older financial data may have been produced under different market conditions than more recent data, causing the training to focus on outdated or overly generalized principles.

For help with predictions, see Predicting and Modeling Financial Data.
For help with optimizing fields, see Optimizing Signals and Predictions.

How Default Ranges are Used for Predictions

The date range associated with a prediction is used for several different things. Part of the data is used for training the neural network model. Part of the data is used as a validation step to make sure the training is improving the results. And, part of the data is left out of the training process to be used for only for testing.

The same date ranges are used for the optimization of the prediction settings and the postprocessing of predicted signals. By default, the training data is used for determining the fitness of each test. The cross validation data is used for determine which generation has provided the best general results. The testing data is typically not used during optimization.

How Default Ranges are Used for Signal Optimization

The date range associated with the optimization of committees and entry/exit systems is use the same as it is for predictions. By default, the training data is used for determining the fitness of each test. The cross validation data is used for determine which generation has provided the best general results. The testing data is typically not used during optimization.

Setting Default Ranges

Default date ranges can be established for each periodicity. For example, end-of-day data, 5-minute bars, and 15-minute bars can all have different default date ranges. In addition, separate default date ranges can be used for predictions versus other optimized signals.

Periodicity

This setting indicates the periodicity of the data for which you are currently setting the defaults. For intraday data, the **Bar Size** also needs to be specified.

Default Range

This setting indicates how much data to set aside for the combined training, cross validation, and testing of the optimization or prediction.

Note: If the default amount of data is not available, the prediction or optimization will use all available data.

Training Set

This value indicates the percentage of the default range to use for the actual training or optimization process. For prediction training, this data is used to determine the error for updating the neural network weights. For optimization, this data is used to determine the fitness of the current settings.

Note: This value equals the data remaining after the cross validation and testing ranges have been removed.

Cross Validation

This setting indicates the percentage of the default range to use for verifying that the new settings are producing better general settings with continued iterations. If the error or fitness for this range stops improving, the training or optimization stops after a given number of attempts and the settings which yielded the best results for the cross validation set are used.

Accuracy Testing

This setting indicates the percentage of the default range to set aside to not be used during training or optimization. This allows you to set aside data which is not used to improve the results so that you can verify the new values will work with new data.

Ordering

This setting indicates the order in which the default range is divided into training, cross validation, and testing sets.

Note: The testing set is typically kept last so that it is closest to any new data which will occur.

Restore Defaults

This button restores the default settings for these values.

What Do I Do Next?

When you are done modifying the training ranges, press the **OK** button. If you would prefer to exit this dialog without making modifications, press the **Cancel** button.

How Did I Get Here?

The Modify Default Range Dialog is displayed for signal optimization settings when you press the **Default Date Ranges…** button on the Signal Optimization Settings Dialog. It is display for prediction training and optimization settings when you press the **Training Ranges…** button on the Modify Options Dialog: Field Creation page.

Modify Rule Dialog

The Modify Rule Dialog allows you to enter the formula for a rule associated with generating a particular signal in an entry/exit system or for a rule associated with generating a message from an alert.

Entering a Rule Formula

To enter a rule, use the formula entry sub-pages. For help with these sub-pages, see the help for Formula Entry.

Entering Entry/Exit Rules

Entry/exit rules are evaluated in the following order:

1. Enter Long
2. Enter Short
3. Exit Long
4. Exit Short

Therefore, if the conditions associated with entering long are true, an enter long signal will be generated and none of the other conditions will be checked. Similarly, if the conditions associated with exiting long are true, they will only be evaluated if neither entry condition set is true and will stop the exit short rules from being evaluated.

Here are examples of typical entry/exit rules:

- **Enter when one value crosses another**

  Functions in the Series Crossing Functions" group can be used to detect when one value crosses above or below another value.

  Example: Is Crossing Above" returns true on the bar when one value crosses above another value after equal to or less than it.

- **Exit on trade profit, loss, or length**

  Functions in the Entry/Exit System Functions and Rules" group can be used to check values related to the current trade and test if certain conditions are met.

  Example: Rule: Exit On Percent Loss" returns true if the current trade results in a loss of a given percentage.

  Note: Functions in the Entry/Exit System Functions and Rules" group do not use the trading style settings associated with analyzing a signal..

What Do I Do Next?

When you are finished making any changes, press the **Close** button.

Note: Any changes made on this dialog will not be saved until the changes to the entire entry/exit system are accepted.

How Did I Get Here?

The Modify Rule Dialog is displayed when you add or modify a rule from the Create an Entry/Exit System Wizard: Enter Rules page, the Modify Entry/Exit System Dialog: Entry/Exit Rules page, the Create an Alert Definition Wizard: Enter Rules page, or the Modify Alert Dialog: Rules page.

Modify Function Group Dialog

Modify Entry/Exit System Group Dialog

Modify Alert Group Dialog

Modify Trading Solution Group Dialog

The Modify Group Dialog appears with different titles, depending on whether the group being modified is for function definitions, entry/exit systems, or trading solutions. It can be used to modify the name and description of an existing group. It can also be used to create a new group.

For help with function definitions, see Calculating Values and Financial Indicators.

For help with entry/exit systems, see Creating and Analyzing Entry/Exit Signals.

For help with alerts, see Working with Messages and Alerts.

For help with trading solutions, see Working with Complete Trading Solutions.

Creating or Modifying a Group

The following values are available when creating or modifying a group.

Name

This value specifies what to call this group. The name must be unique between all function groups, entry/exit system groups, and trading solution groups.

Note: When you are creating a new group, the name will default to a generic name, such as My Functions". This name can be changed or used as is.

Protect Group From Changes

This value specifies whether to lock this group from being deleted. This is useful for making sure that no unintended changes are made to groups.

Description

This value is used to indicate the description that is displayed on the selection dialogs when this group is selected.

What Do I Do Next?

When you are finished making any changes, press the **OK** button. If you would like to exit from this dialog without saving any changes, press the **Cancel** button.

How Did I Get Here?

The Modify Function Group Dialog is displayed when you press the **New…** or **Edit…** buttons on the Define Functions Dialog from under the Function Groups list.

The Modify Entry/Exit System Group Dialog is displayed when you press the **New…** or **Edit…** buttons on the Define Entry/Exit Systems Dialog from under the Entry/Exit System Groups list.

The Modify Trading Solution Group Dialog is displayed when you press the **New…** or **Edit…** buttons on the Define Trading Solutions Dialog from under the Trading Solution Groups list.

The Modify Alert Group Dialog is displayed when you press the press the **New…** or **Edit…** buttons on the Define Alerts Dialog from under the Alert Groups list.

Modify Input Dialog

The Modify Input Dialog allows you to define an input field in a formula. Input fields act as parameters that are specified when a function definition, entry/exit system, or alert is used.

For help with function definitions, see Calculating Values and Financial Indicators.

For help with entry/exit systems, see Creating and Analyzing Entry/Exit Signals.

For help with alerts, see Working with Messages and Alerts.

Selecting a Default Name of an Input

The default name is the default field name that will be used when a function definition, entry/exit system, or alert is used to create a data field. It is also the name that appears in italics when a function definition is inserted into a formula. As the title implies, this name is only a default and any field or value can be inserted when this function is used.

To specify the default name, enter the desired name in the box labeled **Default Name**.

Note: When a new field is being created and a field exists that is equal to the default input name, that field will default to being used for the input. For example, if an input is typically going to be the high trading price of a stock, then naming the input High" will cause it to default to using a field named High" if one is available. If no match is available, the input will typically default to the Close" field.

Selecting the Type of Values for an Input

Most input fields can be a data series or constant. In other words, the value specified for this input can be a data field or the user can set the value to a number. However, some functions require specific types of values for some inputs. For example, the period of a summation must be specified as a constant integer.

The following types of values can be specified for an input.

- **Data Series or Constant**
  This type of value includes any function, data field, or constant number.
- **Data Series**
  This type of value includes any function or data field. It is typically used for array functions such as the Summation function, which operate on a series of data.
- **Constant (integer only)**
  This type of value includes only integer numbers. It is typically used for array functions such as the Summation function, which operate over a specific period. Since this period cannot change over the course of the calculation, it is a constant.
- **Constant (any number)**
  This type of value includes any numbers. It is typically used for values that specify weights or multipliers that should not change over the course of the calculation.

Note: It is typically not necessary to adjust the Type of Value setting. By default, it will be set to the most general type available. If the input is later reused in a more restrictive context, the type of value will automatically be adjusted to the new type.

Additional Settings for an Input

These options are also available for each input.

☐ **Default Numeric Value**
This setting indicates the value that the input will default to when it is used to create a new field. It should be set to the most common value for this input. It is also used as the initial value when an input is included in optimization.

☑ **Use numeric value by default.**
This setting indicates to default to using a numeric value when the **Type of Values** is set to **Data Series or Constant**.

☑ **Include this input during optimization.**

This setting indicates to try different values for this input when this function or entry/exit system is being optimized. This occurs when a function is used as an optimizable function" for a prediction or when a field created with an entry/exit system is marked to be optimized. Values in the **Optimization Range** will be tried. Float (non-integer) values will be tried unless **Constant (integer only)** is selected as the type.

Note: Optimization is not available to inputs to alerts or trading solutions. It is also not available for inputs where **Data Series** is selected as the type.

What Do I Do Next?

When you are finished making any changes, press the **OK** button to save your changes. If you would like to exit from this dialog without saving any changes, press the **Cancel** button.

How Did I Get Here?

The Modify Input Dialog is displayed when you press the **Create a New Input…** button from the Input Field sub-page during Formula Entry. It is also displayed when you press the **Edit…** button from the Inputs page of the Create a Function Definition Wizard , the Create an Entry/Exit System Wizard , the Create an Alert Definition Wizard, the Modify Function Definition Dialog , the Modify Entry/Exit System Dialog , or the Modify Alert Dialog .

Modify Legacy Fitness Settings Dialog

The Modify Legacy Fitness Settings Dialog allows you to specify fitness settings used for optimizing predictions, entry/exit systems, and committees. It is specifically used to view and modify settings defined in the TradingSolutions v2.1 format, which allows multiple values to be combined.

This method of selecting fitness values is typically more cumbersome and less useful than the fitness values specified on the Modify Trading Style Dialog: Signal Optimization page. It is included primarily to view and modify settings associated with trading styles created in TradingSolutions v2.1 and earlier.

Setting the Values to Use for Optimization

The following columns are on this page.

- **Evaluation Value**
  This is the value to be evaluated in the simulated trading.

- **Importance**
  This value is the importance to having this evaluation value reach the specified target. Importance can be set to None, Low, Medium, or High. Items with None for their Importance are not included in the fitness calculation. Other items affect the fitness based on the level of importance they are assigned. See below for how this value is used.

- **Target**
  This value is the desired target for this evaluation value. Values worse than the target are penalized. Values better than the target are rewarded.

  Note: No rewards are assigned for beating the minimum or maximum annual trades values.

The weight for each evaluation value is based on how far the actual value is from the target value versus the overall range of expected values. Therefore, all of the evaluation values are normalized to have approximately the same effect when given the same importance.

The fitness of the value is then calculated from the weight using the following tables.

Penalty For Not Reaching Target	
None	Not Used
Low	-(W+1)
Medium	-((W+1) ^ 2)
High	-((W+1) ^ 3)

Reward For Beating Target	
None	Not Used
Low	W
Medium	W * 2
High	W * 3

Note: Medium and high penalties increase significantly faster than the corresponding rewards. This is to reinforce the importance of reaching the requested target. A more linear scaling can be achieved by setting less restrictive target values.

Selecting Evaluation Values

The following **Evaluation Values** are available. The coefficient" specified for each is the normalization coefficient used to adjust the ranges to have relatively the same scale. The distance between the actual value and the target value is divided by this coefficient to arrive at the weight described above.

- **Annualized Return**
  This value is the annualized return on the initial investment. It can be used to evaluate the overall profitability of the signal. This value is the annualized return on the investment from its initial value to its final value. Additional background information is available on the help for the Modify Trading Style Dialog.
  (coefficient = 0.01)

- **Minimum Annual Trades**

  This value is compared to the average number of trades per year. It can be used to avoid signals that do not produce many trades.

  > Note: Minimum Annual Trades does not provide rewards for beating the target. Because of this, it may be necessary to set the target slightly higher to enforce an actual limit.

  (coefficient = 0.5)

- **Maximum Annual Trades**

  This value is compared to the average number of trades per year. It can be used to avoid signals that trade more frequently than desired.

  > Note: Maximum Annual Trades does not provide rewards for beating the target. Because of this, it may be necessary to set the target slightly lower to enforce an actual limit.

  (coefficient = 0.5)

- **Draw Down From Investment**

  This value is the highest percentage loss from the overall initial investment.
  (coefficient = 0.01)

  > Note: Draw down targets should be expressed as positive percentages.

- **Draw Down From High**

  This value is the highest percentage loss from the previous high equity over all trades.
  (coefficient = 0.01)

  > Note: Draw down targets should be expressed as positive percentages.

- **Percent Wins**

  This value is the percentage of winning (profitable) trades versus the overall number of trades.

  (coefficient = 0.01)

- **Average Trade Gain**

  This value is the average profitability of all of the trades combined.

  (coefficient = 0.1)

- **Average Win / Average Loss**

  This value is the average percent gain of all of the winning (profitable) trades over the average percent loss of all of the losing trades.

  (coefficient = 0.1)

- **Profit Factor**

  This value is the overall gain from all of the winning (profitable) trades over the overall loss from all of the losing trades.

  (coefficient = 0.1)

- **Exit Efficiency**

  This value is the percentage of the maximum gain for each trade that was achieved at the exit of each trade.

  (coefficient = 0.01)

- **Consecutive Losers**

  This value is the number of consecutive losing (unprofitable) trades.

  (coefficient = 0.2)

- **Sharpe Ratio**

  This value is the average percent change in equity of each bar over the standard deviation of those changes. This is useful as a basic reward-to-risk ratio. Higher Sharpe Ratios indicate that a greater amount of average profit could be made with less day-to-day volatility.
  (coefficient = 0.1)

- **Percent of Bars in Market**

  This value is the percentage of overall bars during which a trade is active.
  (coefficient = 0.01)

What Do I Do Next?

When you are finished making any changes, press the **OK** button to save your changes. If you would like to exit from this dialog without performing any changes, press the **Cancel** button.

How Did I Get Here?

The Modify Legacy Fitness Settings Dialog is displayed when you press the **Fitness Settings…** button on the Modify Trading Style Dialog: Signal Optimization page.

Modify Optimization Range Dialog

The Modify Optimization Range Dialog allows you to modify the specific dates and distribution of data used for optimizing a field or training a prediction.

Note: Fields that are currently being used by the Solution Service cannot be modified.

There are no definitive rules for how much data should be used for training or optimizing fields. Including more data is useful for improving results since it provides additional examples for training. However, older financial data may have been produced under different market conditions than more recent data, causing the training to focus on outdated or overly generalized principles.

How the Optimization Range is Used for a Prediction

The date range associated with a prediction is used for several different things. Part of the data is used for training the neural network model. Part of the data is used as a validation step to make sure the training is improving the results. And, part of the data is left out of the training process to be used for only for testing.

The same date ranges are used for the optimization of the prediction settings and the postprocessing of predicted signals. By default, the training data is used for determining the fitness of each test. The cross validation data is used for determine which generation has provided the best general results. The testing data is typically not used during optimization.

How the Optimization Range is Used for a Signal Optimization

The date range associated with the optimization of committees and entry/exit systems is use the same as it is for predictions. By default, the training data is used for determining the fitness of each test. The cross validation data is used for determine which generation has provided the best general results. The testing data is typically not used during optimization.

For help with predictions, see Predicting and Modeling Financial Data.

For help with optimizing fields, see Optimizing Signals and Predictions.

Modifying the Date Range

The following settings are available for specifying the start and end or the date range.

Start of Range / End of Range

These values specify the start and end of the data range. Use the date controls to increase or decrease these values. As these values are updated, the size will be updated automatically.

For help using the date controls, see the help for Date Selection Controls.

Note: For fields being defined for an entire group or fields that use external data as inputs, the data range is limited to the common date range for all of the data being used. For example, if the group for which you are defining a field has a data series with only one year of data, the field will only be able to use one year of data, even if the other data series in the group all have more data.

You can increase a limited data range by either importing more data into the shorter data series, or removing the data series from the field. You can quickly determine the first date available in your data series by adding the first date as a display field in the Portfolio View.

For help with display fields, see Using Display Fields.

Overall Size

This value specifies the number of samples, days, or other length of data in the selected range. If this value is changed, the range will be updated to match the new size. If the End of Range is set to the last date, the Start of Range will be adjusted; otherwise, the End of Range will be adjusted.

Note: Size in samples is not available when creating group fields since the number of samples may be different for the various data series in the group.

Modifying the Date Range Distribution

The following settings are available for assigning the distribution of the date range. See the text above for more information on how these ranges are used.

Training Set

This value indicates the percentage of the date range to use for the actual training or optimization process. For prediction training, this data is used to determine the error for updating the neural network weights. For optimization, this data is used to determine the fitness of the current settings.

> Note: This value equals the data remaining after the cross validation and testing ranges have been removed.

☑ **Cross Validation**

This setting indicates the percentage of the date range to use for verifying that the new settings are producing better general settings with continued iterations. If the error or fitness for this range stops improving, the training or optimization stops after a given number of attempts and the settings which yielded the best results for the cross validation set are used.

☑ **Accuracy Testing**

This setting indicates the percentage of the date range to set aside to not be used during training or optimization. This allows you to set aside data which is not used to improve the results so that you can verify the new values will work with new data.

▣ **Ordering**

This setting indicates the order in which the date range is divided into training, cross validation, and testing sets.

> Note: The testing set is typically kept last so that it is closest to any new data which will occur.

If an Overall Size is available, an Approximate Size will be displayed for each of these percentages to show the approximate number of bars that will be in each range.

> Note: The actual number of bars in each range may be different, depending on if there are bars which need to be excluded due to null values, conditional inputs, or other criteria.

What Do I Do Next?

When you are done modifying the optimization range, press the **OK** button. If you would prefer to exit this dialog without making modifications, press the **Cancel** button.

How Did I Get Here?

The Modify Optimization Range Dialog is displayed for predictions when you press the **Training Range…** button on the Predict a Value Wizard: Select Options page or the Modify Field Dialog: Training Settings page.

The Modify Optimization Range Dialog is displayed for optimizable fields when you press the **Adjust Range…** button on the Signal Optimization Settings Dialog.

Modify Prediction Input Dialog

The Modify Prediction Input Dialog allows you to modify the settings associated with one or more prediction inputs.

Note: Optimizable functions do not use this dialog. Instead, they use a modified version of the Modify Field Dialog.

Note: Fields that are currently being used by the Solution Service cannot be modified.

For help with predictions, see Predicting and Modeling Financial Data.

Modifying Prediction Inputs

The following values are displayed on this dialog.

Field Name

This is the name of the field used for this input.

Data Series / Group

This is the data series or group which the field belongs to. In most cases, this will be the same data series or group in which the prediction is being created.

Preprocessing

This value specifies the type of preprocessing that should be used on the selected field. Preprocessing normally defaults based on the type of value contained in the input field.

- **Percent Change**

  This option uses the percent change in the values from the previous bar as the input. It is typically used for continuous, positive, non-zero values that do not have a constant range, such as price information.

- **Change**

  This option uses the change in the values from the previous bar as the input. It is typically used for continuous values that may not have a constant range, such as some momentum indices.

- **None**

  This option uses the actual value as the input. It is typically used for discrete values that have a constant range, such as entry/exit signals.

- **Conditional**

  This option causes this value not to be used as an input to the prediction. Instead, it is used to determine which bars are included for training. It the value is non-zero, the bar is included. If the value is zero, it is skipped.

  Note: If multiple conditional inputs are specified, all of the values must be non-zero for the bar to be included for training.

- **(Multiple Settings)**

  This option indicates that multiple inputs are selected and that they currently use more than one preprocessing setting. Leaving this value will result in these values remaining unchanged. Changing this value will result in all selected inputs being changed to the newly selected value.

Note: Change and percent change preprocessing are done relative to the previous bar of the prediction data series. In most cases, this is the change from the previous bar of the input. However, when using data of other periodicities, it will be the change from the value at the previous bar of the prediction.

For additional help with working with multiple periodicities, see Understanding Periodicity.

Lag Input

This option allows you to lag the selected input. By default, the value of the selected input is taken for the current day. Selecting this option and specifying a lag greater than zero allows you to include values from previous days. When this option is enabled, you can add the multiple inputs as Discrete Inputs or as an Input Group. Discrete Inputs allow you to select, deselect, and optimize each input individually. Input Groups allows you to view, select, deselect, and optimize the inputs as a single unit.

Example: To use today's value, yesterday's value, and the previous day's value of a field from a data series with daily data, select the Lag Input option and set it from 0 to 2.

- Note: It is typically not necessary to lag inputs. By default, TradingSolutions uses Time-Lag Recurrent Networks which automatically maintain a memory of recent input values.
- Note: Input lags are done relative to the prediction, not relative to the inputs. For example, for a prediction that updates every minute, an input with a 10-minute periodicity only changes once every ten bars. Therefore, most of the values in the lag will be either the current value or the last value. Lagging of these longer periodicity inputs should be done using calculations directly in the longer periodicity data series.
- Note: Advanced neural network users may notice that using multiple samples for the inputs to a Basic Multilayer Perceptron has a similar effect to using a Time-Lag Recurrent Network with Focused TDNN memory. The primary difference between the two methods is that the Lag Input setting allows you to specify different memory depths, whereas focused TDNN memory only allows for only one memory depth to be used for all of the inputs.
- Note: If multiple inputs are selected and they currently have different values for the minimum or maximum lag, these values will not be available for modification.

☐ **Split into separate inputs…**

Inputs which are currently lagged across multiple values are optimized and/or enabled as one unit. To treat each lag independently, press the **Split into separate inputs…** button.

- Note: This button is not available when multiple inputs are selected.

☑ **Include in training.**

This option enables or disables the input as being a part of the prediction. It duplicates the functionality of the individual field checkboxes on the Predict a Value Wizard: Select Inputs page and the Modify Field Dialog: Prediction Inputs page.

- Note: Genetic optimization is the primary cause for an input being disabled.
- Note: Predictions created in previous versions of TradingSolutions included disabled inputs to determine which inputs values were available for each given date. Support for this behavior is controlled from the Modify Training Settings Dialog. If disabled inputs are included, removing disabled inputs may affect your results.
- Note: Conditional inputs cannot be disabled or optimized.
- Note: If multiple inputs are selected and they currently have different values for this feature, the checkbox will be dimmed. Leaving the checkbox dimmed will result in these values remaining unchanged. Changing this value will result in all selected inputs being changed to the new setting.

☑ **Allow optimization to include/exclude this input.**

This option indicates whether an input can be enabled or disabled as part of optimization of the prediction. It allows genetic optimization to try turning on and off the **Include in training** checkbox.

- Note: If multiple inputs are selected and they currently have different values for this feature, the checkbox will be dimmed. Leaving the checkbox dimmed will result in these values remaining unchanged. Changing this value will result in all selected inputs being changed to the new setting.

What Do I Do Next?

When you are done modifying the selected prediction input, press the **OK** button. If you would prefer to exit this dialog without making modifications, press the **Cancel** button.

How Did I Get Here?

The Modify Prediction Input Dialog appears when you press the **Modify Input…** button on the Predict a Value Wizard: Select Inputs page and the Modify Field Dialog: Prediction Inputs page

Modify Solution Service Settings Dialog

The Modify Solution Service Settings Dialog allows you to modify information associated with the Solution Service.

For more information about the Solution Service, see The TradingSolutions Solution Service.

Updating Your Registration Information

The following registration information can be updated on the Solution Service server.

Note: You must be connected to the Internet in order to update your registration information on the Solution Service server.

Prefix, First Name, Last Name

These values indicate how you would like to be addressed.

E-mail Address

This value indicates a valid e-mail address where you can be contacted. Your e-mail address is used to identify you as a Solution Service user. If you request to have your password sent to you, it will be sent to this address. Also, if you have requested to be notified of product updates, these updates will be sent to this address.

Note: If you are registered on multiple machines with the same e-mail address and change your e-mail address on this machine, you will need to re-register the other machines.

Phone

This value indicates a phone number where we can reach you if we encounter any problems with your usage of the Solution Service. This setting is optional.

Note: After changing any of these values, you will need to press the **Update Information** button to send these updates to the Solution Service server. Your changes will not be saved until they are received by the server.

In addition, the following information is also displayed on this page:

Solution Service Password

This value is the password assigned to you by the Solution Service server. It can be used when registering additional machines with the same e-mail address.

Setting Solution Service Options

The following options are also available from this page.

Do not update data for stocks set to another data source.

This setting causes the Solution Service not to download new data for stocks (data series) that have their current data source to another data source other than the Solution Service.

Note: This setting may cause you to get different results from those commented on by NeuroDimension. This is because different data sources may sometimes provide different numbers.

Note: This setting also appears on the Update Solution Service Dialog.

What Do I Do Next?

After modifying the registration information and options, press the **OK** button to save your changes. If you have modified any registration information, TradingSolutions will contact the Solution Service server with the new information. If you would like to exit from this dialog without saving your changes, press the **Cancel** button.

Note: You must be connected to the Internet in order to update the information on the Solution Service server.

How Did I Get Here?

The Modify Solution Service Settings Dialog appears when you select **Modify Settings…** or **Update Account…** for the **Solution Service** data source from the Configure Data Sources Dialog. It can also be displayed by pressing the Modify Settings button on the Update Solution Service Dialog.

Modify Training Settings Dialog

The Modify Training Settings Dialog allows you to set the values associated with training the prediction. It is also used for modifying the default settings for the training and optimization of predictions.

Note: Fields that are currently being used by the Solution Service cannot be modified.

For help with predictions, see Predicting and Modeling Financial Data.

Establishing Default Values

When this dialog is accessed from the Modify Options Dialog: Field Creation page, it can be used to modify the default values to use when creating new predictions. Three different sets of default values are available, which correspond to the default training settings available on the Predict a Value Wizard: Select Options Page.

- **Defaults for No Optimization**
  These defaults correspond to the option to train without optimizing the inputs (quick).
- **Defaults for Brief Optimization**
  These defaults correspond to the option to briefly optimize the inputs and settings.
- **Defaults for Full Optimization**
  These defaults correspond to the option to extensively optimize the inputs and settings (slow).

For defaults including optimization, the default optimization settings can also be modified by pressing the **Optimization Settings…** button, which will display the Training Optimization Settings Dialog.

For help with optimizing fields, see Optimizing Signals and Predictions.

Selecting Training Criteria

Neural networks typically learn by examining a set of data and adjusting a set of internal weights based on how far off the current model is from the desired results. This is a multi-pass process, requiring the neural network to examine the data multiple times to create a desirable model. Each pass that the neural network makes through the entire set of data is called an epoch.

Target Samples-to-Weights Ratio

This value is used to specify the target value of the ratio between the number of data samples available for training and the number of weights in the neural network. This ratio is used by the default setting of allowing neural network to automatically maintain the best estimates for its values. It is also used as the basis for training optimization monitoring the number of weights in the neural network.

Note: When establishing defaults, this value is used for all groups of default settings.

Note: In TradingSolutions v2.1 and previous versions, this value was internally set to 10-to-1.

Number of Training Passes

Neural networks begin the training phase with a random set of initial weights. Different sets of initial weights may provide better or worse initial conditions from which to find an optimal solution. To increase the probability that a desirable model will be found, multiple training passes can be run.

When multiple training passes are used, the training pass with the best cross validation results will be kept as the training for the neural network. If no cross validation set is being used, the training pass with the best training results will be kept.

Number of Training Epochs

This value is used to set the maximum number of times all of the training data will be presented to the neural network during the training phase. Increasing this value allows the prediction a better opportunity to learn the data. However, it will also lengthen the training time and increase the likelihood of over-specialization on the training data if cross validation is not being used.

Maximum Epochs w/o Improvement

This value is used to decrease the amount of time spent attempting to train the neural network when no improvement is being made. Normally, a neural network will train until the number of training epochs is reached, keeping the weights associated with the lowest error for the cross validation data. This set of weights is used since it is the best set of weights for the general case.

Typically, while a neural network is being trained, the cross validation error will improve with the training error up a certain point. After that, the cross validation error will increase while the neural network begins to over-specialize on the training data. Therefore, it is typically safe to stop training when the cross validation error stops improving after a given number of epochs.

☑ **Include disabled inputs in neural network input allocation.**

In TradingSolutions version 2.1 and earlier, inputs that were disabled as part of genetic optimization were still allocated as part of the neural network topology. While the information was not used for training, removing the inputs would change the initial conditions associated with the training process.

This checkbox indicates that any disabled inputs are included for the allocation of the neural network topology. It is typically only used to preserve the values of predictions created with older versions of TradingSolutions.

Note: This option is not available as a default value.

Note: This option is not available if optimizable functions are included as inputs to this prediction.

What Do I Do Next?

When you are done modifying the training settings, press the **OK** button. If you would prefer to exit this dialog without making modifications, press the **Cancel** button.

How Did I Get Here?

The Modify Training Settings Dialog is displayed for a single field when you press the **Training Settings…** button on the Predict a Value Wizard: Select Options page or the Modify Field Dialog: Training Settings page.

The Modify Training Settings Dialog is displayed for modifying default values when you press the **Training Settings…** button on the Modify Options Dialog: Field Creation page.

Single Page Dialogs N-Z

New Toolbar Dialog

The New Toolbar Dialog allows you to specify the name for the new toolbar being created.

What Do I Do Next?

After you have selected a name for the new toolbar, press **OK** to create that toolbar. If you would to exit this dialog without creating a toolbar, press **Cancel**.

Note: New toolbars are created without any buttons. To add buttons to the new toolbar, use the Customize Toolbars Dialog: Toolbar Buttons page.

How Did I Get Here?

The New Toolbar Dialog appears when you press the **New…** button on the Customize Toolbars Dialog: Toolbar Selection page.

Optimal Signal Advanced Settings Dialog

The Optimal Signal Advanced Settings Dialog allows you to view and modify additional settings associated with the optimal signal. These settings are not limited to advanced users, but are separated since they are not typically used when creating or modifying optimal signals.

Note: Fields that are currently being used by the Solution Service cannot be modified.

Advanced Settings for the Optimal Signal

The following advanced settings are available for the optimal signal.

Optimal Signal Type

This value specifies the type of optimal signal to generate.

- **Analog Value Signal**

  This selection generates entry signals as soon as a profit can be realized. Exit signals are generated when no increase in profit is foreseen. Instead of discrete entry/exit signals, this selection generates an analog signal that includes strength information. This combines the benefits of the maximum profit signals and the thresholded signals. It may also be more predictable than the discrete signals since the signal is not as severely penalized for being just short of being profitable.

- **Thresholded Analog Signal**

  This selection generates entry signals as soon as a profit can be realized. Exit signals are generated when no increase in profit is foreseen. This is useful for identifying when a profit generating condition begins, as opposed to when it ends.

- **Maximum Profit Signal**

  This selection generates entry signals only at the points of highest and lowest profit. Exit signals are generated when no increase in profit is foreseen. This is useful for calculating the maximum amount of profit that could be generated. However, it may be the most difficult to predict since it delays entry in profitable situations until the highest profit can be achieved. It is also the most vulnerable to everyday noise in financial data.

- **(Version 1.0/1.1 Analog Value Signal)**

  This selection is included for compatibility with older versions of TradingSolutions. It is the same as the Analog Value Signal, except that the strength is set based on the raw amount by which the price exceeds the price needed to reach the minimum profit. The strength is now based on the percentage by which the profit was exceeded.

☑ **Add random noise to signal.**

This option indicates to add random noise to the signal. When predicting values with neural networks, it is often easier to model the values if they do not contain predominantly a constant value of zero. Since non-analog signals often contain mostly zero, this option adds small amounts of random noise to the optimal signal so that the values are not all zero.

Note: Values of 10% or less will add noise without changing the way non-analog signals are interpreted by TradingSolutions for entry/exit information. Values larger than this may cause hold signals to become exit signals or exit signals to become opposing entry signals.

What Do I Do Next?

When you are finished modifying the settings, press the **OK** button to save any changes. If you would like to exit this dialog without saving your changes, press the **Cancel** button.

How Did I Get Here?

The Optimal Signal Advanced Settings Dialog appears when you press the **Advanced Settings…** button on the Generate an Optimal Signal: Signal Parameters page or the Modify Field Dialog: Signal Parameters page.

Portfolio Update Required Dialog

The Portfolio Update Required Dialog appears when you open a Work directory that was created with a previous version of TradingSolutions. It allows you to select whether to update the portfolio in this directory directly or work with a copy of it.

As improvements are added to TradingSolutions, changes are made to the way information is stored in your portfolio. These changes typically do not affect the results of your calculations and analyses.

Selecting How To Proceed

The following options are available for opening the Work directory that is listed in the upper part of the dialog.

- **Make a copy of this Work directory to use with his new version.**

  This option will create a new directory and copy your portfolio to it. It will then update and open the copy, leaving the current directory in tact.

  Note: If the currently selected Work directory is a subdirectory of TradingSolutions, the new directory will be located under TradingSolutions v2.1. Otherwise, the new directory will be located next to the current directory.

- **Convert this Work directly and use it directly.**

  This option will update your portfolio directly.

  Note: Since your portfolio will be updated to work with the current version of TradingSolutions, you will no longer be able to use it with previous versions of TradingSolutions once it is converted.

- **Select a different Work directory to open at this time.**

  This option allows you to select a different Work directory to open, rather than converting the presently selected one.

What Do I Do Next?

Typically, you should have TradingSolutions make a copy of the selected Work directory and work with that copy. While TradingSolutions is a thoroughly tested software package, errors can occur. Using a copy allows you have a working backup if something does not appear to be working correctly in the new version.

Once you have selected an option, press the **OK** button to continue. If you do not want to open a portfolio at this time, press the **Cancel** button.

How Did I Get Here?

This dialog is typically displayed when you open a new version of TradingSolutions for the first time. It also appears when you select **Change Work Directory…** from the **File** menu and then select a Work directory that was created with a previous version of TradingSolutions.

Postprocessing Optimization Settings Dialog

The Postprocessing Optimization Settings Dialog allows you to set the values associated with optimizing the postprocessing settings of a predicted signal. It is also used for modifying the default settings for these values.

Note: Fields that are currently being used by the Solution Service cannot be modified.

For help with predictions, see Predicting and Modeling Financial Data.

For help with optimizing fields, see Optimizing Signals and Predictions.

Modifying the Settings for Prediction Optimization

The following settings are available for optimizing the postprocessing of predicted signals. This optimization is performed by simulating trading of signals processed with potential values until the best solution is found. The following settings are available for modifying that optimization.

Date ranges to use for optimization.

This value indicates the training ranges to use for optimization of the postprocessing settings.

- **Optimize Training Set, Checking Cross Val.**

  This setting indicates to optimize the fitness of the training set, but to take the settings from the generation with the best fitness for the cross validation set. It also causes the optimization to stop when no improvement occurs on the cross validation set data over a given number of generations.

- ***(Optimize Particular Set or Sets)***

  This setting indicates to optimize the fitness of the indicated set or sets without monitoring the performance of a cross validation set.

Note: You will typically not want to include the testing set in the optimization data. This would result in there not being data set aside for verifying that a good general settings are being found.

Genetic Algorithm Settings…

This button will display the Modify Genetic Algorithm Settings Dialog, which allows you to adjust the settings associated with genetic optimization.

Restore Defaults

This button will restore the settings to their default values.

What Do I Do Next?

When you are finished modifying the settings, press the **OK** button to save your changes. If you would like to exit from this dialog without saving your changes, press the **Cancel** button.

How Did I Get Here?

The Postprocessing Optimization Settings Dialog is displayed for a single field when you press the **Optimization Options…** button on the Signal Postprocessing Settings Dialog.

The Postprocessing Optimization Settings Dialog is displayed for modifying default values when you press the **Signal Postprocessing…** button on the Modify Options Dialog: Field Creation page.

Remove Data Dialog

The Remove Data Dialog allows you to specify a range of dates to remove from a data series.

For help with the spreadsheet view, see Displaying Data in a Spreadsheet.

Specifying a Range of Dates to Remove

To specify a range of dates to remove from a data series, use the date controls.

For help using the date controls, see the help for Date Selection Controls.

Understanding Remove Date Range Warnings

If the date range that you specify is currently being used in a predicted field or a signal analysis field, the date ranges associated with those fields will automatically be adjusted to fit the available data. Since this can significantly change training and calculated results, you will be warned if dates will need to be adjusted.

Following the removal of the selected date range, the indicated date ranges will be adjusted. If possible, the length of the date range associated with predicted fields will be maintained. However, in most cases, any date ranges will be truncated. It is recommended that you verify each of the adjusted date ranges after seeing this warning so that you can confirm that the affected fields continue to perform the expected actions.

What Do I Do Next?

When you have selected a date range to remove, press the **OK** button. If you would like to exit from this dialog without removing any data, press the **Cancel** button.

How Did I Get Here?

The Remove Data Dialog appears when you select **Remove Data…** from the context menu for the Date column in the Spreadsheet View. It is also available from the Modify Data Series Dialog: Name page by pressing the **Remove Some Data…** button.

Select Portfolio View Display Date Dialog

The Select Portfolio View Display Date Dialog allows you to select the display date that will be displayed in the Portfolio View.

For help with the Portfolio View, see Managing Data with the Portfolio View.

Specifying a New Display Date

By default, the Portfolio View will always display the most recent data for each data series in your portfolio. Previous data can be displayed by selecting a date and time to view the data through.

- **Display most recent data.**
  This is the default option, specifying to display the most recent data in each data series.

- **Display data through:**
  This option enables you to specify a date to display the data on. If no values are available for the specified date, the most recent data as of that date is displayed. By default, the last value of the day is displayed for intraday data.

☑ **View intraday data at:**
This option allows you to specify a time for intraday data in the portfolio. End-of-day data is not affected by this setting.

For help using the date controls, see the help for the Date Selection Controls.

What Do I Do Next?

After you have selected a new display date, press the **OK** button. If you would prefer not to change the display date, press the **Cancel** button.

How Did I Get Here?

The Select Portfolio View Display Date Dialog is displayed when you select **Select Display Date…** from the **Portfolio** menu or the context menu for the display date in the Portfolio View. It also appears when the **Select Display Date…** button on the **Portfolio** toolbar is selected.

Select Trading Style Fields Dialog

The Select Trading Style Fields Dialog allows you to select one or more fields to average for the price of a specific value used during signal analysis.

For help with trading styles, see Using Trading Styles.

Selecting Fields

The list of fields this dialog will be averaged together to calculate the specified value. If only one field is selected, its value will be used directly.

To add an additional field to the list, press the **Add New…** button. This will display the Select a Field to Add Dialog.

Note: All of the fields in the Portfolio will be listed on this dialog. If you would like to use a pre-calculated field for this value, you can select it from here. However, be aware that it might not be available for all data series.

To remove a field from the list, select it and press the **Remove** button.

The values selected in the list will either be from the current bar (today) or the next bar (tomorrow). To use the values from the next bar, select **Use values from next bar**.

What Do I Do Next?

If you are finished selecting the fields to average for this value, press the **OK** button. If you would like to exit from this dialog without performing any changes, press the **Cancel** button.

How Did I Get Here?

The Select Trading Style Fields Dialog is displayed when you specify **Select Other Fields…** for a value on the Modify Trading Style Dialog: Analysis Options and Fields page.

Selection Tree Dialogs

This dialog appears in several forms. It allows you to select the target of an action from between several groups, data series, or fields. The title of the dialog will adjust to display the action that is being performed.

What Do I Do Next?

When you have selected desired item, press the **OK** button. If you would like to exit from this dialog without performing an action, press the **Cancel** button. You can also activate the **OK** button by double-clicking the name of the desired item.

For help using the selection tree, see the help for Selection Trees.

Signal Analysis Options Dialog

This dialog appears in several forms. The Modify Options Dialog allows you to modify default settings for the entire program. These settings are kept from session to session, so you do not need to modify them each time you start the program. The Signal Analysis page allows you to specify the default values used for signal analysis. The Signal Analysis Options Dialog allows you to modify the values used for a specific data series or a specific field.

Selecting a Trading Style

Trading styles are groups of settings used for entry/exit signal analysis. They specify such things as the amount to invest and the amount of commission to pay on each trade.

When you analyze an entry/exit signal or create a new field that uses signal analysis, TradingSolutions will default to using the default trading style for the entire portfolio. If a default trading style is defined for a specific data series, it will use that instead. In addition, individual trading styles can be set for the creation and analysis of individual fields.

The trading style used for the case being modified can be selected from the combo box. Additional trading styles can be created by pressing the **Edit Styles…** button. This will display the Define Trading Styles Dialog.

The global default for the entire portfolio is set on the Modify Options Dialog: Signal Analysis page. Individual data series will use this default as long as **Use global default for trading style** is selected. Individual fields can be set to always use the default for the data series by selecting **Use default trading style for series**.

The trading style used for analyzing individual fields also has a default. For optimal signal fields, the default is the trading style used in the definition. For predicted signal fields, the default is the trading style used for postprocessing optimization. All other fields default to the default trading style for the data series. This value can be restored by pressing the **Restore Default** button.

Note: This option is only displayed when editing the options for an individual field.

Specifying the Analysis Period

By default, signal analysis will analyze all of the available data from the first date to the last date. To use a subset of the available data, specific start and end dates can be selected by checking the type of date to constrain and setting the associated date with the date control.

If you would like to analyze the range associated with the training or testing range of a prediction, use the **Copy Optimization Range from a Field…** button. This will display the Copy Optimization Range From Field Dialog, which allows you to select a prediction and training set group.

For help using the date controls, see the help for Date Selection Controls.

What Do I Do Next?

When you are finished modifying the program options, press the **OK** button to use your changes or select another property page. If you would like to exit from this dialog without saving your changes, press the **Cancel** button.

Additional Property Pages

The Modify Options Dialog has the following property pages.

General
This page allows you to specify general options, such as startup behavior.

Charting
This page allows you to specify defaults used for the Chart View.

Sounds
This page allows you to specify the sounds to play when different events occur.

Field Creation
This page allows you to view and modify the default values used when creating new fields.

Signal Analysis

This page allows you to specify the default values used for signal analysis.

For help using property pages, see the help for Property Pages.

How Did I Get Here?

The Modify Options Dialog appears when you select **Options…** from the **Tools** menu.

The Signal Analysis Options Dialog appears for a data series when you select the **Options…** button from the Modify Data Series Dialog: Trading Signals page. It is displayed for a specific field when you select the **Change…** button on the Modify Field Dialog: Signal Analysis page, Overview sub-page.

Signal Optimization Settings Dialog

The Signal Optimization Settings Dialog allows you to set the values associated with optimizing an entry/exit system or committee field. It is also used for modifying the default settings for these values.

Note: Settings associated with optimizing predicted signals are modified from the Training Optimization Settings Dialog.

Note: Fields that are currently being used by the Solution Service cannot be modified.

For help with optimizing fields, see Optimizing Signals and Predictions.

Modifying the Settings for Signal Optimization

The following settings are available for optimizing non-predicted signals. This optimization is performed by simulating trading of signals processed with potential values until the best solution is found. The following settings are available for modifying that optimization.

Trading style to use for simulated trading.

This setting indicates the trading style used during the simulated trading of potential values. It controls the trading conditions being used and also indicates whether to optimize on profit or other values. To create a new style, or view or modify existing styles, press the **Edit Styles…** button.

Date range to use for optimization and validation.

This setting displays the current data range being used for this optimization. It can be used to select from typical settings for the optimization range. Pressing the **Adjust Range…** button will display the Modify Optimization Range Dialog, which allows greater control over the date range.

Note: This setting is only available for individual fields.

Note: For fields being defined for an entire group or fields that use external data as inputs, the data range is limited to the common date range for all of the data being used. For example, if the group for which you are defining a field has a data series with only one year of data, the field will only be able to use one year of data, even if the other data series in the group all have more data.

You can increase a limited data range by either importing more data into the shorter data series, or removing the data series from the field. You can quickly determine the first date available in your data series by adding the first date as a display field in the Portfolio View.

For help with display fields, see Using Display Fields.

Default Date Ranges…

This button will display the Modify Default Range Dialog, which allows you to set the default date range for individual periodicities.

Note: This button is only available when setting the defaults for the portfolio.

Genetic Algorithm Settings…

This button will display the Modify Genetic Algorithm Settings Dialog, which allows you to adjust the settings associated with genetic optimization.

Restore Defaults

This button will restore the settings to their default values.

There are no definitive rules for how much data should be used for optimization. Including more data is useful for improving results since it provides additional examples. However, older financial data may have been produced under different market conditions than more recent data, causing the training to focus on outdated or overly generalized principles.

What Do I Do Next?

When you are finished modifying the settings, press the **OK** button to save your changes. If you would like to exit from this dialog without saving your changes, press the **Cancel** button.

How Did I Get Here?

The Signal Optimization Settings Dialog is displayed for a single field when you press the **Optimization Options…** button on the Apply an Entry/Exit System Wizard: Select Inputs page, the Create a Committee Wizard: Select Fields page, the Modify Field Dialog: Entry/Exit System Inputs page or the Modify Field Dialog: Committee Fields page.

The Signal Optimization Settings Dialog is displayed for modifying default values when you press the **Entry/Exit System and Committee Optimization…** button on the Modify Options Dialog: Field Creation page.

Signal Postprocessing Settings Dialog

The Signal Postprocessing Values Dialog allows you to view and modify the settings associated with postprocessing signal values that are produced by predictions.

Note: Fields that are currently being used by the Solution Service cannot be modified.

For help with predictions, see Predicting and Modeling Financial Data.

Understanding the Signal Postprocessing

Predicted entry/exit signals often hover around a single value. This is because when neural networks lack adequate information to make perfect predictions, they tend towards the mean of the desired outputs. This does not mean that the prediction is not valid. However, in the case of entry/exit signals, it may result in an output that remains too close to the mean to cross over the thresholds that differentiate entry/exit signals.

To adjust the predicted entry/exit signals to be usable as signals in TradingSolutions, postprocessing is applied to the values output from the network. This basic postprocessing uses values to adjust the outputs by establishing thresholds within the range of outputs. These values are normally set using a brief genetic optimization stage after the training.

Selecting the Type of Postprocessing

Two different types of signal postprocessing are available. In most cases, the default setting is used.

Type of Postprocessing

- **Adjust Thresholds (default)**
  This is the most common option. Internally, TradingSolutions uses constant thresholds associated with entry and exit signals. This option allows you to set different thresholds to use for the predicted signal. These field-specific thresholds are then used to amplify the predicted signal to the appropriate levels.

- **Offset and Multiply**
  This option is a less complex type of postprocessing that is typically used when the postprocessing values will be hand-modified. An offset is added to the predicted signal. Then, the sum is multiplied by a scaling factor. Since the postprocessing values affect all of the predicted signals in the same way, they are typically easier to modify by hand than the values associated with adjusting the thresholds.

- **None**
  This option is typically used when you would like to see the raw output of the prediction. It is also useful when you would like to apply your own postprocessing algorithm.

Note: For more information on how these values are used, see the section on Current Postprocessing Settings, below.

Understanding the Current Postprocessing Settings

The current postprocessing settings that are displayed are dependent on the type of postprocessing that is currently selected for this field.

- **Adjust Thresholds Postprocessing**
  These values represent the thresholds used against the values produced by the neural network.

  - **Enter Long**
    Outputs greater than or equal to this value are adjusted to be 0.5 or greater. Scaling of larger values is based on the distance between the Enter Long and Enter Short thresholds, or Enter Long and zero if they are equal.

  - **Exit Short**
    Outputs greater than or equal to this value, but less than the Enter Long threshold are adjusted to be in the range from 0.2 to less than 0.5. Scaling is based on the distance between the Exit Short and Enter Long thresholds.

- **(Hold)**

Outputs between the Exit Short and Exit Long thresholds are adjusted to be in the range between -0.2 and 0.2. Scaling is based on the distance between the Exit Short and Exit Long thresholds.

- ☐ **Exit Long**

  Outputs less than or equal to this value, but greater than the Enter Short threshold are adjusted to be in the range from -0.2 to greater than -0.5. Scaling is based on the distance between the Exit Long and Enter Short thresholds.

- ☐ **Enter Short**

  Outputs less than or equal to this value are adjusted to be -0.5 or less. Scaling of lesser values is based on the distance between the Enter Long and Enter Short thresholds, or Enter Short and zero if they are equal.

- **Offset and Multiply Postprocessing**

  These values represent the terms that are used when postprocessing the outputs of the neural network. They are performed in the order offset, then multiplication.

  - ☐ **Offset**

    This value is the amount added to the output of the neural network before it is multiplied.

  - ☐ **Multiplier**

    This value is the amount by which the output is multiplied after the offset has been added.

Configuring Postprocessing Optimization

The postprocessing settings are normally set during a brief genetic optimization phase following training. This optimization is performed by simulating trading of signals processed with potential values until the best solution is found.

The following settings are available for modifying that optimization.

- ▣ **Trading style to use when optimizing the signal**

  This setting indicates the trading style used during the simulated trading of potential values. It controls the trading conditions being used and also indicates whether to optimize on profit or other values. To create a new style, or view or modify existing styles, press the **Edit Styles…** button.

  Note: This value defaults to the trading style which was used to define the desired output.

- ☑ **Optimize postprocessing settings after each training.**

  This option specifies that signal postprocessing should be optimized using genetic optimization after each time the prediction is trained. If this value is not selected, TradingSolutions will select basic values after the first training based on the range of output values.

- ☐ **Optimization Settings…**

  This button displays the Postprocessing Optimization Settings Dialog, which allows you to modify options for which there are global defaults.

What Do I Do Next?

When you are finished modifying the settings, press the **OK** button to save any changes. If you would like to exit this dialog without saving your changes, press the **Cancel** button.

How Did I Get Here?

The Signal Postprocessing Settings Dialog appears if you press the **Signal Postprocessing Settings…** button on the Modify Field Dialog: Training Analysis: Overview page. It also appears if you press the **Values…** button on the Modify Field Dialog: Desired Output page when the desired output is a signal and the definition is for a data series. Postprocessing values for group-level predictions are not available from the definition.

Register for Solution Service Reminder Dialog

Update the Solution Service Reminder Dialog

The Solution Service Reminder Dialog provides helpful reminders associated with the TradingSolutions Solution Service. It appears in two forms – the Register for Solution Service Reminder Dialog and the Update the Solution Service Reminder Dialog.

What is the Solution Service?

The TradingSolutions Solution Service is a service maintained by NeuroDimension (the creators of TradingSolutions). It provides you with sample models, data, and commentary for a select group of stocks so that you can see the software in action. The sample models also provide a valuable learning tool as examples for creating your own models.

For more information about the Solution Service, see The TradingSolutions Solution Service.

Registering for the Solution Service

The Solution Service requires that you register in order to receive the sample models, data, and commentary for the Solution Service signals. The service is free in both all versions of the software.

Selecting **Yes** on the Register for Solution Service Dialog displays the Register for the Solution Service Wizard.

Note: If you have previously registered for the Solution Service on another computer, you can use the Register for the Solution Service Wizard to re-register the same information.

Updating for the Solution Service

After you have registered for the Solution Service, you will typically want to update the data after every trading day to follow the signals and associated commentary. If you have not updated the Solution Service in several days, this dialog will remind you to do so.

Selecting **Yes** on the Update the Solution Service Dialog begins the Solution Service update process. This will display the Update Solution Service Dialog unless you have indicated to no longer display it.

Additional Options

☑ **Do not show me this reminder again.**

Select this checkbox if you would prefer not to receive this reminder again.

Note: After selecting this option, you can restore this reminder by pressing the **Restore Hidden Information Panel** button on the Modify Options Dialog: General sub-page.

What Do I Do Next?

Press the **Yes** button if you would like to perform the action specified by this dialog. The results of the Yes button are listed above. If you do not want to perform the action, press the **No** button.

How Did I Get Here?

This dialog is displayed automatically when you start TradingSolutions or change to a new Work directory. It is typically only displayed every few times TradingSolutions is started.

Specify Exchange Characteristics Dialog

The Specify Exchange Characteristics Dialog allows you to define and/or modify the settings associated with exchanges in TradingSolutions.

Defining exchanges is useful for specifying the days and times that sets of stocks and other financial instruments are expected to have new data. These settings are primarily used for the time information associated with intraday data.

For help with exchanges, see Working with Different Exchanges.

Specifying Exchange Information

The following information can be specified for an exchange.

- **Exchange**

  This setting indicates the name of for this exchange definition in TradingSolutions.

- **Symbol Group**

  This setting indicates which internal list of symbols TradingSolutions should use when assigning names to symbols. It also is used for filling in the list of symbols in the Import Data Wizard: Select Symbols to Download Page.

- **Time Zone**

  This setting specifies the time zone that this exchange physically trades in. In most cases, the time information associated with an exchange is specified in that exchange's local time, which may be different than the time where you are located.

  Note: The list of available time zones is retrieved directly from the Windows system settings. If a new or updated time zone does not appear in this list, verify that you have installed the latest updates for your version of Windows.

- **Trading Times**

  These settings indicate when the exchange is open during a typical trading day. Any times should be specified using times in the exchange's time zone.

  Note: If this exchange closes and re-opens during a typical trading day, the first opening time and last closing time should be specified.

  Note: If this exchange is open for different amounts of time on different days, the earliest opening time and the latest closing time should be specified.

- **Trading Days**

  These settings indicate which days of the week the exchange is typically open.

The **Trading Times** and **Trading Days** settings are used primarily to determine when new intraday information should be available. Data that is associated with times outside of these settings will be discarded.

What Do I Do Next?

When you are finished modifying the settings, press the **OK** button. If you would prefer not to change any options at this time, press the **Cancel** button.

How Did I Get Here?

This Specify Exchange Characteristics Dialog is displayed when you press the **Add New…** or **Modify…** buttons on the Define Exchanges Dialog.

Specify Format Characteristics Dialog

The Specify Format Characteristics Dialog allows you to create a new field format or modify an existing one. These formats are used when displaying fields in the Spreadsheet View and the Portfolio View. The format that will be used to display a field can be selected on the Modify Field Dialog: Overview page.

For help with the Portfolio View, see Managing Data with the Portfolio View.

For help with the Spreadsheet View, see Displaying Data in a Spreadsheet.

Viewing the Current Field Formatting

The current format is displayed in the Sample Formatting table. For non-signals, this table displays how the numbers 1875, 18.75, and 0.1875 would be displayed as positive and negative numbers. For signals, this table displays how the signal strengths 1 (100%), 0.3125 (31.25%), and 0.03125 (3.125%) would be displayed as upward and downward signals.

Formatting Decimals and Fractions

To select between displaying partial numbers as decimals or fractions, choose the appropriate button.

- **Display partial numbers as decimals**

  This option displays partial numbers as decimals rounded to the specified number of decimal places.

  ☑ **Fixed**

  This option causes all decimal numbers to be displayed with the specified number of decimal places. If this option is turned off, trailing zeros will be removed from the value.

- **Display partial numbers as fractions**

  This option displays partial numbers as fractions with up to the specified number of digits in the denominator. Partial values that cannot be displayed as a fraction will be rounded to the closest displayable fraction.

Note: To display all values as whole numbers, select to display partial numbers as decimals and specify to zero decimal places.

Displaying Symbols with Numbers

Use the following options to add special symbols to the values.

☑ **Currency Symbol ($)**

This option adds a dollar sign in front of all values.

☑ **Thousands Separator (,)**

This option adds a comma before every third digit in the whole number portion of a value, designating the billions, millions, and thousands places.

☑ **Percent Sign (%) With Adjustment**

This option multiplies all values by 100 and displays a percent sign after them.

Formatting Negative Numbers

Use the following options to indicate how to format values that are less than zero.

☑ **Include Negative Sign (-)**

This option adds a negative sign in front of all negative values.

☑ **Highlight in Red**

This option displays all negative values in red.

☑ **Enclose in Parentheses**

This option surrounds all negative values with parentheses.

Restoring the Default Values for Pre-defined Formats

If you have modified a pre-defined field format and would like to restore the original values for the format, press the **Restore Defaults** button.

Note: For a list of the pre-defined formats, see the help for the Define Field Formats Dialog.

What Do I Do Next?

When you are finished making changes, press the **OK** button to save your changes. If you would prefer to exit this dialog without making any changes, press the **Cancel** button.

How Did I Get Here?

The Specify Format Characteristics Dialog is displayed when you press the **Add…** or the **Modify…** button on the Define Field Formats Dialog.

Specify Range Dialog

The Specify Range Dialog allows you to adjust the date range being displayed in the chart window. It performs the same function as other date scaling actions except it allows finer control over the date range being displayed.

For help using charts, see Displaying Data in a Chart.

Specifying the Chart Date Range

To specify a new start or end to the date range displayed in the chart, use the date controls. In addition, the Adjust Dates range can be set to keep the date separated by a specific size. This is useful for moving to a new section of the data without losing the current magnification.

To adjust the dates independently, or to adjust the dates to a size that is not listed, select **Custom Range**.

For help using the date controls, see the help for Date Selection Controls.

What Do I Do Next?

When you have selected the new date range, press the **OK** button. If you would like to exit the dialog without modifying the date range, press the **Cancel** button.

How Did I Get Here?

The Specify Date Range Dialog appears when you select **Select Date Range…** on the **Chart** menu or from the context menu for the date axis of a chart window.

Specify Value Range Dialog

The Specify Value Range Dialog allows you to adjust the value range being displayed in a sub-chart. It performs the same function as other value scaling actions except it allows finer control over the value range being displayed.

For help using charts, see Displaying Data in a Chart.

Specifying a Chart Value Range

To specify the value range used in the sub-chart, use the buttons and the associated values.

- **Auto-adjust range to include all values.**

  This option causes the value range to adjust automatically to include all of the values in the date range currently being displayed.

  ☑ **Always include zero in adjusted range.**

  This option causes zero to always be included in the value range. This is useful for displaying the magnitude of positive values.

- **Maintain constant value range.**

  This option allows a specific value range to be entered as minimum (From) and maximum (To) values. The value range will not be adjusted to contain all of the values for a given date range.

  Note: This may cause some or all of the values of a chart field not to be displayed in a sub-chart.

What Do I Do Next?

When you have selected the new value range, press the **OK** button. If you would like to exit this dialog without modifying the value range, press the **Cancel** button.

How Did I Get Here?

The Specify Value Range Dialog appears when you select **Select Value Range…** from the context menu for the value axis of a sub-chart in a chart window.

Status Dialog

The Status Dialog displays the current status of operations that may take some amount of time to complete. These operations include calculating fields, training predictions, and importing or exporting data.

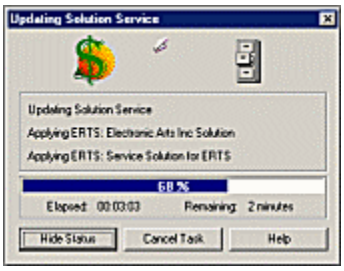
The Status Dialog appears in several different formats, depending on the task or tasks being monitored.

Monitoring Processing Time

The Status Dialog includes a progress bar displaying a percentage of the task that has completed, along with the elapsed time and an estimate of the time remaining.

The progress bar represents the percentage of overall steps that have completed for this task. Since different steps take different amounts of time, the progress bar will typically not complete at a constant rate. Similarly, the estimated time remaining is based on the progress bar, so it is possible that this estimate will be off by a significant amount. In most cases, the estimate is longer than the actual time remaining.

Monitoring Operations



The Status Dialog normally displays a single task. It appears while TradingSolutions is performing operations such as importing data, updating the Solution Service, and deleting fields.

Some or all of the following buttons are available:

- **Hide Status**

  This button closes the Status Dialog. The task continues processing normally. This allows you to continue working with the program interface while TradingSolutions is working in the background.

  Note: You can redisplay the Status Dialog by pressing the Task Detail Button [?] next to this task in the Current Tasks Window.

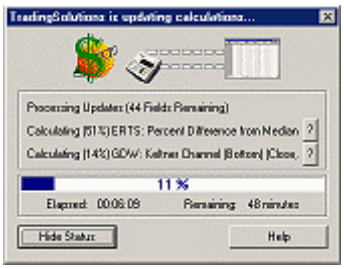
  Note: The Status Dialog will automatically be hidden if it is covered by another dialog or a message box.

- **Cancel Task**

  This button requests for TradingSolutions to stop processing this task. This allows you to stop importing data or other operations if you change your mind.

  Note: Field processing tasks cannot be cancelled. If processing is being performed for a field that you no longer want, simply delete or modify the field and the task will be updated automatically.

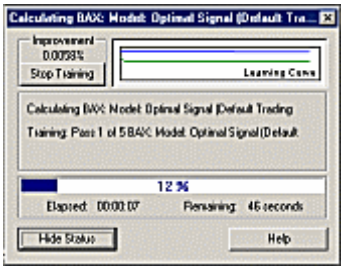
Monitoring Field Processing



While fields are being updated, a special Status Dialog may be displayed with a summary of the fields currently being processed, along with an overall status.

This Status Dialog adds Task Detail Buttons [?] for each task currently being processed. These buttons will display an additional Status Dialog for the associated task.

Monitoring Training of Predictions



During the training phase of a predicted field, the Status Dialog for that task will display a graph of the internal error of the neural network. This graph is called the learning curve. The green line indicates the current error in the training set. The blue line indicates the current error in the cross validation set if one is being used.

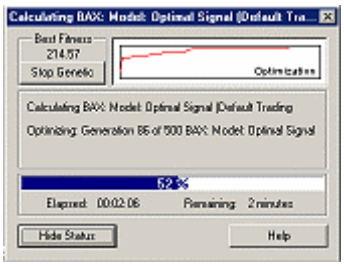
Both of these lines will generally decrease over time. The Status Dialog will also display the percentage by which the error on the cross validation set improves after each training epoch. After the training phase, the learning curve will be available on the Modify Field Dialog: Training Analysis page under the Learning Curve sub-page.

The following button is also available:

- **Stop Training**
  This button allows you to stop the training phase and continue with whatever training has taken place. If multiple training passes are being performed, you will be asked whether you would like to stop all of the training passes, or just the current training pass.

For help with predictions, see Predicting and Modeling Financial Data.

Monitoring Genetic Optimization



During genetic optimization of a predicted field, the Status Dialog will display a graph of the value being optimized. For training optimization, this is the error of the cross validation set. For postprocessing optimization, this is the fitness based on the evaluation settings of the trading style for the postprocessing values.

Note: This graph is only updated at the end of each generation. As a result, the display may remain empty for a significant amount of time, until the first generation has been evaluated.

After the genetic optimization phase, this graph will be available on the Modify Field Dialog: Training Analysis page under the Training Optimization sub-page or the Postprocessing Optimization sub-page.

The following button is also available:

- **Stop Genetic**
  This button allows you to stop this phase and continue with whatever optimization has taken place.

For help with optimizing fields, see Optimizing Signals and Predictions.

What Do I Do Next?

The Status Dialog will disappear automatically after the associated tasks have completed. It can also be dismissed before processing has completed by pressing the **Hide Status** button.

How Did I Get Here?

The Status Dialog appears automatically during the processing of many different operations. It can also be displayed by pressing the Task Detail Button [?] on another Status Dialog, the Current Tasks Window, or the Task toolbar.

Training Optimization Settings Dialog

The Training Optimization Settings Dialog allows you to set the values associated with the optimization of predictions. It is also used for modifying the default settings for the optimization of predictions.

Note: Fields that are currently being used by the Solution Service cannot be modified.

For help with predictions, see Predicting and Modeling Financial Data.

For help with optimizing fields, see Optimizing Signals and Predictions.

Selecting Data Optimizations

The following settings are available for optimizing the data being used in the prediction.

☑ **Input Selections/Parameters**

This option indicates to optimize which inputs are included in the prediction. If optimizable functions are included in the list of inputs, the parameters to these functions will also be optimized.

Note: Prediction inputs which are existing fields cannot have their parameters optimized. These fields can only be included or excluded by the optimization process. Individual fields can be excluded from being optimized from the Modify Prediction Input Dialog for each input.

☑ **Memory Depth**

This option indicates to optimize the memory depth associated with the prediction. Optimizing the memory depth allows the prediction to adjust how many recent values of each input the prediction will use. Integer values from 1 to 20 are attempted.

Note: Memory depth can only be optimized in neural network models containing memory, such as time-lag recurrent networks. You can see the neural network model currently associated with a prediction on the Create a Prediction Wizard: Configure Model page or the Modify Field Dialog: Prediction Model page.

Note: If Maintain Auto Samples-to-Weights Ratio is selected below, the memory depth will be adjusted using a single value for the entire neural network. If another option is selected, the memory depth will be adjusted for the individual neural networks with memory.

Selecting Model Optimizations

The following settings are available for optimizing the neural network model being used in the prediction.

☐ **Samples-to-Weights Ratio Monitoring**

The samples-to-weights ratio monitors the number of samples of data available versus the number of weights in the neural network. Weights are added to the neural network based on the number of inputs, the memory depth, and the number of processing elements.

The more weights available in a neural network, the more information it can store about individual patterns it can find. Having more weights allows it to learn more patterns, but can cause the network to become to specific to the data it is using for training and not able to handle new situations. Having too few weights can limit the number of patterns that can be learned. A good rule-of-thumb is to use a samples-to-weights ratio of 10 samples per weight.

The following settings are available for monitoring the samples-to-weights ratio during optimization:

- **Maintain Auto Samples-to-Weights Ratio**

  This option adjusts the number of processing elements to maintain a samples-to-weights ratio as close to the target value as possible. The setting corresponds to the **Automatically Maintain Best Estimates** setting on the Advanced Topology Settings Dialog. The target value can be set on the Modify Training Settings Dialog.

  Note: Selecting this option disables the optimization of the other Model Optimization settings.

- **Penalize Low Samples-to-Weights Ratios**

  This option monitors the samples-to-weights ratio of each test. If the value is less than 75% of the target samples-to-weights ratio, the fitness is significantly decreased as a penalty. The target value can be set on the Modify Training Settings Dialog.

- **Optimize Model Components Freely**

  This option causes the samples-to-weights ratio to not be monitored during optimization.

☑ **Number of Processing Elements**

This option optimizes the number of processing elements in each hidden layer of the neural model. This value is normally set from the Advanced Topology Settings Dialog using the sub-page of the Layer 1 Axon and Layer 2 Axon. Genetic optimization will try integer values from 1 to 15.

☑ **Weight Update Sample Size**

This option optimizes the weight update method used by the neural model. This value is normally set from the Advanced Topology Settings Dialog Overview sub-page.

☑ **Learning Momentum Rate**

This option optimizes the momentum associated with the learning rates of the individual components of the neural model. These values are normally set from the Advanced Topology Settings Dialog using the sub-page for each component. Genetic optimization will try all values from 0 to 1.

☑ **Learning Step Size**

This option optimizes the step size associated with the learning rates of the individual components of the neural model. These values are normally set from the Advanced Topology Settings Dialog using the sub-page for each component. Genetic optimization will try all values from 0 to 1.

Selecting a Fitness Calculation

For each potential group of settings (chromosome), the genetic optimization determines a fitness value to assess how good it is. The settings with the best fitness value are kept.

The following values are available as a basis for the fitness:

- **Maximize Profit (based on Trading Style) ***

  This setting indicates to use the best signal fitness value for a predicted signal. The signal fitness calculation is specified in the trading style associated with the prediction on the Modify Trading Style Dialog: Signal Optimization page.

  Note: * This setting is only available for predicted signals. When predicting non-signals, the prediction error will be minimized instead.

- **Minimize Prediction Error**

  This setting indicates to use the best prediction error. The prediction error is defined as the mean squared difference between the predicted value and the desired output.

The date range used for calculating the fitness value can be set to the following values:

⊡ **Date ranges to use for optimization.**

This value indicates the training ranges to use for optimization of the postprocessing settings.

- **Optimize Training Set, Checking Cross Val.**

  This setting indicates to optimize the fitness of the training set, but to take the settings from the generation with the best fitness for the cross validation set. It also causes the optimization to stop when no improvement occurs on the cross validation set data over a given number of generations.

- ***(Optimize Particular Set or Sets)***

  This setting indicates to optimize the fitness of the indicated set or sets without monitoring the performance of a cross validation set.

Note: * The testing set and the use of multiple sets are not available when optimizing on prediction error. If one of these values are selected, the training error will be used.

Note: You will typically not want to include the testing set in the optimization data. This would result in there not being data set aside for verifying that a good general settings are being found.

Other Settings Available

The following options are also available on this dialog.

☐ **Genetic Algorithm Settings…**

This button will display the Modify Genetic Algorithm Settings Dialog, which allows you to adjust the settings associated with genetic optimization.

☐ **Restore Defaults**

This button will restore the settings to their default values.

What Do I Do Next?

When you are done modifying the optimization settings, press the **OK** button. If you would prefer to exit this dialog without making modifications, press the **Cancel** button.

How Did I Get Here?

The Modify Training Settings Dialog is displayed for a single field when you press the **Optimization Settings…** button on the Predict a Value Wizard: Select Options page or the Modify Field Dialog: Training Settings page.

The Modify Training Settings Dialog is displayed for modifying default values when you press the **Optimization Settings…** button on the Modify Training Settings Dialog.

Update Options Dialog

The Update Options Dialog allows you to modify the data that will be updated during an import. These options are only used when **Update data in the target group** is selected on the Import Data Wizard: Select Type page.

For help importing data, see Importing and Exporting Data.

Modifying the Update Options

The following options can be modified for an update.

Note: These settings will only be used for this specific update.

☑ **Include data that is not marked for updating with this group.**

This option overrides deselecting the **Update when group is updated** setting on the Modify Data Dialog: Properties page. In other words, this option forces the data to be updated regardless of that setting.

☑ **Re-import and overwrite previous data.**

This option indicates to include the specified number of previous bars in the update.

Example: The daily data being updated is one day out-of-date and this box is selected with the value set to 2 bars. The update will import three days worth of data – the last two days of the current data and the one new day.

Note: TradingSolutions fields keep track of the state of their calculations for the last date in each data series. If you overwrite previous data, predictions and other fields work from previous values will need to recalculate from the beginning of the data series. This can cause the calculations after an import to take significantly longer than after a normal update.

Note: For updates from Prophet Finance, if the collection of data being updated has different periodicities or ending dates, all values from that number of bars before the earliest end date will be updated.

Note: For updates from files, all previous data will be re-imported if this option is selected.

☑ **Keep these settings for future updates.**

This option indicates to preserve these settings for each import. If this option is not selected, these options will only be used for this import.

What Do I Do Next?

When you are finished selecting options, press the **OK** button. If you would prefer not to change any options at this time, press the **Cancel** button.

How Did I Get Here?

This dialog is displayed when you press the **Update Options…** button on the Import Data Wizard: Select Type page.

Update Solution Service Dialog

The Update Solution Service Dialog notifies you that you have selected to update the TradingSolutions Solution Service. Since this operation may take several minutes, this dialog presents an opportunity to not perform the update at this time.

Note: You must be connected to the Internet to complete this update.

For more information about the Solution Service, see The TradingSolutions Solution Service.

Solution Service Options

The following options are available from this dialog.

☑ **Do not display this introductory dialog for future updates.**

This setting allows you to not display this dialog prior to each update. Each time you request an update after selecting this option, the update will proceed without displaying this page.

If you would like to restore this introduction page after selecting not to display it, exit any dialogs or wizards and select **Options…** from the **Tools** menu. This will display the Modify Options Dialog, where you can select the General Options property page. On this page, press the **Restore Hidden Information Panels** button to restore this page and any other information panels you previously selected not to display.

☐ **Modify Settings**

This button displays the Modify Solution Service Settings Dialog, which allows you to change the options associated with updating the Solution Service.

What Do I Do Next?

If you would like to update the Solution Service at this time, press the **Start Update** button. If you would prefer not to perform the update at this time, press the **Cancel** button.

How Did I Get Here?

This page is displayed when you request an update to the Solution Service. You can do this by pressing the **Update Solution Service** button on the toolbar, selecting **Update Solution Service** from the **File** menu, or selecting **Update Solution Service** from the context menu for the Solution Service groups that are created when the Solution Service is first updated.

Note: This dialog will only appear when this installation of TradingSolutions has been registered with the Solution Service.

Welcome Dialog

The Welcome Dialog presents you with several common options that users select when starting TradingSolutions. This dialog is typically displayed when the program is started, but this option can be disabled once you have become familiar with the product.

For more help getting started with TradingSolutions, see Getting Started.

Using the Welcome Dialog Menus

The Welcome Dialog uses rollover menus to present the common startup options. Simply move your mouse over any text with a shadow and that option will change colors. To perform that option, just click on it. You can also use the up and down arrow keys on the keyboard to change the selection in the menu and the Enter key to make selections.

The following options are available through the Welcome Dialog.

- **Introductory Demos**

  This option presents a selection of animated introductory demonstrations that will introduce you to the various features in TradingSolutions. For more help with these demonstrations, see the help for the Demo Dialog.

- **Step-by-Step Tutorials**

  This option presents a list of step-by-step tutorials that walk you through many of the common tasks you can perform with TradingSolutions. We encourage you to begin with the first tutorial, but instructions are included for starting with any of them.

- **What's New in v3.0?**

  This option displays a list of major features and enhancements that have been added since the original release of TradingSolutions. This is a great way to become acquainted with the features in TradingSolutions when upgrading from a previous version.

- **Start Working**

  This option exits the Welcome Dialog so that you can start working with TradingSolutions.

- **Change Startup Behavior**

  This smaller option allows you to change what happens when TradingSolutions starts. Specifically, you can turn off the Welcome Dialog so that it is not displayed each time you start TradingSolutions. For more information on this option, see the help for the Modify Options Dialog: General page.

  Note: If you would later like to restore the Welcome Dialog, select **Options…** from the **Tools** menu to display this options page again.

  Note: The option to change the startup behavior is not available in the Evaluation Version.

- **Evaluation Version Restrictions**

  This option displays the restrictions associated with using the evaluation version of TradingSolutions. This option is only available from the Evaluation Version.

What Do I Do Next?

When you would like to dismiss the Welcome Dialog, select **Start Working** from the menu.

How Did I Get Here?

By default, the Welcome Dialog is displayed when the TradingSolutions program is started.

Help with Multi-Page (Tabbed) Dialogs

Advanced Topology Settings Dialog

Advanced Topology Settings Dialog

The Advanced Topology Settings Dialog allows you to adjust the individual elements of a network topology. It is primarily for people who are familiar with the internal workings of neural networks.

Note: Fields that are currently being used by the Solution Service cannot be modified.

For help with predictions, see Predicting and Modeling Financial Data.

Viewing a Neural Network Topology

The Advanced Topology Settings Dialog displays a diagram of the currently selected neural network topology. The properties for each component in the topology are available in property pages beneath the diagram. The properties for a component can also be accessed by clicking on the picture of that component.

Note: Users of the NeuroSolutions neural network simulation environment will recognize the diagram as a half-scale display of a NeuroSolutions breadboard. For simplicity, the properties of the back-propagation and gradient search components are displayed as part of the properties for the associated activation layer components.

For help using property pages, see the help for Property Pages.

Understanding the Topology Diagram

Axon

This component serves as a placeholder for introducing inputs into the network.

Synapse

This component takes each element of the previous component and sends it to each element in the next component with a weight applied.

TanH Axon

This component contains processing elements (PE's) that introduce non-linear processing into the model.

Bias Axon

This component shifts the results of the processing to have the same mean as the desired outputs.

L2 Temporal Criterion Component

This component analyzes the current results and feeds back an error value used to adjust the weights during the training phase.

TDNN Memory Axon

This component contains memory elements that pass along previous values as inputs to the next component.

Gamma Memory Axon

This component is similar to the TDNN Memory Axon, except that it uses exponents to persist previous values.

Laguarre Memory Axon

This component is similar to the Gamma Memory Axon, except that it uses a more complex equation.

Delay Synapse

This component is similar to the Synapse, except that it delays its output by one sample.

Integral Axon

This component is used in Jordan/Elman networks to apply processing to previous information.

Context Axon

This component is used in Jordan/Elman networks to apply processing to previous information.

Automatically Maintaining a Neural Network Topology

By default, TradingSolutions automatically maintains the best estimates for the settings to use in the neural network topology for a prediction. Adjustments are primarily made in response to changes in the number of inputs.

This automatic updating can be disabled in two ways. One way is to turn it off manually from the Advanced Topology Settings Dialog. The other way is to enable genetic optimization, which turns it off in order to optimize the settings.

☑ **Automatically Maintain Best Estimates**

This option enables you to turn on or off the automatic updating of the settings.

Note: If this option is on, the other settings on this dialog cannot be modified.

Fine-Tuning a Neural Network Topology

Settings are available for each individual component of the neural network topology. In addition, overall settings are available for the entire topology.

Overall

The following settings are available for adjusting the overall topology.

Bump Step Sizes

This adjustment allows you to modify the step sizes of all of components with step sizes up or down by a given percentage of their value. Press the **Up** or **Down** buttons to increase or decrease the step sizes.

Example: Setting the value to 25 and pressing the **Up** button will increase the step sizes of all of the components by 25% of their current value.

Adjust Seed…

This button displays the Adjust Random Number Seed Dialog, which allows you to set the random number seed used when initializing the weights of the neural networks. The seed is used at the beginning of the first training pass only.

Weight Updates: Batch or Online

This setting indicates whether the weights associated with each component should be updated after all of the data has been presented (batch) or after each piece of data is presented (online). This setting is only available for static networks.

Weight Updates: Samples Per Exemplar

This setting indicates how many samples should be examined each time the neural network updates its weights during the training phase. This setting is only available for dynamic networks. By default, TradingSolutions will set this value to twice the memory depth.

Individual Components (non-Criterion)

The individual components of the topology each have some combination of the following settings. The only exceptions are the Criterion component and some components which have no modifiable settings.

Processing Elements (PEs)

This setting indicates the number of processing elements for this component. This setting is only available for the TanH axons in each hidden layer.

Processing elements are the processing portion of a neural network. In theory, more processing elements will be able to learn more complex relationships. However, the network may be harder to train effectively. It may also become overly-specific to the training data, making it poor for predicting values not in the training set.

Memory Taps

This setting indicates the number of memory taps for this component. This setting is only available for memory components, including Input Axons with memory.

The number of memory taps effectively controls the number of samples into the past a memory component can remember.

Note: It is recommend that the input layer have the highest number of memory taps since it has access to the least modified data. The number of memory taps then typically decreases through the hidden layers.

Momentum

This setting indicates the momentum rate for the gradient search portion of this component. This setting is only available for components that are modified during weight updates.

The momentum is used to speed the learning by taking a portion of the most recent weight update and reapplying it. It also helps the network arrive at better solutions by helping it avoid local minima. The momentum value is the amount by which the most recent weight update is multiplied after the step size has been applied. It should have a value less than 1.

Step Size

This setting indicates the step size for the gradient search portion of this component. This setting is only available for components that are modified during weight updates.

The step size is used to determine the amount by which an individual component will react during each weight update. It is the amount by which each weight in the component will be adjusted. Using values close to 0 will cause the component to adjust very slowly. Using values closer to 1 may cause the component to over-react during weight updates and render them incapable or learning.

Note: It is recommended that the first hidden layer have the largest step size, followed by the second hidden layer, then the output layer. In addition, memory components should have significantly lower step sizes than other components on the same layer.

Criterion Component

The training of the prediction can be optimized to highlight different aspects of the data. To select individual learning criteria, select the appropriate checkboxes.

Discount Least Recent Values

This optimization adds additional value to successfully learning more recent values. This is useful when predicting time series in which the conditions may be changing over time, such as predictions based on long-term historical data.

Optimize for Directional Accuracy

This optimization adds additional value to successfully learning the sign of the desired output. This is useful when basing an entry/exit system on the positive or negative direction of a prediction. It may also be useful for predicting entry/exit signals since it adds additional value to successfully learning the infrequent actual signals, rather than the more frequent non-signals.

Minimize Number of Large Errors

This optimization adds additional value to successfully reducing the number of large errors, where the error is the difference between the desired output and the predicted value. This is useful for learning infrequent data that has a desired value that is not the same as most of the desired values. However, this may result in less accuracy overall.

Note: These Learning Criteria settings are the same settings as the Learning Criteria on the Predict a Value Wizard: Select Options page and the Modify Field Dialog: Prediction Model page.

Output Data is Pre-Differenced

This constraint indicates that the values of the desired output data represent change or percent change data. When optimizing for directional accuracy, the criterion component will need to calculate the change from the previous value if the data is not pre-differenced.

What Do I Do Next?

When you are finished modifying the settings, press the **Close** button. Any changes made to the settings in this dialog will not be saved until the changes to the associated prediction field are saved.

How Did I Get Here?

The Advanced Topology Settings Dialog is displayed when you press the **Advanced Topology Settings…** button on the Modify Field Dialog: Prediction Model page.

Change Display Properties Dialog

Change Display Properties Dialog: Appearance

The Change Display Properties Dialog allows you to change the appearance and values used for a field in a chart or spreadsheet. The Appearance page allows you to select the line type and color of the field in a chart.

For help with the chart view, see Displaying Data in a Chart.

Changing the Appearance of a Chart Field

The following settings can be used to adjust the appearance of a chart field. Note that different settings are available for different types of chart fields.

- **Values**

  - **Display**

    This option changes the type of line being displayed for this value. **Line**, **Dash**, and **Dot** are types of lines that connect a value point-to-point. **Bars** display the value as a bar chart, with an individual bar rising from the origin to each value.

    Note: **Dash** and **Dot** lines may appear as solid lines unless the chart is zoomed to the point where the individual days in the chart can be seen.

  - **Color**

    This option changes the color of the line or bars. To select a new color, press the arrow at the right of the color control and select a new color from the palette.

- **Signals**

  - **Display (with non-signal)**

    This option changes how a signal will be displayed when it is displayed on top of a non-signal. In other words, when it is displayed as entry/exit arrows.

    Normally, only new signals, or signals that represent new actions, are displayed. For example, after an enter long signal is displayed, no new signals will be displayed until an exit long or an enter short signal is encountered.

    You can select whether you want to display new signals from the start of the data or from the start of the window. Selecting to display new signals from the start of the window will always display the first entry signal in the window. Selecting to display new signals from the start of the data will only display this first entry signal if it would actually generate a new market entry.

    You can also select to display every signal by selecting to display redundant signals. In addition, you can turn off the signal display all together by selecting to display the signal as a value line.

  - **Display (as value line)**

    This option changes how a signal is displayed when it is not being displayed as entry/exit arrows. The options available here are the same as the options for Values described above.

  - **Color**

    This option changes the color of the signal when it is being displayed as a value line. To select a new color, press the arrow at the right of the color control and select a new color from the palette.

    Note: The color of the signal arrows cannot be adjusted.

- **Composite Fields**

  - **Display**

    This option changes which type of composite field is being displayed.

  - **Color / Color Above / Color Below**

    This option changes the color of the line or bars. For Minimum/Maximum composite fields, both the above and below colors can be set. For Candlestick composite fields, this color will only be used for the bar of downward movements. To select a new color, press the arrow at the right of the color control and select a new color from the palette.

What Do I Do Next?

When you are finished updating the properties of this chart field, press the **OK** button to use your changes or select another property page. If you would like to exit from this dialog without performing any changes, press the **Cancel** button.

Additional Property Pages

The Change Display Properties Dialog has the following property pages.

Appearance

This page allows you to select the line type and color.

Value

This page allows you to select how to modify the value before it is displayed.

For help using property pages, see the help for Property Pages.

How Did I Get Here?

The Change Display Properties Dialog appears when you select **Change Display Properties of Field…** from the context menu for a chart or spreadsheet field.

Change Display Properties Dialog: Value

The Change Display Properties Dialog allows you to change the appearance and values used for a field in a chart or spreadsheet. The Value page allows you to select how to modify the value before it is displayed.

Note: This page is not available for composite chart fields.

For help with the chart view, see Displaying Data in a Chart.

For help with the spreadsheet view, see Displaying Data in a Spreadsheet.

Modifying the Value of a Chart Field

Several different value modifications can be applied to a data field before it is displayed in a chart. These value modifications do not change the value of the data field, only the value that is charted.

Sub-value

This option selects other sub-values for the field being displayed. These sub-values are the same as those listed on the Display Fields Dialog.

- **Value**

  This sub-value displays the actual value of the field. This is the same value that is displayed if the field name is selected.

- **Change in Value**

  This sub-value displays the change in the value of the field from the previous bar.

  Note: If the previous value is null, the change is considered to be null.

- **Percent Change in Value**

  This sub-value displays the percent change in the value of the field from the previous bar.

  Note: If the previous value is zero or null, the percent change is considered to be null.

- **Raw Prediction Output**

  This sub-value displays the value of the neural network without postprocessing. In other words, if this field was predicted using percent change preprocessing, the value being displayed would be the predicted percent change. In addition, any postprocessing applied to predicted signals is removed.

- **Error in Prediction Value**

  This sub-value displays the difference between the predicted value and the desired value.

  Note: If the desired value is null, the error will also be null.

- **Error in Raw Prediction Output**

  This sub-value displays the difference between the raw prediction output and the desired value without postprocessing. In other words, if this field was predicted using percent change preprocessing, the value being displayed would be the difference between the predicted percent change and the actual percent change.

  Note: If the desired value is null, the error will also be null.

☑ **Use Absolute Value**

This option displays the absolute value of the current value. This is useful for displaying the relative volatility of change values without showing the direction of the change.

Bars to Offset Value for Change/Prediction

For Change and Percent Change displays, this setting controls the number of bars over which to calculate the change in value.

Example: To display the change in value between today's value and yesterday's value for a data series with daily data, this value should be set to 1.

Bars to Shift Display of this Field Forward

Advances the value forward before displaying it. This is useful for displaying predicted values on the day they are predicted for, rather than on the day with the data they are being predicted from.

Note: The shifting bars of prediction error values cannot be modified.

Bars to Combine to Create a Moving Average

Applies a simple moving average to the data before charting it. This is useful for smoothing out volatile data without having to calculate a separate data field with a moving average.

What Do I Do Next?

When you are finished updating the properties of this field, press the **OK** button to use your changes or select another property page. If you would like to exit from this dialog without performing any changes, press the **Cancel** button.

Additional Property Pages

The Change Display Properties Dialog has the following property pages.

Appearance

This page allows you to select the line type and color when this field is displayed in a chart.

Value

This page allows you to select how to modify the value before it is displayed.

For help using property pages, see the help for Property Pages.

How Did I Get Here?

The Change Display Properties Dialog appears when you select **Change Display Properties of Field…** from the context menu for a chart or spreadsheet field.

Correlation Analysis Dialog

Customize Toolbars Dialog

Customize Toolbars Dialog: Toolbar Selection

The Customize Toolbars Dialog allows you to customize the toolbars in TradingSolutions to fit your individual preferences. The Toolbar Selection Page allows you to select which toolbars should be displayed, as well as create new ones.

Selecting the Toolbars to Display

By default, TradingSolutions displays only one toolbar, the Standard Tools toolbar. In addition to this toolbar, it has several other more specific toolbars that are included with TradingSolutions.

☑ **Standard Tools**

This toolbar contains a collection of the most commonly used tools from the other toolbars.

☑ **Edit Tools**

This toolbar contains tools for editing spreadsheet cells, such as cut, copy, and paste.

☑ **Field Tools**

This toolbar contains tools for adding, modifying, and analyzing fields.

☑ **File Tools**

This toolbar contains tools for importing and exporting different types of files.

☑ **General Tools**

This toolbar contains the most commonly used tools from the **Tools** menu.

☑ **Help Tools**

This toolbar contains the most commonly used tools from the **Help** menu.

☑ **Portfolio Tools**

This toolbar contains tools for manipulating the Portfolio View.

☑ **View Tools**

This toolbar contains tools for displaying different types of views.

Note: The **Menu bar** is also listed with the other toolbars. However, it cannot be deselected.

In addition to these toolbars, you can also create your own toolbars by pressing the **New…** button. This will display the New Toolbar Dialog, which allows you to specify the name of your new toolbar.

Note: New toolbars are created without any buttons. To add buttons to the new toolbar, use the Toolbar Buttons page.

Other Toolbar Options

The following options are also available from this dialog.

☑ **Show Tooltips**

This option can be turned off so that TradingSolutions will not display a tool tip when the mouse is positioned over toolbar buttons.

☑ **Cool Look**

This option can be turned off to add borders to the buttons.

☑ **Large Buttons**

This option can be turned on to increase the size of all toolbar buttons.

☐ **Reset**

This button will reset the buttons currently included on the selected toolbar to its default tools.

Note: This button is only available when one of the default toolbars is selected.

☐ **Delete**

This button will remove the selected toolbar if it was not included with TradingSolutions.

Note: This button is only available when a user-created toolbar is selected.

What Do I Do Next?

When you are finished modifying the toolbars, press the **OK** button to use your changes or select another property page. You can also save your changes without exiting the dialog by pressing the **Apply** button. If you would like to exit from this dialog without making any changes, press the **Cancel** button.

Additional Property Pages

The Customize Toolbars Dialog has the following property pages.

Toolbar Selection

This page allows you to select which toolbars should be displayed, as well as create new ones.

Toolbar Buttons

This page allows you to select which tool buttons should be displayed on each toolbar.

How Did I Get Here?

The Customize Toolbars Dialog appears when you select **Customize Toolbars…** from the **Tools** menu.

Customize Toolbars Dialog: Toolbar Buttons

The Customize Toolbars Dialog allows you to customize the toolbars in TradingSolutions to fit your individual preferences. The Toolbar Buttons Page allows you to select which tool buttons should be displayed on each toolbar.

Selecting the Buttons to Display

The buttons currently associated with a toolbar can be dragged to any toolbar currently being displayed. To do this, select the category of tool you would like and then drag the desired tool button to the location in the toolbar that you would like it displayed.

Note: You must drag the button to the actual toolbar, not to the category list.

For help with the categories, see the Toolbar Selection page.

What Do I Do Next?

When you are finished modifying the toolbars, press the **OK** button to use your changes or select another property page. You can also save your changes without exiting the dialog by pressing the **Apply** button. If you would like to exit from this dialog without making any changes, press the **Cancel** button.

Additional Property Pages

The Customize Toolbars Dialog has the following property pages.

Toolbar Selection

This page allows you to select which toolbars should be displayed, as well as create new ones.

Toolbar Buttons

This page allows you to select which tool buttons should be displayed on each toolbar.

How Did I Get Here?

The Customize Toolbars Dialog appears when you select **Customize Toolbars…** from the **Tools** menu.

Modify Alert Definition Dialog

Modify Data Series Dialog

Modify Data Series Dialog: Properties

The Modify Data Series Dialog allows you to analyze and change the properties associated with a data series. The Properties page allows you to change the name and other settings for the data series. It also provides you with several quick actions that you can perform on the data series.

Modifying Data Properties

The following settings are available for this group.

Note: Any changes to these settings will only be made with the **Apply Changes** button is pressed.

Display Name

The data name is the name that will be displayed in the Portfolio View and other places throughout TradingSolutions. Unlike the ticker symbol, it does not need to be unique. However, it is recommended that it be kept unique to save confusion.

Ticker Symbol

The ticker symbol is a short 3-6 letter designation used to identify a security or index. Any combination of letters or numbers can be used here; however, it must be unique to the other ticker names in your portfolio with the same periodicity.

Exchange

This setting defines the exchange for which this data is associated. This is used primarily for determining when new data is available for updates.

Note: If you would like to create a new exchange, press the **Edit…** button. This will display the Define Exchanges Dialog.

Data Source

This setting indicates where the data for the data series is imported from.

Note: If this data series was previously imported from a file, the type of file will appear in the list of available data sources. The **Last File** path will also be displayed. To associate this data series with a different file, use the Import Data Wizard to import the new file directly.

Note: If no data source is associated with this file and it was never imported from a file, a value of **None** will be also available.

Last File

If this data series has previously been updated from a file, this value is a report of the last file that was imported. The value cannot be modified.

Periodicity

This value is a report of the periodicities of the data currently in this group. The value cannot be modified.

☑ **Update when group is updated.**

This setting indicates whether the data should be updated when **Update data in the target group** is selected in the Import Data Wizard.

Note: This setting can be overridden for individual updates from the Update Options Dialog.

☑ **Include in intraday streaming updates.**

This setting indicates whether the data should be updated when streaming is turned on.

For help with streaming data, see Streaming Intraday Data.

Note: This setting is only available for intraday data.

Performing Quick Actions on a Data Series

This page has several different Quick Action buttons, which allow you to perform tasks on this data series directly from the Modify Data Series Dialog. Most of these tasks are also available from other locations.

The following Quick Actions can be performed from this page:

- **Display in Chart**

This button displays the Display Fields in Chart Dialog, which allows you to select a specific field to display in a new chart window. After a field is selected, the Modify Data Series Dialog will be dismissed. Once displayed, other fields can be added to this chart window for comparison.

- **Display in Spreadsheet**

  This button displays the Display Fields in Spreadsheet Dialog, which allows you to select specific fields to display in a new spreadsheet window. After the fields have been selected, the Modify Data Series Dialog will be dismissed.

- **Create / Modify Fields**

  This button displays the Data Fields page, which allows you to add new fields, as well as modify and delete existing fields in the data series.

- **Remove Some Data**

  This button displays the Remove Date Range Dialog, which allows you to remove the records in a range of dates from the data series.

What Do I Do Next?

When you are finished making any changes, press the **Close** button or select another property page. However, note that any changes on the Name page will not occur unless the **Apply Changes** button is pressed.

Additional Property Pages

The Modify Data Series Dialog has the following property pages.

Properties

This page allows you to change the ticker and display names for the data series, as well as providing you with several quick actions to perform on the data series.

Data Fields

This page allows you to add new fields, as well as modify and delete existing fields in the data series.

Predictions

This page allows you to analyze and retrain prediction fields for the data series.

Entry/Exit Signals

This page allows you to compare and analyze signal fields for the data series.

Data Views

This page allows you to manage previously saved chart and spreadsheet views for the data series.

For help using property pages, see the help for Property Pages.

How Did I Get Here?

The Name property page appears when you select **Rename…** from the context menu for a data series or double-click on a data series in the Portfolio View.

Modify Data Series Dialog: Data Fields

The Modify Data Series Dialog allows you to analyze and change the properties associated with a data series. The Data Fields page allows you to add new fields, as well as modify and delete existing fields in the data series.

Working with Fields

To create a new field, press the **New…** button. This will display the Create a Field Wizard where you can define the properties of the new field.

To modify an existing field, select the field in the selection tree, then press the **Modify...** button. This will display the Modify Field Dialog. You can also modify a field by double-clicking the field name in the selection tree.

To make a copy of an existing field, select the field in the selection tree, then press the **Copy** button. This will create a copy of the definition of the field. For predictions, the current training weights will be copied, as well.

Note: If a definition for an entire group is copied, the copy will be made for the local data only. To copy the definition for the entire group, use the Modify Group Dialog: Data Fields page **Copy** button.

To delete an existing field, select the field in the selection tree, then press the **Delete** button. If the field is not currently being used for other calculations, your action will be confirmed and the field will be deleted.

Warning: Before you delete a field, make sure that you no longer need it. After deleting a field, you will not be able to get it back without using the steps you used to create it.

Note: Fields that are currently being used by other fields and fields that are currently being used by the Solution Service cannot be deleted.

For help using the selection tree, see the help for Selection Trees.

What Do I Do Next?

When you are finished making any changes, press the **Close** button or select another property page.

Additional Property Pages

The Modify Data Series Dialog has the following property pages.

Properties

This page allows you to change the ticker and display names for the data series, as well as providing you with several quick actions to perform on the data series.

Data Fields

This page allows you to add new fields, as well as modify and delete existing fields in the data series.

Predictions

This page allows you to analyze and retrain prediction fields for the data series.

Entry/Exit Signals

This page allows you to compare and analyze signal fields for the data series.

Data Views

This page allows you to manage previously saved chart and spreadsheet views for the data series.

For help using property pages, see help for Property Pages.

How Did I Get Here?

The Data Fields property page appears when you select **Modify Fields…** from the context menu for a data series in the Portfolio View. It also appears if the **Modify Field Properties** button on the toolbar is selected when a data series is selected or when the **Create / Modify Fields** button is selected on the Name page.

Modify Data Series Dialog: Predictions

The Modify Data Series Dialog allows you to analyze and change the properties associated with a data series. The Predictions page allows you to analyze and retrain prediction fields for the data series.

Note: If no prediction fields have been created for the data series, the dialog will indicate that no predictions have been created.

For help with predictions, see Predicting and Modeling Financial Data.

Comparing Predictions

The Predictions page can be used to easily compare the error, correlation, and accuracy of the predictions for a data series. The predictions can be grouped by desired field, desired type (signals and non-signals), or not at all.

Group Predictions By

This value indicates how to group the display of the predictions.

- **Desired Field**

  This setting indicates to group the predictions by their desired outputs. This is useful for determining the best prediction of a specific field.

- **Desired Type**

  This setting indicates to group the predictions by whether the desired output is a signal or a non-signal. This is useful for determining the best prediction of a signal when multiple desired output signals are used.

- **No Grouping**

  This setting indicates not to group the predictions.

Analyze

This value indicates which portion of the training data to display an analysis for. Typically, the testing set is used to compare the effectiveness of predictions.

The information in each of these columns can be sorted. To sort a column of information, double-click on the heading of that column. The values in that column will then be sorted from best-to-worst, or alphabetical order for field names.

The following information is listed.

Error

For predictions that use change preprocessing, this value is the error of the predicted changes. For all other predictions, this value is the raw error of the prediction.

Correl.

For predictions that use change preprocessing and signals, this value is the correlation of the postprocessed value. For all other predictions, this value is the raw correlation.

Accuracy

For predicted signals, this is the percent of signals that were in the correct direction. For all other predictions, this value is the percent of time the predicted change was in the correct direction.

Note: Information on each of these values is available in the help for the Modify Field Dialog: Training Analysis page.

Analyzing a Prediction

To analyze a prediction field, select the field, then press the **Analyze…** button. This will display the Modify Field Dialog: Training Analysis page. You can also analyze a prediction field by double-clicking the field name in the selection tree.

While viewing the Modify Field Dialog, you can change any of the properties of the prediction by selecting a different property page. However, the analysis will not be updated to reflect those changes until the **OK** button is pressed and the field has been retrained and reanalyzed.

For help using the selection tree, see the help for Selection Trees.

Retraining a Prediction

To retrain a prediction field, select the field, then press the **Retrain** button. Your action will be confirmed and the prediction will be retrained.

For help using the selection tree, see the help for Selection Trees.

What Do I Do Next?

When you are finished analyzing the predictions and making any changes, press the **Close** button or select another property page.

Additional Property Pages

The Modify Data Series Dialog has the following property pages.

Properties

This page allows you to change the ticker and display names for the data series, as well as providing you with several quick actions to perform on the data series.

Data Fields

This page allows you to add new fields, as well as modify and delete existing fields in the data series.

Predictions

This page allows you to analyze and retrain prediction fields for the data series.

Entry/Exit Signals

This page allows you to compare and analyze signal fields for the data series.

Data Views

This page allows you to manage previously saved chart and spreadsheet views for the data series.

For help using property pages, see the help for Property Pages.

How Did I Get Here?

The Predictions property page appears when you select **Analyze Predictions…** from the context menu for a data series in the Portfolio View.

Modify Data Series Dialog: Entry/Exit Signals

The Modify Data Series Dialog allows you to analyze and change the properties associated with a data series. The Entry/Exit Signals page allows you to compare and analyze signal fields for the data series.

For help with entry/exit signals, see Creating and Analyzing Entry/Exit Signals.

Comparing Entry/Exit Signals

This dialog displays a comparison of the signal fields defined for the data series. Information above of the comparison table indicates the date range that is currently being analyzed. Each entry in the table represents one signal field. Each signal field is analyzed using its own trading style, which can be selected on from the Modify Field Dialog: Signal Analysis page for that field.

In addition to the signal fields, an entry called **Buy/Hold** is displayed for a comparison to buying (entering long) the commodity on the first date of the analysis. This entry is displayed even if no signal fields have been defined.

An entry may also be displayed for comparison to a benchmark index, such as the S&P 500. The benchmark can be specified or changed by pressing the **Options…** button.

For end-of-day data, the following information is displayed for each signal field:

- **Annualized Return**
  This value is the annualized return on the initial investment. It can be used to evaluate the overall profitability of the signal. This value is the annualized return on the investment from its initial value to its final value. Additional background information is available on the help for the Modify Trading Style Dialog.
- **Annual Trades**
  This value displays the average number of trades that that were entered during an average year.
- **Percent Wins**
  This value displays the percentage of these trades that produced a positive gain (profit).

For intraday data, the following information is displayed:

- **Overall Return**
  This value displays the percent change in the value of the investment from its initial value to its final value. If the investment lost money, it is displayed as a negative number in red.
- **Overall Trades**
  This value displays the number of trades that that were entered during date range.
- **Percent Wins**
  This value displays the percentage of these trades that produced a positive gain (profit).

The information in each of these columns can be sorted. To sort a column of information, double-click on the heading of that column. When a column is first sorted, it will be in ascending order. Double-clicking the heading of a column that has been sorted will sort that column in descending order.

For detailed information about the trades that make up these statistics, select the signal you want information on and press the **Analyze…** button.

Note: Detailed analysis is not available for **Buy/Hold** or the benchmark. They will always consist of one trade that has a gain based on the overall change in the trading price.

Special Display Values

The following values may be displayed instead of the analysis of a signal.

- **<pending>**
  This value is displayed when this signal or its analysis still requires processing. This value will be updated automatically when the analysis is completed.

- **<suspended>**

  This value is displayed when this symbol is streaming. In order to update alerts and display fields as quickly as possible, automatic signal analysis is suspended for the signals of data series that are streaming. This analysis is update automatically when streaming is stopped.

  Note: Analysis of individual signals is still available by selecting the signal and pressing the **Analyze…** button. If the analysis indicates processing is required, TradingSolutions is currently processing a new bar for this symbol. Exit out of the analysis, wait a moment, and open the analysis again.

- **<error>**

  This value is displayed if there was an error calculating this signal or one of its inputs.

Analyzing an Entry/Exit Signal in Detail

To display a detailed analysis of a signal field, select the field in the comparison table, then press the **Analyze…** button. This will display the Modify Field Dialog: Signal Analysis page. You can also analyze a signal field by double-clicking the signal field name in the comparison table.

While viewing the Modify Field Dialog, you can change any of the properties of the signal field by selecting a different property page. However, the analysis will not be updated to reflect those changes until the **OK** button is pressed and the field has been recalculated and reanalyzed.

Selecting Primary and Secondary Signals

Primary and Secondary signals allow you to easily track and analyze your favorite entry/exit signals for each data series. You can specify which signals are your Primary and Secondary Signal by selecting a signal and pressing the **Make Primary** or **Make Secondary** button.

The settings or the current Primary and Secondary signals can be cleared by selecting **Buy/Hold** and pressing the **Clear Primary** or **Clear Secondary** buttons.

Note: If the Primary Signal is cleared, the next signal created for this data series will be set as the Primary Signal.

For more information about special signal designations, see Primary, Secondary and Service Signals.

Changing Signal Analysis Options

To change the signal analysis options for this data series, press the **Change…** button. This will display the Signal Analysis Options Dialog. If the date range is changed from this dialog, the signals will be reanalyzed and the new results will be displayed in the comparison table.

To change the default signal analysis options for all of TradingSolutions, exit the Modify Data Series Dialog and select **Options…** from the **Tools** menu. This will display the Modify Options Dialog, where you can select the Signal Analysis property page and adjust the default signal analysis options.

What Do I Do Next?

When you are finished analyzing the trading signals and making any changes, press the **Close** button or select another property page.

Additional Property Pages

The Modify Data Series Dialog has the following property pages.

Properties

This page allows you to change the ticker and display names for the data series, as well as providing you with several quick actions to perform on the data series.

Data Fields

This page allows you to add new fields, as well as modify and delete existing fields in the data series.

Predictions

This page allows you to analyze and retrain prediction fields for the data series.

Entry/Exit Signals

This page allows you to compare and analyze signal fields for the data series.

Data Views

This page allows you to manage previously saved chart and spreadsheet views for the data series.

For help using property pages, see the help for Property Pages.

How Did I Get Here?

The Entry/Exit Signals property page appears when you select **Analyze Signals…** from the context menu for a data series in the Portfolio View. It also appears when the **Analyze Entry/Exit Signals** button is selected on the Name page.

Modify Data Series Dialog: Data Views

The Modify Data Series Dialog allows you to analyze and change the properties associated with a data series. The Data Views page allows you manage previously saved chart and spreadsheet views for the data series.

Managing Views

To rename a previously saved view, select the view in the selection tree and press the **Rename…** button. This will display the Rename View Dialog.

Note: To permanently save the most recent view, rename the **Most Recent View** entry to a different name.

To delete one or more previously saved views, select the view or views in the selection tree and press the **Delete** button.

Note: Deleting a view will not affect the fields that are in included in that view.

You may also display a view directly from this dialog by selecting it and press the **Display…** button. This will display the Display Fields in Chart Dialog or Display Fields in Spreadsheet Dialog , as appropriate.

Note: This button is not available when the Modify Data Series Dialog is opened from another dialog, such as the Display Fields dialogs listed above.

What Do I Do Next?

When you are finished managing data views, press the **Close** button or select another property page.

Additional Property Pages

The Modify Data Series Dialog has the following property pages.

Properties

This page allows you to change the ticker and display names for the data series, as well as providing you with several quick actions to perform on the data series.

Data Fields

This page allows you to add new fields, as well as modify and delete existing fields in the data series.

Predictions

This page allows you to analyze and retrain prediction fields for the data series.

Entry/Exit Signals

This page allows you to compare and analyze signal fields for the data series.

Data Views

This page allows you to manage previously saved chart and spreadsheet views for the data series.

For help using property pages, see the help for Property Pages.

How Did I Get Here?

The Data Views property page appears when you press the Manage Views button on the Display Fields in a Chart Dialog or the Display Fields in a Spreadsheet Dialog.

Modify Entry/Exit System Dialog

Modify Field Dialog

Modify Field Dialog

The Modify Field Dialog allows you to analyze and modify the properties of a field.

Modify Field Dialog Property Pages

The Modify Field Dialog has different property pages that will be displayed as is appropriate for the type of field being modified.

Alert Definition

This page allows you to change the alert definition being used to generate an alert. It is available for alert fields and is only displayed at the data series or group where the field is defined.

Alert Inputs

This page allows you to change the inputs being used for a entry/exit system. It is available for entry/exit system fields that require inputs and is only displayed at the data series or group where the field is defined.

Committee Fields

This page allows you to change the fields that make up a committee field. It is available for committee fields and is only displayed at the data series or group where the field is defined.

Correlation Analysis

This page allows you to view the results of a correlation analysis. It is available after a correlation analysis has been run using the Correlation Analysis Wizard.

Desired Outputs

This page allows you to change the desired outputs being used in a prediction. It is available for prediction fields and is only displayed at the data series or group where the field is defined.

Overview

This page allows you to rename the field, as well as providing you with many quick actions to perform on the field. It is always available, but the rename function may be disabled in some situations.

Entry/Exit System

This page allows you to change the entry/exit system being used to generate a signal. It is available for entry/exit system fields and is only displayed at the data series or group where the field is defined.

Entry/Exit System Inputs

This page allows you to change the inputs being used for a entry/exit system. It is available for entry/exit system fields that require inputs and is only displayed at the data series or group where the field is defined.

Function

This page allows you to change the function being used in a calculation. It is available for calculation fields and is only displayed at the data series or group where the field is defined.

Function Inputs

This page allows you to change the inputs being used in a function. It is available for calculation fields that require inputs and is only displayed at the data series or group where the field is defined.

Prediction Inputs

This page allows you to change the inputs being used in a prediction. It is available for prediction fields and is only displayed at the data series or group where the field is defined.

Prediction Model

This page allows you to change the options being used for a prediction. It is available for prediction fields and is only displayed at the data series or group where the field is defined.

Signal Analysis

This page allows you to analyze statistics associated with an entry/exit signal. It is available for signal fields and is only displayed for data series where the signal is generated.

Signal Parameters

This page allows you to change the parameters used to generate an optimal signal based on future knowledge. It is available for optimal signal fields and is only displayed at the data series or group where the field is defined.

Trading Parameters

This page allows you to specify the parameters associating with the simulated trading for a set of signal analysis fields.

Training Analysis

This page allows you to analyze statistics associated with a prediction. It is available for prediction fields and is only displayed for data series where the value is predicted.

Training Settings

This page allows you to change the training data being used for a prediction. It is available for prediction fields and is only displayed at the data series or group where the field is defined.

For help using property pages, see the help for Property Pages.

What Do I Do Next?

When you are finished updating the properties of the field, press the **OK** button to save your changes. If you would like to exit from this dialog without performing any changes, press the **Cancel** button.

How Did I Get Here?

The Modify Field Dialog appears when you select to modify or analyze the selected field from the Modify Data Series Dialog or the Modify Portfolio/Group Dialog. It is also displayed when you select **Modify Field…** from the context menu for a field in a chart or spreadsheet.

Modify Field Dialog: Overview

The Modify Field Dialog allows you to analyze and modify the properties of a field. The Overview page allows you to rename the field. It also provides you with many quick actions that can be performed on the field.

Note: Fields that are currently being used by the Solution Service cannot be modified.

Renaming a Field

To select a new name for a field, use one of the selections from the combo box or enter a different name. The name of the field must be unique for all of the data series it is in.

Note: The name of a field can only be changed in the data series or group where it was created. If the field name is grayed for a calculated field on this field, press the **Modify Definition for This Field** button to jump to the place where this field is defined. From there, the name should be available for modification.

Modifying the Definition of a Field Defined for a Group

Fields can be created for individual data series or entire groups of data series. When fields are created for entire groups, the definition of that field (the parameters, options, and other settings) is stored only with the group. Therefore, when you want to modify the definition of that field, you will need to view that field in the group where it is defined.

If you are viewing a group-defined field from the data series, you can jump to the group definition by pressing the **Modify Definition for This Field** button on this page.

If you are viewing a group-defined field at the group level, you can move the definition to the underlying data by pressing the **Move Definition to Underlying Data** button on this page. This is useful for modifying the parameters of the field on a stock-by-stock basis. It also allows you to perform genetic optimization on predictions that were defined at the group level.

Note: Once you move a definition from the group level to the underlying data, it will no longer be defined at the group level. Because of this, it will not be applied automatically when new data is added to the group.

Changing the Display Format of a Field

The format that will be used to display the field in spreadsheet and the portfolio view is indicated here. This format can be changed to any format defined on the system by selecting a new format from the combo box. New formats can be defined by pressing the **New…** button, which will display the Define Field Formats Dialog.

Note: If the Signal format is selected for a field that is currently not a signal, a signal analysis will be run against the value of that field. Similarly, if a field that is currently a signal is set to a format other than Signal, it will no longer be evaluated as a signal on the signal analysis page.

Performing Quick Actions on a Field

This page has many different Quick Action buttons, which allow you to perform tasks on this field directly from the Modify Field Dialog. Most of these tasks are also available from other locations.

The following Quick Actions can be performed from this page:

- **Display in Chart**

  This button dismisses the Modify Field Dialog and displays the field in a new chart window. Once displayed, other fields can be added to this chart window for comparison. This button is only available for data series fields.

- **Display in Spreadsheet**

  This button dismisses the Modify Field Dialog and displays the field in a new spreadsheet window. Once displayed, other fields can be added to this spreadsheet window for comparison. This button is only available for data series fields.

- **Display in Portfolio View**

  This button causes this field to be added as a display field for this group. This button is only available for group fields.

- **Correlation Analysis**

  This button starts the Correlation Analysis Wizard, which allows you to compare this field to other fields in order to search for possible leading indicators. If correlation analysis has already been run for this field, the previous results will be displayed.

- **Training Analysis**

  This button displays the Training Analysis page, which displays an analysis of the last training of a prediction field. This button is only available for prediction fields at the data series level.

- **Signal Profit Analysis**

  This button displays the Signal Analysis page, which displays an analysis of the profitability of trading a signal against historical data. This button is only available for signal fields at the data series level.

- **Retrain Prediction**

  This button will cause a prediction field to be retrained. After the training has been updated, the Training Analysis page will be displayed. This button is only available for prediction fields at the data series level.

  Note: Retraining a prediction may cause different results to be obtained from the prediction field. This is because random conditions are used at the beginning of each training run.

- **Resume Training**

  This button will cause a prediction field to resume training from where it was stopped. After the training has been updated, the Training Analysis page will be displayed. This button is only available for prediction fields at the data series level which have not been modified since their last training.

- **Export Training Data**

  This button will export the training data for use as an input/desired output file in NeuroSolutions. This button is only available for prediction fields at the data series level.

What Do I Do Next?

When you are finished updating the properties of the field, press the **OK** button to save your changes or select another property page. If you would like to exit from this dialog without performing any changes, press the **Cancel** button.

Additional Property Pages

The Modify Field Dialog has many different property pages that will be displayed as is appropriate for the type of field being modified. For information on the other property pages available, see the help for the Modify Field Dialog.

How Did I Get Here?

The Modify Field Dialog appears when you select to modify or analyze the selected field from the Modify Data Series Dialog or the Modify Portfolio/Group Dialog. It is also displayed when you select **Modify Field…** from the context menu for a field in a chart or spreadsheet.

Modify Field Dialog: Correlation Analysis

The Modify Field Dialog allows you to analyze and modify the properties of a field. The Correlation Analysis page allows you to view the results of a correlation analysis produced by the Correlation Analysis Wizard.

Correlation Analysis is useful for searching for direct relationships between values of one data field and previous values of another field. Specifically, correlation analysis determines if the two sets of values move in the same direction by the similar amounts. If a strong relationship is found, the previous values of the second field may be useful for predicting new values of the first.

For example, if there is a high correlation between the closing price of ABC and the closing price of DEF on the previous day, then the changes in the price of DEF may make an effective input for predicting the price of ABC.

Understanding the Significance of the Results

Correlation analysis is a statistical measure of whether two sets of values move in the same direction by the same amount. Like other statistical measures, it is only as good as the data being analyzed. Even if the date range being analyzed has the same characteristics as the data you will be trying to predict, it may still include variability or noise" that may appear as a correlation when one does not exist.

Because of this, TradingSolutions indicates the values where various levels of confidence exist. For example, the line that indicates **Value needed for 99% confidence**" displays the correlation value required to be 99% certain that a correlation exists. This is statistics' way of saying that 99% of the time, this correlation value was not caused by the values appearing to correlate by chance.

Analyzing Correlation Analysis Results

After the Correlation Analysis Wizard has been run, the results of the correlation analysis are displayed on the Correlation Analysis page. By default, the results are displayed sorted on the absolute value of the correlation. The following information is provided:

- **Output Field (or Input Field)**

  This value indicates the data field for which the correlation analysis was run.

  Note: This column is only displayed when correlation analysis is run for a portfolio or subgroup field.

- **Input Field (or Output Field)**

  This value indicates the field for which correlation is being analyzed. This value, combined with the lag size, indicates the value being analyzed.

- **Lag**

  This value indicates the number of samples the Input Field column was lagged before being analyzed. For example, for daily data, a lag of 3 indicates that the correlation values on this line are for the values three trading days before the current value.

- **Samples**

  This value indicates the number of pairs of values that were included in this correlation analysis.

- **Correlation**

  This value indicates the statistical correlation between the data field and the field being analyzed at the given lead/lag length. Specifically, this value is the correlation coefficient between the two sets of data.

  The coefficient has a range of 1 to -1:

correlation = 1	perfect correlation
correlation = 0	no correlation found
correlation = -1	inverse correlation

  Note: When searching for potential inputs, a high inverse correlation can be just as useful as a high normal correlation. When an input field has a high inverse correlation to the output field, the output field will typically go in the opposite direction as the input field, rather than in the same direction.

- **Abs. Value (Absolute Value)**

  This value displays the absolute value of the correlation. It is used to display the correlation values in order of strength, while disregarding the direction of the correlation.

Note: If more than 200 combinations of data fields, leading fields, and lead/lag values have been analyzed, only the highest 100 and lowest 100 correlation values will be displayed. The lowest 100 correlation values are included since high inverse correlation values can be as useful as high normal correlation values.

Creating Predictions Based on Highly Correlated Values

Using the information in the correlation analysis, highly correlated values can be used to create a prediction of future values of the data field. Depending on the type of correlation analysis that was performed, different options will be available for creating predictions directly from this page.

Create a New Prediction from the Selected Fields…

This button is displayed when correlation analysis is used to determine if other fields may be leading indicators for this data field. To begin creating a prediction, select one or more combinations of leading fields and lead lengths from the display and press this button. This will display the Predict a Value Wizard.

Note: Multiple lines in the display can be selected with the mouse by holding down the **Ctrl** key when selecting new lines. The **Shift** key can also be used to select groups of lines.

Create a New Prediction for the Selected Field…

This button is displayed when correlation analysis is used to determine if this data field may be a leading indicator to other fields. To begin creating a prediction, select a combination of lagging field and lag length from the display and press this button. This will display the Predict a Value Wizard.

Display Correlation for Selected Data Field Only…

This button is displayed when correlation analysis is run for an entire group of data fields. Before a prediction can be created from this correlation analysis, the display must be limited to the correlation values for only one data field. To do this, select a data field from the display and press this button. This will display the Modify Field Dialog: Correlation Analysis page (this page) for the selected data field. One of the above buttons will then be displayed for creating predictions.

Note: Any previous correlation analysis data for the selected data field will be replaced when this option is used.

Changing the Correlation Analysis Options

To change the correlation analysis to analyze different fields, a different date range, or a larger maximum lead, press the **Change Analysis…** button to change the analysis options. This will display the Correlation Analysis Wizard: Analysis Fields and Analysis Options pages. After the options are changed, the correlation analysis will be rerun and the display will be updated to reflect the new analysis.

Deleting Previous Correlation Analysis Results

To delete previous correlation analysis results, press the Delete Analysis button. This is useful for reducing the size of your portfolio files when the results are no longer needed.

What Do I Do Next?

When you are finished updating the properties of the field, press the **OK** button to save your changes or select another property page. If you would like to exit from this dialog without performing any changes, press the **Cancel** button.

Additional Property Pages

The Modify Field Dialog has many different property pages that will be displayed as is appropriate for the type of field being modified. For information on the other property pages available, see the help for the Modify Field Dialog.

How Did I Get Here?

The Modify Field Dialog appears when you select to modify or analyze the selected field from the Modify Data Series Dialog or the Modify Portfolio/Group Dialog. It is also displayed when you select **Modify Field…** from the context menu for a field in a chart or spreadsheet.

The Correlation Analysis page is only displayed when the Correlation Analysis Wizard has been run.

Modify Field Dialog: Desired Output

The Modify Field Dialog allows you to analyze and modify the properties of a field. The Desired Outputs page allows you to add or change the desired outputs being used in a prediction.

Note: Fields that are currently being used by the Solution Service cannot be modified.

For help with predictions, see Predicting and Modeling Financial Data.

Selecting a Value to Predict

To specify the value to predict, use the following options.

Value to Predict

This value specifies the name of the data series field to predict.

Note: Only fields from the current data series or group are available for the desired outputs. If you would like to predict the value of a field in another data series, create a calculated field that is equal to the value of the field you want to predict, then use that calculated field for the desired output.

Samples in Advance

This value specifies the number of values to look ahead in the desired output field.

Example: If you are trying to predict a value two trading days in advance from a data series with daily data, this value should be set to 2.

Note: If this value is zero, the prediction will be for the current value. This can be useful when predicting values like the optimal signal, which suggest actions based on future values.

Preprocessing

This value specifies the type of preprocessing that should be used on the desired output. Preprocessing is typically used to give the desired output a more uniform range, often it making it more predictable. TradingSolutions automatically postprocesses the predicted values when preprocessing is used.

Example: When **Percent Change** preprocessing is used, the percent change in value is the value that is sent to the neural network. Any values that are received from the neural network are treated as a percent change in value and converted automatically to what the value would be if that percent change occurred.

Note: This value is only available when the prediction is for at least one sample in advance.

- **Percent Change**

  This option is typically used when you are trying to predict a continuous, positive, non-zero value that does not have a constant range, such as price information.

- **Change**

  This option is typically used when you are trying to predict a continuous value that may not have a constant range, such as some momentum indices.

- **None**

  This option is typically used when you are trying to predict discrete values that have a constant range, such as entry/exit signals.

Note: Preprocessing on outputs is automatically reversed when values are produced by the neural network. For example, prices predicted using percent change preprocessing will result in prices which are determined by a predicted percent change from the appropriate previous value.

Signal Postprocessing Settings

This button displays the Signal Postprocessing Settings Dialog, which allows you to view or modify the postprocessing settings used for a predicted signal.

Note: This button is only available when the predicted value is an entry/exit signal.

Specifying Multiple Outputs for a Prediction

Most predictions will have only one desired output and, therefore, only output one field. To predict multiple values at one time, select **Predict multiple values with this prediction.**

This option displays the list of outputs for this prediction. When this option is first selected, only the current desired output will be listed. To add an additional output, press the **Add New** button and specify the information for the selected output. To remove extra outputs from a prediction, press the **Remove** button to remove the selected output.

There are two ways to approach predicting multiple values in one data series:

- **Create individual predictions for each value being predicted.**

  This option will typically produce more specialized models of the values being predicted. This is typically preferable, especially with values that are hard to model. However, highly specialized models may have trouble generalizing results for new values. By default, a cross validation set is used to help prevent models from specializing on the training set.

- **Predict multiple values with one prediction.**

  This option will typically produce less specialized models of the values being predicted. This is useful for reducing the amount of specialization on the training data, which in turn may allow the models to generalize better on new values.

Note: Additional outputs can be added to a prediction at any time. However, once a prediction is created, individual outputs cannot be removed.

Note: Postprocessing of predicted signals is performed separately for each output.

What Do I Do Next?

When you are finished updating the properties of the field, press the **OK** button to save your changes or select another property page. If you would like to exit from this dialog without performing any changes, press the **Cancel** button.

Additional Property Pages

The Modify Field Dialog has many different property pages that will be displayed as is appropriate for the type of field being modified. For information on the other property pages available, see the help for the Modify Field Dialog.

How Did I Get Here?

The Modify Field Dialog appears when you select to modify or analyze the selected field from the Modify Data Series Dialog or the Modify Portfolio/Group Dialog. It is also displayed when you select **Modify Field…** from the context menu for a field in a chart or spreadsheet.

Modify Field Dialog: Training Analysis

The Modify Field Dialog allows you to analyze and modify the properties of a field. The Training Analysis page allows you to view an analysis of the prediction results versus the desired values.

For help with predictions, see Predicting and Modeling Financial Data.

Analyzing Prediction Training Results

After a prediction has been trained, the outputs of the prediction are compared to the desired values. Several sub-pages are available for viewing the values and analysis of this comparison.

Overview

This sub-page displays an overview of the training, including the date ranges used and the number of epochs trained.

Learning Curve

This sub-page displays the learning curve of the best training pass. The learning curve is a graph of the internal error for each epoch.

Normalized Error

This sub-page displays an analysis of the difference between the desired values and the predicted values for non-signal predictions.

Correlation

This sub-page displays an analysis of the statistical correlation between the desired values and the predicted values for non-signal predictions.

Directional Accuracy

This sub-page displays an analysis of the directional accuracy of a predicted non-signal value.

Training Optimization

This sub-page displays a graph of the best cost, mean cost, and worst cost for each generation of the training optimization.

Error Analysis

This sub-page displays a combined analysis of the normalized error, correlation, and percent correct signal for predicted signals.

Prediction Matrix

This sub-page displays an analysis of the directional accuracy of a predicted signal.

Postprocessing Optimization

This sub-page displays a graph of the best cost, mean cost, and worst cost for each generation of the postprocessing optimization.

For help using sub-pages, see the help for Property Pages.

Handling Training Errors

If the training or calculation phase for a prediction fails, the reason for that failure is displayed in the analysis text on each sub-page. See Help for Specific Messages for additional help with failure messages. If you cannot locate help with a specific problem, try retraining the prediction to see if this corrects the problem.

What Do I Do Next?

When you are finished updating the properties of the field, press the **OK** button to save your changes or select another property page. If you would like to exit from this dialog without performing any changes, press the **Cancel** button.

Additional Property Pages

The Modify Field Dialog has many different property pages that will be displayed as is appropriate for the type of field being modified. For information on the other property pages available, see the help for the Modify Field Dialog.

How Did I Get Here?

The Modify Field Dialog appears when you select to modify or analyze the selected field from the Modify Data Series Dialog or the Modify Portfolio/Group Dialog. It is also displayed when you select **Modify Field…** from the context menu for a field in a chart or spreadsheet.

Modify Field Dialog: Training Settings

The Modify Field Dialog allows you to modify the properties of a previously created field. This page allows you to view or modify the settings associated with training or optimizing this prediction.

Note: Fields that are currently being used by the Solution Service cannot be modified.

For help with predictions, see Predicting and Modeling Financial Data.

Re-optimizing this Prediction

The inputs and settings associated with this prediction can be optimized for better performance. The following settings are available:

☑ **Re-optimize neural network inputs and settings on save.**

This option causes the prediction to be optimized from its current state after the OK button is pressed. Any current settings or training will be lost. For fields created for entire groups, this prediction will automatically be optimized for any new data added to the group. To re-optimize the prediction for the entire group, uncheck and re-check this option.

Note: If optimizable functions were used to create inputs during a previous optimization, TradingSolutions will offer to remove these previously created fields so that they do not interfere with trying new optimization values.

Note: If this is a field defined for an entire group, optimization cannot be turned off for this field.

Note: If re-optimization is selected, it cannot be deselected after leaving this page except by pressing the **Cancel** button to leave this dialog.

☐ **Optimization Settings…**

This button will display the Training Optimization Settings Dialog which allows you to modify the options used for optimizing this prediction.

Modifying the Training Data

The data range associated with a prediction is used for several different things. Part of the data is used for training the neural network model. Part of the data is used as a validation step to make sure the training is improving the results. And, part of the data is left out of the training process to be used for only for testing. The ranges are also used for checking the results of the optimization.

⊡ **Training Range**

This setting displays the current data range being used for this prediction. It can be used to select from typical settings for the training range. Pressing the **Training Range…** button will display the Modify Optimization Range Dialog, which allows greater control over the date range.

There are no definitive rules for how much data should be used for training a prediction. Including more data is useful for improving results since it provides additional examples for training. However, older financial data may have been produced under different market conditions than more recent data, causing the training to focus on outdated or overly generalized principles.

Note: For predictions being defined for an entire group or predictions that use external data as inputs, the data range is limited to the common date range for all of the data being used. For example, if the group for which you are defining a prediction has a data series with only one year of data, the prediction will only be able to use one year of data, even if the other data series in the group all have more data.

You can increase a limited data range by either importing more data into the shorter data series, or removing the data series from the prediction. You can quickly determine the first date available in your data series by adding the first date as a display field in the Portfolio View.

For help with display fields, see Using Display Fields.

Exporting the Training Data for use in NeuroSolutions

NeuroSolutions is general purpose neural network software from NeuroDimension, the makers of TradingSolutions. It can be used to create custom neural networks for use in TradingSolutions with the addition of the Custom Solution Wizard add-on product.

To export the selected training set into files that can be used from within NeuroSolutions, press the **Export Training Data for use in NeuroSolutions…** button. This will display a file selection dialog labeled **Export Training Data As**. This dialog allows you to specify the name of the main file to export the data to. Once you have selected a file name and directory, press the **Save** button.

For help with the file selection dialog, see the help for the File Selection Dialog.

The data for the training set will be saved in the file name selected. If a cross validation set is allocated, the cross validation set will be saved in the same file name with _CrossVal" added. If a testing set is allocated, the testing set will be saved in the same file name with _Testing" added.

Note: Field names with characters that cannot be handled by the NeuroSolutions file component will automatically be converted for use in NeuroSolutions.

Modifying the Training Settings

The settings associated with terminating the training can also be viewed of modified from this page.

- **Training Settings…**

  This button displays the Modify Training Settings Dialog, where you can modify the settings used for training the neural network.

What Do I Do Next?

If you are finished updating the properties of a previously created field, press the **OK** button to save your changes or select another property page. If you would like to exit from this dialog without performing any changes, press the **Cancel** button.

Additional Property Pages

The Modify Field Dialog has many different property pages that will be displayed as is appropriate for the type of field being modified. For information on the other property pages available, see the help for the Modify Field Dialog.

How Did I Get Here?

The Modify Field Dialog appears when you select to modify or analyze the selected field from the Modify Data Series Dialog or the Modify Portfolio/Group Dialog. It is also displayed when you select **Modify Field…** from the context menu for a field in a chart or spreadsheet.

Modify Field Dialog: Signal Analysis

The Modify Field Dialog allows you to analyze and modify the properties of a field. The Signal Analysis page allows you to analyze statistics associated with an entry/exit signal.

Note: Fields that are currently being used by the Solution Service cannot be modified.

For help with entry/exit signals, see Creating and Analyzing Entry/Exit Signals.

Analyzing Entry/Exit Signals

After a signal has been generated, the signal is tested by running a simulation that executes the trades indicated by the signal against the historical data. Several sub-pages are available for viewing the results of this simulation.

The simulation uses the compounded value of the investment over time. In other words, any money gained or lost during previous trades is applied against subsequent trades. In addition, a commission is deducted each time a trade is executed. The values used for the initial size of the investment, commission, and trading value can be adjusted from the Modify Options Dialog: Signal Analysis page.

Note: The compounded investment used for signal analysis differs from optimal signal generation, which uses a typical investment value for testing trades.

Overview

This sub-page displays an overview of the simulation used to test the signal.

Trading Overview

This sub-page displays an overview of the profitability and length of the trades by winners and losers.

Trading Risk

This sub-page displays statistics analyzing the risk associated with the trades that were made.

Equity Risk

This sub-page displays statistics analyzing the risk associated with the overall changes in the equity.

Equity Curve

This sub-page displays the equity of the simulation on a bar-by-bar basis in a chart with the equity associated with a buy/hold strategy.

Analysis by Trade

This sub-page displays the simulation activity on a trade-by-trade basis.

Analysis by Bar

This sub-page displays the simulation activity on a bar-by-bar basis. For end-of-day data, this would be day-by-day analysis.

For help using sub-pages, see the help for Property Pages.

Not the Results You Expected?

The trades displayed on these pages may not match the entry/exit signals displayed in a Chart View or Spreadsheet View. See the help for the Overview sub-page for common causes for this.

Storing Results in a Field

Signal analysis results can be stored to fields for further processing, displaying in the Portfolio View as Display Fields, and displaying in charts. For more information about signal analysis fields, see Analyzing Entry/Exit Signals.

What Do I Do Next?

When you are finished updating the properties of the field, press the **OK** button to save your changes or select another property page. If you would like to exit from this dialog without performing any changes, press the **Cancel** button.

Additional Property Pages

The Modify Field Dialog has many different property pages that will be displayed as is appropriate for the type of field being modified. For information on the other property pages available, see the help for the Modify Field Dialog.

How Did I Get Here?

The Modify Field Dialog appears when you select to modify or analyze the selected field from the Modify Data Series Dialog or the Modify Portfolio/Group Dialog. It is also displayed when you select **Modify Field…** from the context menu for a field in a chart or spreadsheet.

Signal Analysis Sub-pages

Signal Analysis Page: Overview

The Modify Field Dialog allows you to analyze and modify the properties of a field. The Signal Analysis page allows you to analyze statistics associated with an entry/exit signal.

For help with entry/exit signals, see Creating and Analyzing Entry/Exit Signals.

Overview Sub-Page

This sub-page displays an overview of the simulation used to test the signal. It summarizes the information that can be found on the other sub-pages.

Signal Analysis Settings

This section displays the settings that were used during the signal analysis on these sub-pages.

- **Style**

  This value is the trading style that was used to analyze the signal. It can be modified using the **Change…** button.

- **Range**

  This value is the date range currently being analyzed. It can be modified using the **Change…** button or by selecting a range on the Equity Curve sub-page and selecting **Analyze the Displayed Range** from the context menu for the chart.

- **Comments**

  This text indicates special situations and inconsistencies that may result with the selection of the trading style.

These settings can be changed for this dialog by pressing the **Change…** button. This will display the Signal Analysis Options Dialog.

Equity Curve

This chart is a miniature version of the equity curve that is displayed on the Equity Curve sub-page. It displays the equity in the simulated trading account over the entire date range. It also displays the value of buying and holding this data series and the benchmark data series.

A legend of the line colors used in the chart is displayed above the Profitability section.

Profitability

This section displays the profitability of the signal over the entire date range. It also displays the profitability of buying and holding this data series. An optional benchmark data series can also be displayed for comparison.

Note: The benchmark data series is specified in the trading style being used for analysis.

- **Net Profit**

  This value is the total profit that the trading achieved over the date range. It is the final equity minus the initial investment.

- **Gain/Loss**

  This value is the total profit compared to the initial investment.

- **Annualized Return**

  This value is the annualized return on the initial investment. It can be used to evaluate the overall profitability of the signal. This value is the annualized return on the investment from its initial value to its final value. Additional background information is available on the help for the Modify Trading Style Dialog.

A more detailed analysis of the profitability of the signal can be found on the Trading Analysis sub-page.

Trading Overview

This section displays the number of trades that were performed and the percentage of them that made a profit. In addition to overall values, values for long and short trades are also displayed.

A more detailed analysis of long and short trades can be found on the Trading Analysis sub-page.

Risk Overview

This section displays key values from the Trading Risk and Equity Risk sub-pages, as well as displaying an average number of annual trades.

- **Annual Trades**

  This value is the average number of trades that took place for each year in the date range. This is useful for determining how actively this signal would need to be traded to achieve the displayed results.

- **Profit Factor**

  This value is the profit generated by profitable trades divided by the losses generated by losing trades. A value of 2 would indicate that twice as much money was made from winning trades than was lost from losing trades. Higher values indicate less risk.

  Note: This value is not defined if no losing trades were made.

- **Sharpe (Annualized)**

  This value uses the Sharpe Ratio by bar and annualizes that value based on the approximate number of trading days in the year. The Sharpe Ratio by bar is the average percent change in equity of each bar over the standard deviation of those changes. This is useful as a basic reward-to-risk ratio. Higher Sharpe Ratios indicate that a greater amount of average profit could be made with less day-to-day volatility.

Additional risk measures are available on the Trading Risk and Equity Risk sub-pages.

Not the Results You Expected?

The trades displayed on this page may not match the entry/exit signals displayed in a Chart View or Spreadsheet View. Here are some common causes for this:

- **Trades Excluded by Analysis Range**

  The date range being analyzed may not include all of the data. This can cause entry signals that appear in a chart or spreadsheet to not be included in the analysis.

- **Trades Excluded by Analysis Activity**

  The signal analysis may be only performing long or short trades. This can cause all long or short entry signals that appear in a chart or spreadsheet to not be included in the analysis.

- **Entry Signal for First Trade Does Not Appear in Chart View**

  By default, entry/exit signals that are displayed in the Chart View do not include redundant signals. For example, once an Enter Long signal has been displayed, no Enter Long signals will be displayed until after an Enter Short or Exit Long signal has been displayed. Therefore, if the signal analysis date range does not start at the beginning of the data, a redundant entry signal that is not displayed in the chart may start the first trade. Redundant entry/exit signals can be displayed in the Chart View by changing the display characteristics for a charted entry/exit signal from the Change Display Properties Dialog.

The simulated trading of an entry/exit signal can also produce better or worse results than expected. Here are some common causes for this:

- **Trading Style Does Not Match The Definition**

  Optimal signal fields and postprocessed predictions or models of signals use simulated trading to produce their values. This simulated trading is based on a specified trading style. If the trading style used to create a field and the trading style used to analyze a field do not match, less favorable results may be reported.

  Example: An optimal signal may be generated using an investment of $10,000 and a commission of $10. If that signal is then analyzed with an investment of $1,000, it will not be as profitable since the commission will take out a larger percentage of each trade.

- **Optimal Signal Produced No Trades**

  The optimal signal uses two parameters to determine when to enter the market. One setting is the number of samples to look ahead, the other setting is the minimum amount of profit that is required. If the minimum profit cannot be achieved in the given number of samples, no entry signal will be generated. For lower volatility stocks and intraday data, you may need to reduce the minimum profit or extend the number of samples to look ahead.

How Did I Get Here?

This is a sub-page of the Modify Field Dialog: Signal Analysis page.

Signal Analysis Page: Trading Overview

The Modify Field Dialog allows you to analyze and modify the properties of a field. The Signal Analysis page allows you to analyze statistics associated with an entry/exit signal.

For help with entry/exit signals, see Creating and Analyzing Entry/Exit Signals.

Trading Overview Sub-Page

This sub-page displays an overview of the trades, both overall and grouped as profitable and losing trades. Some of the information can be analyzed as either percentage gains or dollar gains. It can also be restricted to specifically long trades or short trades within the simulation when both types of trades are being made.

Note: This page combines the information of the Gain/Loss, Profit, and Length sub-pages that were available in TradingSolutions Version 1.0.

Number of Trades

These values are the overall number of trades, the number of profitable trades, and the number of losing trades. The number of times that the simulated trading stayed out of the market is also displayed.

Note: **Out of Market** indicates the number of times that the trading was out of the market, either before starting trading, or after an exit or stop. If this number is 0, this signal remained in the market throughout the entire analysis period.

Profitability

This section displays an overview of the profitability of the trades.

Cumulative

This value is the total percent gains or the total equity for the given type of trade.

Average Trade

This value is the average percent gain or the average equity for the given type of trade.

Largest Win/Loss

These values are the largest win and the largest loss by percentage or by equity for the given type of trade.

Note: These values may change significantly when changing between displaying As Percentage and displaying As Equity. For example, the trade with largest loss by percentage may be different from the trade with the largest loss by equity.

Length of Trades

This section displays an overview of the length of the trades. It also includes information for the length of periods that the simulated trading was not in the market.

Cumulative

This value is the total number of bars the given type of trade was active.

Average Length

This value is the average number of bars the given type of trade active. This is important for determining how actively this signal will need to be traded.

Shortest

This value indicates the shortest number of bars that the given type of trade was active.

Longest

This value indicates the longest number of bars that the given type of trade was active.

How Did I Get Here?

This is a sub-page of the Modify Field Dialog: Signal Analysis page.

Signal Analysis Page: Trading Risk

The Modify Field Dialog allows you to analyze and modify the properties of a field. The Signal Analysis page allows you to analyze statistics associated with an entry/exit signal.

For help with entry/exit signals, see Creating and Analyzing Entry/Exit Signals.

Trading Risk Sub-Page

This sub-page displays several measures that can be useful for determining the risk associated with the trades made when analyzing a particular entry/exit signal. Some of the information can be analyzed as either percentage gains or dollar gains. It can also be restricted to specifically long trades or short trades within the simulation when both types of trades are being made.

Note: This sub-page does not take into account the strength of the prediction for predicted signals. That information can be assessed on the Training Analysis page.

What Can I Determine From This Page?

The following types of risk can be assessed using these strategies. For help with the individual values, see below for the descriptions of each section.

- **Trade Effectiveness**

  Look at the Profit Factor. This value takes into account the amount of money that was lost in the process of making the reported gains.

  Also, look at the Exit Efficiency. This value is a measure of whether trades may have been held too long relative to the maximum amount of profit to be made.

- **Worst Case Scenarios**

  Look at the Maximum Consecutive Losers. This will give you an idea of how many losing trades you may have to face before getting a winner.

Win / Loss Ratios

This section displays an analysis of the equity on a trade-by-trade basis. The values that are used in these calculations are available on the Equity By Trade sub-page.

- **Percent Winners**

  This value is the percentage of the overall trades for the given type of trade.

- **Profit Factor**

  This value is the profit generated by profitable trades divided by the losses generated by losing trades. A value of 2 would indicate that twice as much money was made from winning trades than was lost from losing trades. Higher values indicate less risk.

  Note: This value is not defined if no losing trades were made.

- **Avg Win / Avg Loss**

  This value is the average profit generated by profitable trades divided by the average losses generated by the losing trades. This differs from the Profit Factor in that it does not take into account the number of winning or losing trades. Instead, it compares the size of the wins to losses. Higher values indicate less risk.

  Note: This value is not defined if no losing trades were made.

Entry / Exit Analysis

This section displays an analysis of statistics associated with the entry and exit of trades.

- **Exit Efficiency**

  This value is the percentage of the maximum gain for each trade that was achieved at the exit of each trade. Only trades where a profit could be made are included.
  This is useful for determining if trades are being held past their maximum value. Values close to 100% indicate that the trades are typically being exited when the maximum profit is available. Lower values indicate that higher profits may be possible if the strategy for generating exit signals were more aggressive.

Note: This value does not take into account the profits missed from exiting a trade too early. For example, keeping every trade to a length of one bar would produce an exit efficiency of 100%, but this would typically not be the most profitable system.

- **Trades Stopped**

  This value is the percentage of trades that were exited due to a stop ordering being executed. Values close to zero are preferable, since trades that are exited using a stop typically do not get a favorable exit price.

- **Limits Not Reached**

  This value is the percentage of attempted trade entries that were not executed due to the limit price not being reached. Values close to zero are preferable, since trades that are not executed typically miss potential profits.

Maximum Draw Down

This section reports the low equity versus various points in the equity curve. This is useful for determining how prone the signal was to losses. It also is useful for determining the margin requirements for accounts that trade on margin.

It is important to note that these values typically occur in the middle of the trade, not necessarily on the exit.

- **from Trade Entry**

  This value indicates the lowest amount of equity within a single trade relative to the amount that was invested in that trade.

  Note: This corresponds to the Max. Loss column on the Analysis by Trade page.

- **from Trade High**

  This value indicates the lowest amount of equity within a single trade relative to the previous high made during that trade.

  Note: This corresponds to the Max. Drop column on the Analysis by Trade page.

Consecutive Trades

This section reports the maximum number of consecutive winning and losing trades. This does not take into account the relative profitability of those trades, only whether those trades generated any profit.

- **Max. Consecutive Winners**

  This value indicates the maximum number of profitable trades that occurred in a row for the given type of trade. This is useful for determining whether this signal may perform better during certain market conditions.
  For example, a high number of maximum consecutive winners may indicate that there were certain periods of time when this signal was most effective.

- **Max. Consecutive Losers**

  This value indicates the maximum number of unprofitable trades that occurred in a row for the given type of trade. This is useful for determining whether this signal may perform worse during certain market conditions.
  For example, a high number of maximum consecutive losers may indicate that there were certain periods of time when this signal was not effective.

Expectancy Ratings

This section reports on trade expectancy. Expectancy was introduced by Van K. Tharp in the book "Trade Your Way To Financial Freedom". It is defined as the expected profit per dollar risked" or the mathematical expectation of profit". Like many other indicators, it has gone through various revisions as people have used it over time.

- **Trade Expectancy**

  This value indicates the amount expected to be returned by each trade. It equals the percent wins times the average win, minus the percent losses times the average loss.

- **Risk-Adjusted Value**

  This value takes the risk associated with volatile trading into account by dividing the trade expectancy by the average loss.

- **Annualized Score**

  This value multiplies the risk-adjusted value by the annual trades to determine an annualized expectation of profit with risk taken into account.

How Did I Get Here?

This is a sub-page of the Modify Field Dialog: Signal Analysis page.

Signal Analysis Page: Equity Risk

The Modify Field Dialog allows you to analyze and modify the properties of a field. The Signal Analysis page allows you to analyze statistics associated with an entry/exit signal.

For help with entry/exit signals, see Creating and Analyzing Entry/Exit Signals.

Equity Risk Sub-Page

This sub-page displays several measures that can be useful for determining the risk associated with the fluctuations in the equity while trading a particular entry/exit signal. Some of the information can be analyzed as either percentage gains or dollar gains.

Note: This sub-page does not take into account the strength of the prediction for predicted signals. That information can be assessed on the Training Analysis page.

What Can I Determine From This Page?

The following types of risk can be assessed using these strategies. For help with the individual values, see below for the descriptions of each section.

- **Day-to-Day Volatility**

  Look at the Sharpe Ratio. This value takes into account the profitability versus the underlying volatility. You should also look at the Beta value. This will give you an idea of how volatile the equity is versus a buy/hold strategy for this data series or the benchmark data series.

- **Worst Case Scenarios**

  Look at the Maximum Draw Down values. This will give you an idea of the size of the individual losses that occurred in the process of achieving these gains. This can be important for determining the size of margins required when trading on margin accounts.

Equity Analysis By Bar

This section displays an analysis of the equity on a bar-by-bar basis. The values that are used in these calculations are available on the Equity By Bar sub-page.

- **Average Change Per Bar**

  This value is the average change in equity for each bar, including when the simulated trading was not in the market. This can also be considered to be the average gain or loss than was taken each day.

- **Standard Deviation**

  This value is the standard deviation of the equity for each bar, including when the simulated trading was not in the market. For a typical bar, the change in equity will tend to be within one standard deviation of the average change. This can be useful for determining the volatility of the daily equity from this signal. Higher standard deviations indicate more bar-by-bar volatility.

- **Upside Deviation**

  This value is the standard deviation of the equity for each bar where the equity increases. Higher values indicate more volatility in the amount by which the equity increases.

- **Downside Deviation**

  This value is the standard deviation of the equity for each bar where the equity decreases. Higher values indicate more volatility in the amount by which the equity increases.

Note: Since this section analyzes the equity curve on a bar-by-bar basis, it is not available specifically for long or short trades. If you would like to analyze the effects of only trading long or only trading short, you can do so by changing the signal analysis options to include that specific type of trading.

Beta (Volatility)

This section displays an analysis of the changes in the equity curve compared to changes in the buy/hold equity curve and the benchmark equity curve. Specifically, the Beta is defined as the slope of a linear regression between these two values. An optional benchmark data series can also be used for calculating the beta.

Note: The benchmark data series is specified in the trading style being used for analysis.

Beta values greater than one indicate that the equity curve changed on a bar-by-bar basis by a larger amount than the benchmark. Values less than one indicate that it changed less than the benchmark. Values less than zero indicate that it typically moved in the opposite direction from the benchmark.

Beta values are relative. A value of two indicates that the change in the equity curve will typically be twice as large as the change in the benchmark.

- **Beta**

  This value is the Beta for all of the bars in the date range.

- **Beta on Increase**

  This value is the Beta for all of the bars for which the benchmark increased. This is useful for determining how the equity curve reacts on days when the benchmark increases.

- **Beta on Decrease**

  This value is the Beta for all of the bars for which the benchmark decreased. This is useful for determining how the equity curve reacts on days when the benchmark decreases.

> Note: Since this section analyzes the equity curve on a bar-by-bar basis, it is not available specifically for long or short trades. If you would like to analyze the effects of only trading long or only trading short, you can do so by changing the signal analysis options to include that specific type of trading.

Equity Risk Measures

This section displays an analysis of the equity on a bar-by-bar basis. The values that are used in these calculations are available on the Equity By Bar sub-page.

- **Sharpe Ratio By Bar**

  This value is the average change in the equity over the standard deviation of those changes. This is useful as a basic reward-to-risk ratio. Higher Sharpe Ratios indicate that a greater amount of average profit could be made with less day-to-day volatility.

- **Annualized Sharpe Ratio**

  This value annualizes the Sharpe Ratio By Bar based on the approximate number of bars in the trading year. This normalizes the Sharpe Ratio value for comparison between different periodicities and other software.

  > Note: Traditional Sharpe Ratio values also take into account a Risk-free Rate of Return. This value is not taken into account in TradingSolutions.

- **Sortino Ratio**

  This value is the average change in the equity over the downside deviation of those changes. It is similar to the Sharpe Ratio, but instead of penalizing for general volatility including upward changes, it only penalizes for downward volatility.

- **Annualized Calmar Ratio**

  This value is the annual percent gain over the maximum drawdown from high equity. It is similar to the Sharpe Ratio, but penalizes based on the worst case scenario, rather than on volatility.

> Note: Since this section analyzes the equity curve on a bar-by-bar basis, it is not available specifically for long or short trades. If you would like to analyze the effects of only trading long or only trading short, you can do so by changing the signal analysis options to include that specific type of trading.

Maximum Draw Down

This section reports the low equity versus various points in the equity curve. This is useful for determining how prone the signal was to losses. It also is useful for determining the margin requirements for accounts that trade on margin.

It is important to note that these values typically occur in the middle of the trade, not necessarily on the exit.

- **from Investment**

  This value indicates the lowest amount of equity relative to the initial investment for the entire date range. This is the largest loss relative to initial investment. It will typically include the losses from several trades.

- **from High Equity**

This value indicates the lowest amount of equity relative the previous high in the equity curve. This is the largest loss relative to the best gain. It will typically include the losses from several trades.

Note: The percentage version of this value is typically the most useful for establishing margin requirements since it displays the largest percentage loss within the equity curve.

How Did I Get Here?

This is a sub-page of the Modify Field Dialog: Signal Analysis page.

Signal Analysis Page: Equity Curve

The Modify Field Dialog allows you to analyze and modify the properties of a field. The Signal Analysis page allows you to analyze statistics associated with an entry/exit signal.

For help with entry/exit signals, see Creating and Analyzing Entry/Exit Signals.

Equity Curve Sub-Page

This sub-page displays the equity of the simulation on a bar-by-bar basis in a chart with the equity associated with a buy/hold strategy.

- **Equity By Bar**
  This value is the graph of the total equity of the signal for each bar.
- **Buy/Hold Equity**
  This value is the graph of the total equity of buying and holding the stock.
- **Benchmark**
  This value is the graph of the total equity of buying and holding the benchmark.

Adjusting Chart Ranges

The date and value axes can be scaled to display specific portions of the data. The options for doing this are similar to those associated with the Chart View. For more information, see Adjusting Chart Ranges.

The date range of the signal analysis can also be adjusted using the context menu for the equity curve. After adjusting the date range associated with the equity curve, you can change the date range of the signal analysis to match the displayed range by selecting **Analyze Displayed Range** from the context menu for the chart.

How Did I Get Here?

This is a sub-page of the Modify Field Dialog: Signal Analysis page.

Signal Analysis Page: Analysis by Trade

The Modify Field Dialog allows you to analyze and modify the properties of a field. The Signal Analysis page allows you to analyze statistics associated with an entry/exit signal.

For help with entry/exit signals, see Creating and Analyzing Entry/Exit Signals.

Analysis by Trade Sub-Page

This sub-page displays the simulation activity on a trade-by-trade basis. The following information is provided.

Note: By default, the information is sorted by date. However, the information in any column can be sorted by double-clicking on the field heading. The direction of the sort can be reversed by double-clicking on the field heading again.

Copy Button

This button (in the lower-right corner of the grid) will copy the contents of the entire grid to your Windows clipboard. Once copied, you can paste the values into programs such as Microsoft Excel.

Special Messages

The following message may be listed at the bottom of the Analysis by Trade page.

- **Trading stopped due to insufficient funds.**
  This message is displayed when the equity in the simulated trading account is too low to enter a new trade.

Entry/Exit Section

- **Start Date**
  This value is the date that the trade was entered on.
  Note: This will not be the same date as when the signal was generated. Since signals are generated at the end of a bar, this date is typically for the bar after the signal was generated.

- **Position**
  This value indicates whether this was a long or short trade.

- **Entry Sig.**
  This value displays the signal that caused the trade to be requested.

- **Exit Sig.**
  This value displays the signal that caused the trade to be exited. In addition to signals, the following special conditions can also cause a trade to be exited or never entered.

  - **Closed**
    This value indicates that the trade was exited due to the intraday time.
  - **Stopped**
    This value indicates that the trade was exited due to a stop.
  - **Limit Fail**
    This value indicates that the trade was not entered due to a limit price not being reached.
  - **Re-entry Fail**
    This value indicates that the trade was not entered due to the criteria for re-entering a trade after a stop not being met.
  - **Time Fail**
    This value indicates that the trade was not entered due to the intraday time.

  Note: If the last trade in the analysis has not been exited, this value will display …".

- **Entry Value**
  This value is the price paid when the trade was entered.

- **Exit Value**
  This value is the price paid when the trade was exited.
  > Note: If the trade is listed as **Limit Fail**, the exit value displays the closest price to the limit price.

Information Section

- **Gain/Loss**
  This value is the percentage change in the value that was invested.
  > Note: This value may be larger than the specified stop percentage. The most common reason for this is that the price gapped" over the stop price during after hours trading, causing the stop to use the opening price for the trade.

- **Inv. Size**
  This value is the amount that was invested at the beginning of this trade, including the commission for the trade entry.

- **Shares**
  This value is the number of shares that were traded.

- **Bars**
  This value is the number of bars during which the trade was open.
  > Note: This value will be zero if the stop price was in the trading range for the bar that the trade was entered.

- **End Date**
  This value is the date that the trade was exited on.
  > Note: This will not be the same date as when the signal was generated. Since signals are generated at the end of a bar, this date is typically for the bar after the signal was generated.
  > Note: If the last trade in the analysis has not been exited, this value will display …".

Account Equity Section

- **Eq. Start**
  This value is the amount of equity in the account before the trade is entered.

- **Profit**
  This value is the amount by which the investment changed during the trade.

- **Commiss.**
  This value is the amount of commissions that were paid from the account. It includes both entry and exit commissions.

- **Eq. End**
  This value is the amount of equity in the account after the trade was exited.
  > Note: If the last trade in the analysis has not been exited, the current value of the trade will be evaluated using the basis for equity, rather than the current trading value.

- **Eq. %Chng**
  This value is the percent change in the equity from the start to the end of the trade.
  > Note: This value will only be the same as the gain/loss amount if the entire equity amount was traded.

Maximum Gain/Loss Section

- **End Gain**
  This value is the percentage change in the value that was invested. It is the same as Gain/Loss and is included here for comparison to the Max. Gain.

- **Max. Gain**

  This value is the maximum percentage increase in the value that was invested.

  Note: Max. Gain, Max. Loss, Max. Drop, and End Drop are based on the Trading Value and do not take the high and low into consideration. That is, these are the maximum gains and losses if the trade had been exited during any given bar.

- **Max. Loss**

  This value is the maximum percentage decrease in the value that was invested. This is equivalent to the Maximum Draw Down from Trade Entry.

- **Max. Drop**

  This value is the maximum percentage decrease in the value that was invested from the previous maximum increase. This is equivalent to the Maximum Draw Down from Trade High.

- **End Drop**

  This value is the percentage difference between the Max. Gain and the End Gain. It is useful for determining the amount that was lost by not exiting at the point of the maximum gain.

Stop/Limit Analysis Section

- **End Gain**

  This value is the percentage change in the value that was invested. It is the same as Gain/Loss and is included here for comparison to the Max. Gain.

- **Min. Stop**

  This is the minimum percentage that an exit stop could be placed at relative to the initial entry value so that the stop would not execute during the life of the trade.

  Note: Min. Stop and Min. Trail are based on the high and low and will differ from the values in the previous section, which are based only on the trading value.

- **Min. Trail**

  This is the minimum percentage that a trailing exit stop could be placed at so that the stop would not execute before the maximum gain is reached.

- **Initial Stop**

  This value indicates the initial stop price associated with this trade. It is set based on the entry price and does not reflect any trailing stops that may be used.

  Note: This value and the headroom below will not be displayed if stop orders are not being used.

- **Headroom**

  This value indicates the minimum difference between the stop price and the trading range as a percentage of the price used as a basis for the stop price. This is useful for determining if the stop percentage in a trading style can be decreased.

- **Max. Limit**

  This is the maximum percentage that an entry limit could be placed at so that the trade would still have occurred.

  Note: This value can be negative when the trading value is outside the trading range. This primarily occurs when the current close is used as the trading value.

Note: Due to the amount of data being displayed, the values after the percent change will typically be off the right hand side of the displayed. To view these values, move the horizontal scrollbar at the bottom of the grid.

How Did I Get Here?

This is a sub-page of the Modify Field Dialog: Signal Analysis page.

Signal Analysis Page: Analysis by Bar

The Modify Field Dialog allows you to analyze and modify the properties of a field. The Signal Analysis page allows you to analyze statistics associated with an entry/exit signal.

For help with entry/exit signals, see Creating and Analyzing Entry/Exit Signals.

Analysis by Bar Sub-Page

This sub-page displays the simulation activity on a bar-by-bar basis. The following information is provided.

Note: By default, the information is sorted by date. However, the information in any column can be sorted by double-clicking on the field heading. The direction of the sort can be reversed by double-clicking on the field heading again.

Copy Button

This button (in the lower-right corner of the grid) will copy the contents of the entire grid to your Windows clipboard. Once copied, you can paste the values into programs such as Microsoft Excel.

Overview Section

Date

This value is the date for the bar being analyzed.

Signal

This value is the signal that was generated on this bar.

Note: This is **not** the signal being executed on this bar.

Action Section

Action

This value is the type of trade that was executed on this bar.

Note: This column only displays a value if a new trade is being executed based on the values in the signal column.

Price

This value is the price associated with the action for this bar. If no new action is taking place, the equity basis price is displayed.

Stop Price

This value is the stop price associated with the current trade. If no trade is currently open, the stop price will not be set.

Results Section

Position

This value indicates the position that was held at the end of the bar. It may also include special information about the activity that occurred during that bar.

- **Long**
  Currently holding long position.
- **Short**
  Currently holding short position.
- **Out**
  Currently out of market.
- **Closed**

Currently out of market. The most recent position has been exited due to the intraday time.

- **Stopped**
  Currently out of market. The most recent position has been exited due to the stop price being reached. This may include trades entered on this same bar.

- **Limit Fail**
  Currently out of market. An attempt to enter the market was made on this bar, but the limit price was not reached.

- **Re-entry Fail**
  Currently out of market. An attempt to enter the market was made on this bar, but the criteria for re-entering a trade after a stop was not met.

- **Time Fail**
  Currently out of market. An attempt to enter the market was made on this bar, but the criteria for intraday time was not met.

☐ **%Change**
This value indicates the percent gain/loss in overall equity during the bar.

☐ **Equity**
This value displays the total account equity at the end of the bar.

Trading Values Section

☐ **Trade Value**
This value is the price used for the market entry price and the exit price of each trade.

Note: This value and the remaining values are determined by the fields selected in the trading style.

☐ **High Price**
This value is the price used to determine the high price of the trading range. The trading range is used to determine whether limit and stop orders are executed. It is also used to restrict the adjustment of percentage prices to available values.

☐ **Low Price**
This value is the price used to determine the low price of the trading range. The trading range is used to determine whether limit and stop orders are executed. It is also used to restrict the adjustment of percentage prices to available values.

☐ **Limit Basis**
This value is the price used to create the limit price by adding or subtracting the specified percentage from it.

☐ **Stop Basis**
This value is the price used to create the trailing stop price by adding or subtracting the specified percentage from it.

Note: The initial stop price does not use this value. It is set based on the entry price.

☐ **Equity Basis**
This value is the price used when determining the current equity in the analyzed trading account.

How Did I Get Here?

This is a sub-page of the Modify Field Dialog: Signal Analysis page.

Training Analysis Sub-pages

Training Analysis Page: Overview

The Modify Field Dialog allows you to analyze and modify the properties of a field. The Training Analysis page allows you to view an analysis of the prediction results versus the desired values.

For help with predictions, see Predicting and Modeling Financial Data.

Overview Sub-Page Data

This sub-page displays an overview of the training. The following information is provided.

- **Testing Summary**

  These values are a summary of the testing values that are displayed on the other sub-pages. For predictions of fields that are not signals, these values are displayed for the actual value and the percent change value. For predictions of signal fields, these values are displayed for the raw and postprocessed values.

  - **Normalized Error**

    These values are the normalized error of the difference between the desired values and the predicted values normalized using the last known value. For more information on these values, see the help for the Normalized Error sub-page.

  - **Correlation**

    These values are the statistical correlation between the desired values and the predicted values. For more information on these values, see the help for the Correlation sub-page.

  - **Directional Accuracy**

    This value is displays an analysis of the directional accuracy of the predicted values. For more information on this value, see the help for the Directional Accuracy sub-page.

  - **Accuracy (Non-Hold)**

    These values display an analysis of the directional accuracy of the predicted signals. For more information on these values, see the help for the Prediction Matrix sub-page.

- **Ranges**

  These values summarized the ranges of data used for the training, cross validation, and accuracy testing set.

  - **Starting Date / Ending Date**

    These values display the starting and ending date for this subset.

    Note: These date ranges can be adjusted on the Training Optimization Settings Dialog.

  - **Overall Samples**

    These values indicate the total number of samples that were available in this subset.

    Note: These sample sizes will often be different from the approximate sizes displayed on the Training Optimization Settings Dialog. This is because the approximate sizes do not take into account lagged, null, or conditional data.

  - **Changes Upward / Changes Downward**

    These values indicate the percentage of the overall samples in which the data changed upward or downward from the previous sample. This is useful for determining if a disproportionate number of samples changed in a given direction, which may cause the prediction to specialize on the predominant direction.

  - **Positive Signals / Negative Signals**

    These values indicate the percentage of the overall samples in which the signal was above or below the exit threshold. This is useful for determining if a disproportionate number of samples were for a certain signal type, which may cause the prediction to specialize on the predominant signal.

    Note: These percentages do not include hold signals.

Overview Sub-Page Analysis

The analysis presented on this page is based on the values displayed in the testing summary. TradingSolutions will try to find the best characteristic of the summary and highlight it. This can be useful for determining how a model can best be used.

The evaluation of models is very abstract. Models that are classified as excellent" or good" may be good at mirroring the desired data, but may not predict the values in a way that is useful in the way that was intended. Similarly, models that are classified as poor" may produce values that are still useful. The analysis text is simply provided as a starting point for evaluating the model as a whole.

If a problem occurred during the training or calculation phase, the analysis will be replaced with a description of the error. A summary of these error messages is displayed on the help for the Modify Field Dialog: Training Analysis page.

Overview Sub-Page Actions

To retrain the network immediately, press the **Retrain Prediction** button. To resume the existing training from where if left off, press the **Resume Training** button.

> Note: If any settings relating to the training of the prediction have been changed since the last training, the resume button will not be available.

To view the postprocessing values associated with a predicted signal, press the **View Postprocessing…** button. This will display the Signal Postprocessing Settings Dialog.

How Did I Get Here?

This is a sub-page of the Modify Field Dialog: Training Analysis page.

Training Analysis Page: Learning Curve

The Modify Field Dialog allows you to analyze and modify the properties of a field. The Training Analysis page allows you to view an analysis of the prediction results versus the desired values.

For help with predictions, see Predicting and Modeling Financial Data.

Learning Curve Sub-Page Data

This sub-page displays the learning curve of the best training pass. The learning curve is a graph of the internal error of the neural network over each epoch of training. This is the same graph that is displayed on the Status Dialog during training.

Note: The internal error of the neural network can be substantially different from the Normalized Errors reported in TradingSolutions. The internal errors being reported are the cost" associated with the criterion component of the neural network. Typically, this is the Mean Squared Error (MSE) for the normalized values in the neural network. The values in TradingSolutions have been denormalized from their neural network values and the associated errors are then normalized using the last known values".

The learning curve for the training set and the cross validation set should both decrease over time. Bumps during the initial epochs are acceptable, but both curves should be mostly horizontal when training ends. Over time, the learning curve for the cross validation set will typically begin to increase as the prediction begins to over-specialize on the training data.

Note: The training weights from the neural network are saved at the point of the best cross validation error.

Note: If learning criteria options, such as optimizing for directional accuracy, are being used, the learning curves may not be as smooth as those when the options are not used. These options can be enabled or disabled from the Prediction Model page.

In addition to the learning curve, the following statistics are displayed.

- **Total Time**

  This value indicates the total amount of time that was taken to train this prediction, including all passes. If the training of this prediction is restarted, this value is zeroed before being updated.

- **Epoch of Best**

  This value indicates which epoch produced the best error for the cross validation set.

- **Total Epochs**

  This value indicates the number of times the training set was presented to the neural network during the training phase. Training may stop before the maximum number of epochs if the error on the cross validation set does not decrease over a given number of epochs, set on the Modify Training Settings Dialog. Training will also stop if the **Stop Training** button is pressed on the Status Dialog.

  Note: If the maximum number of epochs is reached and cross validation is being used, more learning may be possible by resuming training with a higher maximum number of epochs. The maximum number of epochs can be increased manually from the Modify Training Settings Dialog.

Adjusting Chart Ranges

The epoch and value axes can be scaled to display specific portions of the data. The options for doing this are similar to those associated with the Chart View. For more information, see Adjusting Chart Ranges.

Learning Curve Sub-Page Analysis

The analysis presented on this page detects common characteristics of learning curves and recommends actions, if appropriate. Some common results include:

- **The best training weights were found in epoch #n.**

  This is the normal analysis condition. The error on the cross validation was lowest at the reported epoch. Using the typical training values, TradingSolutions will continue training for 50 epochs after this value.

- **The best training weights were found close to the end of training. Continued training may produce better results.**

The error on the cross validation was lowest within a few epochs of the end of training. Typically, this indicates that better results can be achieved by resuming the training. The training can be resumed at any time by pressing the **Resume Training** button on the Overview sub-page.

- **No significant learning appears to have taken place.**

  This message appears when the best cost occurred on the first epoch.

If a problem occurred during the training or calculation phase, the analysis will be replaced with a description of the error. A summary of these error messages is displayed on the help for the Modify Field Dialog: Training Analysis page.

How Did I Get Here?

This is a sub-page of the Modify Field Dialog: Training Analysis page.

Training Analysis Page: Normalized Error

The Modify Field Dialog allows you to analyze and modify the properties of a field. The Training Analysis page allows you to view an analysis of the prediction results versus the desired values.

For help with predictions, see Predicting and Modeling Financial Data.

Normalized Error Sub-Page Data

This sub-page displays an analysis of the difference between the desired values and the predicted values. This value is normalized using the difference between the desired values and the last known values. This produces an error value in which 0 indicates no error and 1 indicates that the prediction was no better than simply repeating the last known values.

error = 0	perfect prediction
error < 1	prediction better than last known value
error = 1	prediction of previous value
error > 1	prediction worse than last known value

When predicting values using change or percent change, this number is especially significant. An error of around 1 indicates that the network typically predicted a change or percent change of zero. This is a common occurrence and typically indicates that the neural network does not have adequate information to make a valid prediction. As a result, it ends up predicting the mean of all of the changes, which is typically 0.

The last known value" for predictions of one sample in advance or more is the current value of the desired output. For models of the current value, it is the previous value of the desired output.

Note: For predictions of two samples or more in advance, this can result in smaller normalized errors since the change in the desired value is typically much larger. This does not mean that these predictions are better than zero or one samples in advance models, just that the normalization results in different results.

The analysis is performed for the training, cross validation, and accuracy testing sets used for the prediction. Each type of analysis is performed on the entire subset. In addition, each type of analysis is also performed for when the value is predicted to increase or decrease. This is useful for determining if predictions in a particular direction are more accurate than others.

Note: If a value associated with a predicted direction is listed as n/a", no predictions were made in that direction.

A normalized error value is calculated for both the actual values and the change or percent change values. Typically, these values are very similar.

Normalized Error Sub-Page Analysis

The analysis presented on this page is based on the normalized error values. It detects common characteristics to look for in the data and is intended only as a starting point for evaluating the model. Some common results include:

- **This might be a good / reasonable / weak predictive model.**

  This is an analysis of the error in the testing set. If no testing set is used, the cross validation or training set error is used. The following table is used:

error < .80	excellent model
error < .85	very good model
error < .90	good model
error < .95	reasonable model
error >= .95	weak model

  The evaluation of models in this way is very abstract. Models that are classified as excellent" or good" may be good at mirroring the desired data, but may not predict the values in a way that is useful in the way that was intended. Similarly, models that are classified as weak" may produce values that are still useful. As stated above, this is intended only as a starting point for evaluating the model.

- **It performed better / worse than simply predicting the last value.**

This is an explanation of the rationale for the analysis text. As explained above, an error of 1 is equivalent to predicting the previous value. Therefore, the effectiveness of the model is based on its improvement over simply predicting the last known value.

- **It is specialized on the training data.**

  This is an analysis of the error in the testing set as compared to the error in the training set. If no testing set is used, the error in the cross validation set is used.

  This is significant when determining whether the training has produced a model that is good at making generalizations outside of the training set. If a model over-trains or simply memorizes the training data, it may perform very well at predicting values in the training set; however, it will tend to perform poorly at predicting the values outside of the training set. A good predictive model will perform equally well on data in the training, cross validation, and testing sets.

  This message may appear if the samples to weights ratio is not adequate for the type of data being used. A good rule of thumb is to have about ten training samples for each weight in the network. Significantly lower ratios may allow the neural network to simply use the weights to memorize the data, rather than make effective generalizations about its characteristics. See the Prediction Model page for a report of this ratio and help for improving it.

- **It is specialized on upward / downward trends.**

  This is an analysis of the error across all data sets, comparing the error when upward changes are predicted to the error when downward changes are predicted. If the error is significantly better for predictions in a given direction, the model may be specialized on predicting changes in that direction. This is significant when determining whether directional information from the prediction is useful.

  This message may appear when the training set contains data that trends mostly in the reported direction. In this case, the network may determine that the average change is in a given direction and use that average change when it does not have enough information to correctly predict a value. A report of the actual number of changes up and down is on the Overview sub-page.

- **It is only producing upward / downward predictions for this data.**

  This is an analysis of the error across all data sets. It indicates that a model is predicting changes in only one direction. If the training set does not contain predominantly changes in one direction, this is typically an indication that the model did not have enough relevant information to produce an effective model.

If a problem occurred during the training or calculation phase, the analysis will be replaced with a description of the error. A summary of these error messages is displayed on the help for the Modify Field Dialog: Training Analysis page.

How Did I Get Here?

This is a sub-page of the Modify Field Dialog: Training Analysis page.

Training Analysis Page: Correlation

The Modify Field Dialog allows you to analyze and modify the properties of a field. The Training Analysis page allows you to view an analysis of the prediction results versus the desired values.

For help with predictions, see Predicting and Modeling Financial Data.

Correlation Sub-Page Data

This sub-page displays an analysis of the statistical correlation between the desired values and the predicted values. Specifically, the reported correlation coefficient is an analysis of whether the desired values and the predicted values move in the same direction by similar amounts. If a strong relationship is found, the changes in the predicted values are very similar to the changes in the desired values.

A correlation value of 1 indicates that both values change by the same amount for each sample. A value of 0 indicates that there is no correlation between the changes in the values. Negative values indicate that the values move in opposite directions.

correlation = 1	perfect correlation
correlation = 0	no correlation found
correlation = -1	inverse correlation

A correlation value is calculated for both the actual values and the change or percent change values. When predicting using change or percent change values, the correlation of the actual values is typically very high. This is because the desired and predicted changes are typically very similar relative to the scale of the data. However, the change and percent change values are evaluated relative to the scale of the other changes. Therefore, this can be a more accurate analysis of the effectiveness of the model.

The analysis is performed for the training, cross validation, and accuracy testing sets used for the prediction. Each type of analysis is performed on the entire subset. In addition, each type of analysis is also performed for when the value is predicted to increase or decrease. This is useful for determining if predictions in a particular direction are more accurate than others.

Note: If a value associated with a predicted direction is listed as n/a", no predictions were made in that direction.

Correlation Sub-Page Analysis

The analysis presented on this page is based on the correlation values. It detects common characteristics to look for in the data and is intended only as a starting point for evaluating the model. Some common results include:

- **This might be a good / reasonable / weak correlational model.**

  This is an analysis of the correlation in the testing set. If no testing set is used, the cross validation or training set error is used. The following table is used:

correlation > .20	excellent model
correlation > .15	very good model
correlation > .10	good model
correlation > .05	reasonable model
correlation <= .05	weak model

  The evaluation of models in this way is very abstract. Models that are classified as excellent" or good" may be good at mirroring the desired data, but may not predict the values in a way that is useful in the way that was intended. Similarly, models that are classified as weak" may produce values that are still useful. As stated above, this is intended only as a starting point for evaluating the model.

- **It produced values with a strong / weak correlation to the desired data.**

  This is an explanation of the rationale for the analysis text. As explained above, a higher correlation is desirable. If an inverse correlation is reported, this is generally not a desirable characteristic, since the model is supposed to be training to produce results similar to the desired data, not opposite to it.

- **It is specialized on the training data.**

This is an analysis of the correlation in the testing set as compared to the correlation in the training set. If no testing set is used, the correlation in the cross validation set is used.

This is significant when determining whether the training has produced a model that is good at making generalizations outside of the training set. If a model over-trains or simply memorizes the training data, it may perform very well at predicting values in the training set; however, it will tend to perform poorly at predicting the values outside of the training set. A good predictive model will generally perform equally well on data in the training, cross validation, and testing sets.

This message may appear if the samples to weights ratio is not adequate for the type of data being used. A good rule of thumb is to have about ten training samples for each weight in the network. Significantly lower ratios may allow the neural network to simply use the weights to memorize the data, rather than make effective generalizations about its characteristics. See the Prediction Model page for a report of this ratio and help for improving it.

- **It is specialized on upward / downward trends.**

  This is an analysis of the correlation across all data sets, comparing the correlation when upward changes are predicted to the correlation when downward changes are predicted. If the correlation is significantly better for predictions in a given direction, the model may be specialized on predicting changes in that direction. This is significant when determining whether directional information from the prediction is useful.

  This message may appear when the training set contains data that trends mostly in the reported direction. In this case, the network may determine that the average change is in a given direction and use that average change when it does not have enough information to correctly predict a value. A report of the actual number of changes up and down is on the Overview sub-page.

- **It is only producing upward / downward predictions for this data.**

  This is an analysis of the correlation across all data sets. It indicates that a model is predicting changes in only one direction. If the training set does not contain predominantly changes in one direction, this is typically an indication that the model did not have enough relevant information to produce an effective model.

If a problem occurred during the training or calculation phase, the analysis will be replaced with a description of the error. A summary of these error messages is displayed on the help for the Modify Field Dialog: Training Analysis page.

How Did I Get Here?

This is a sub-page of the Modify Field Dialog: Training Analysis page.

Training Analysis Page: Directional Accuracy

The Modify Field Dialog allows you to analyze and modify the properties of a field. The Training Analysis page allows you to view an analysis of the prediction results versus the desired values.

For help with predictions, see Predicting and Modeling Financial Data.

Directional Accuracy Sub-Page Data

This sub-page displays an analysis of the directional accuracy of the predicted values. Specifically, it reports whether the predicted values increase or decrease at the same time as the desired values. This is useful for determining if the direction of change in the predicted values is useful even when the error or correlation values are marginal.

The values are presented as a percentage of samples in which the direction was predicted correctly. A directional accuracy of 100% would indicate that the predicted changes for every sample were in the correct direction. A directional accuracy of 50% would indicate that the direction was correct half the time, which would be equivalent to flipping a coin and choosing a random direction.

accuracy = 100%	perfect accuracy
accuracy = 50%	no directional accuracy
accuracy = 0%	perfect inverse

The analysis is performed for the training, cross validation, and accuracy testing sets used for the prediction. Each type of analysis is performed on the entire subset. In addition, each type of analysis is also performed for when the value is predicted to increase or decrease. This is useful for determining if predictions in a particular direction are more accurate than others.

Note: If a value associated with a predicted direction is listed as n/a", no predictions were made in that direction.

Since directional accuracy is based on the change from the previous value, only one report is displayed.

Directional Accuracy Sub-Page Analysis

The analysis presented on this page is based on the directional accuracy values. It detects common characteristics to look for in the data and is intended only as a starting point for evaluating the model. Some common results include:

- **This might be a good / reasonable / weak directional model.**

  This is an analysis of the directional accuracy in the testing set. If no testing set is used, the cross validation or training set directional accuracy is used. The following table is used:

accuracy > 70%	excellent model
accuracy > 65%	very good model
accuracy > 60%	good model
accuracy > 55%	reasonable model
accuracy <= 55%	weak model

  The evaluation of models in this way is very abstract. Models that are classified as excellent" or good" may be good at mirroring the desired data, but may not predict the values in a way that is useful in the way that was intended. Similarly, models that are classified as weak" may produce values that are still useful. As stated above, this is intended only as a starting point for evaluating the model.

- **It predicted the direction of changes better / worse than simply predicting a random direction.**

  This is an explanation of the rationale for the analysis text. As explained above, a directional accuracy of 50% is equivalent to predicting a random direction. Therefore, the effectiveness of the model is based on it improving over selecting a random direction.

- **It is specialized on the training data.**

  This is an analysis of the directional accuracy for the testing set as compared to the directional accuracy for the training set. If no testing set is used, the directional accuracy for the cross validation set is used.

  This is significant when determining whether the training has produced a model that is good at making generalizations outside of the training set. If a model over-trains or simply memorizes the training data, it may

perform very well at predicting values in the training set; however, it will tend to perform poorly at predicting the values outside of the training set. A good predictive model will perform equally well on data in the training, cross validation, and testing sets.

This message may appear if the samples to weights ratio is not adequate for the type of data being used. A good rule of thumb is to have about ten training samples for each weight in the network. Significantly lower ratios may allow the neural network to simply use the weights to memorize the data, rather than make effective generalizations about its characteristics. See the Prediction Model page for a report of this ratio and help for improving it.

- **It is specialized on upward / downward trends.**

  This is an analysis of the directional accuracy across all data sets, comparing the directional accuracy when upward changes are predicted to the directional accuracy when downward changes are predicted. If the directional accuracy is significantly better for predictions in a given direction, the model may be specialized on predicting changes in that direction. This is significant when determining whether directional information from the prediction is useful.

  This message may appear when the training set contains data that trends mostly in the reported direction. In this case, the network may determine that the average change is in a given direction and use that average change when it does not have enough information to correctly predict a value. A report of the actual number of changes up and down is on the Overview sub-page.

- **It is only producing upward / downward predictions for this data.**

  This is an analysis of the directional accuracy across all data sets. It indicates that a model is predicting changes in only one direction. If the training set does not contain predominantly changes in one direction, this is typically an indication that the model did not have enough relevant information to produce an effective model.

If a problem occurred during the training or calculation phase, the analysis will be replaced with a description of the error. A summary of these error messages is displayed on the help for the Modify Field Dialog: Training Analysis page.

How Did I Get Here?

This is a sub-page of the Modify Field Dialog: Training Analysis page.

Training Analysis Page: Training Optimization

The Modify Field Dialog allows you to analyze and modify the properties of a field. The Training Analysis page allows you to view an analysis of the prediction results versus the desired values.

For help with predictions, see Predicting and Modeling Financial Data.

Training Optimization Sub-Page Data

This sub-page displays a graph of the fitness for each generation of the genetic optimization. This graph is the same graph that appears on the Status Dialog during optimization.

Note: The lower limit of this chart is limited to a specific value to ensure that the most relevant values are displayed. Optimization fitness values can be penalized if they do not meet certain criteria, resulting in large negative values which can distort the chart making it hard to differentiate relevant values.

In addition to the optimization curve, the following statistics are displayed.

- **Total Time**

  This value indicates the total amount of time that was taken in this genetic phase, including all passes. The maximum amount of time can be adjusted on the Modify Genetic Algorithm Settings Dialog.

- **Generation Yielding Best**

  This value indicates which generation produced the best fitness. If cross validation was being used to stop the optimization, the generation with the best cross validation is indicated.

- **Total Generations**

  This value indicates the number of generations that were run in the genetic optimization phase. The maximum number of generations can be adjusted on the Modify Genetic Algorithm Settings Dialog.

This sub-page is available if genetic optimization has previously been used to optimize this field. It continues to be available even if the model is trained afterwards without genetic optimization. If multiple genetic optimizations are performed on one field, only the statistics from the last optimization are displayed.

Adjusting Chart Ranges

The generation and value axes can be scaled to display specific portions of the data. The options for doing this are similar to those associated with the Chart View. For more information, see Adjusting Chart Ranges.

Training Optimization Sub-Page Analysis

The analysis presented on this page detects common characteristics of learning curves and recommends actions, if appropriate. Some common results include:

- **The best improvement on the learning was found in generation #n.**

  This is the normal analysis condition. The last improvement on the best cost occurred at the reported epoch.

- **The best improvement on the learning was found close to the end of optimization. Continued optimization may produce better results.**

  The last improvement on the best cost occurred within a few generations of the end of optimization. Typically, this indicates that better results can be achieved by performing more optimization. Optimization can be resumed on the next training by selecting **Re-optimize neural network inputs and settings on save** on the Training Settings page.

- **No improvement on the signal/learning was found during optimization.**

  This message appears when the best cost occurred in the initial generation.

If a problem occurred during the training or calculation phase, the analysis will be replaced with a description of the error. A summary of these error messages is displayed on the help for the Modify Field Dialog: Training Analysis page.

How Did I Get Here?

This is a sub-page of the Modify Field Dialog: Training Analysis page.

Training Analysis Page: Error Analysis

The Modify Field Dialog allows you to analyze and modify the properties of a field. The Training Analysis page allows you to view an analysis of the prediction results versus the desired values.

For help with predictions, see Predicting and Modeling Financial Data.

Error Analysis Sub-Page Data

This sub-page displays an analysis of the error, correlation, and percent of correct signals for both the raw values and the postprocessed values.

Normalized Error

This value is an analysis of the difference between the desired values and the predicted values. This value is divided by the difference between the desired value and the previous value. This produces a normalized error value in which 0 indicates no error and 1 indicates that the prediction was no better than simply repeating the previous value. For more information on this value, see the help for the Normalized Error sub-page.

Correlation

This value is an analysis of the statistical correlation between the desired values and the predicted values. Specifically, the reported correlation coefficient is an analysis of whether the desired values and the predicted values move in the same direction by similar amounts. If a strong relationship is found, the changes in the predicted values are very similar to the changes in the desired values. For more information on this value, see the help for the Correlation sub-page.

Percent Correct Signal

This value is an analysis of the overall direction of the predicted signal. This information is analyzed in detail on the Prediction Matrix sub-page.

The analysis is performed for the training, cross validation, and accuracy testing sets used for the prediction. Each type of analysis is performed on the entire subset.

Error Analysis Sub-Page Analysis

The analysis presented on this page is based on the normalized error and correlation values. It detects common characteristics to look for in the data and is intended only as a starting point for evaluating the model. Some common results include:

- **This might be a good / reasonable / poor predictive model.**

  This is an analysis of the error in the testing set. If no testing set is used, the cross validation or training set error is used. The following table is used:

error < .80	excellent model
error < .85	very good model
error < .90	good model
error < .95	reasonable model
error >= .95	poor model

  The evaluation of models in this way is very abstract. Models that are classified as excellent" or good" may be good at mirroring the desired data, but may not predict the values in a way that is useful in the way that was intended. Similarly, models that are classified as weak" may produce values that are still useful. As stated above, this is intended only as a starting point for evaluating the model.

- **It performed better / worse than simply predicting the last value.**

  This is an explanation of the rationale for the analysis text. As explained above, an error of 1 is equivalent to predicting the previous value. Therefore, the effectiveness of the model is based on its improvement over simply predicting the last known value.

- **This might be a good / reasonable / weak correlational model.**

  This is an analysis of the correlation in the testing set. If no testing set is used, the cross validation or training set error is used. The following table is used:

correlation > .20	excellent model

correlation > .15	very good model
correlation > .10	good model
correlation > .05	reasonable model
correlation <= .05	poor model

The evaluation of models in this way is very abstract. Models that are classified as excellent" or good" may be good at mirroring the desired data, but may not predict the values in a way that is useful in the way that was intended. Similarly, models that are classified as weak" may produce values that are still useful. As stated above, this is intended only as a starting point for evaluating the model.

- **It produced values with a strong / weak correlation to the desired data.**

  This is an explanation of the rationale for the analysis text. As explained above, a higher correlation is desirable. If an inverse correlation is reported, this is generally not a desirable characteristic, since the model is supposed to be training to produce results similar to the desired data, not opposite to it.

If a problem occurred during the training or calculation phase, the analysis will be replaced with a description of the error. A summary of these error messages is displayed on the help for the Modify Field Dialog: Training Analysis page.

How Did I Get Here?

This is a sub-page of the Modify Field Dialog: Training Analysis page.

Training Analysis Page: Prediction Matrix

The Modify Field Dialog allows you to analyze and modify the properties of a field. The Training Analysis page allows you to view an analysis of the prediction results versus the desired values.

For help with predictions, see Predicting and Modeling Financial Data.

Prediction Matrix Sub-Page Data

This sub-page displays an analysis of the accuracy of predicted entry/exit signals. Specifically, it reports how often each type of signal was predicted as compared to the desired signals. This is useful for determining the nature of incorrectly predicted signals.

There are several sections to the data being presented. Each section is divided into separate columns for training, cross validation, and testing data. Typically, the testing data is of primary importance since it is not used for training and will most closely resemble the behavior on any new data.

Heading

The total and desired sections are present for each type of predicted signal. These signals are displayed using the following symbols:

	Enter Long	>= 0.50
	Exit Short	>= 0.20
	Hold	
	Exit Long	<= -0.20
	Enter Short	<= -0.50

Total

These values are the percentage of the outputs from each training set that produced each type of predicted signal. These values total 100% for each training set, but may sum to a different number if rounding occurs.

Example: A 42% in the first sub-column indicates that 42% of the signals produced in the training set were enter long.

Desired

These values are the percentage of the outputs from each training set that produced each type of predicted signal, broken down by desired signal. These 25 values total 100% for each training set, but may sum to a different number if rounding occurs.

The values are color-coded to differentiate matches in correct and incorrect directions.

Background	Meaning
White	Perfect Match
Light Gray	Correct Direction
Dark Gray	Neutral – Hold Expected or Produced
Light Pink	Incorrect Direction
Dark Pink	Incorrect Entry

Neutral

This value indicates the total percentage of the outputs that were not in the incorrect direction. In other words, all of the white, light gray, and dark gray values in the desired section.

Note: A high neutral percentage is not always useful prediction. If the prediction signal produces primarily hold signals, it could be up to 100% neutral.

Correct

This value indicates the total percentage of the outputs that were in the correct direction. In other words, all of the white and light gray values in the desired section.

Perfect

This value indicates the total percentage of the outputs that matched the desired signal. In other words, all of the white values in the desired section.

Prediction Matrix Sub-Page Analysis

The analysis presented on this page is based on the directional accuracy values. It detects common characteristics to look for in the data and is intended only as a starting point for evaluating the model. Some common results include:

- **This might be a good / reasonable / weak directional model.**

  This is an analysis of the directional accuracy in the testing set. It uses the percent correct direction for the values not in the dark gray cells. In other words, values that were predicted as a hold or desired to be a hold, but did not match, are ignored. If no testing set is used, the cross validation or training set directional accuracy is used. The following table is used:

accuracy > 65%	excellent model
accuracy > 55%	very good model
accuracy > 45%	good model
accuracy > 35%	reasonable model
accuracy <= 35%	weak model

  The evaluation of models in this way is very abstract. Models that are classified as excellent" or good" may be good at mirroring the desired data, but may not predict the values in a way that is useful in the way that was intended. Similarly, models that are classified as weak" may produce values that are still useful. As stated above, this is intended only as a starting point for evaluating the model.

- **It is specialized on the training / cross validation data.**

  This is an analysis of the directional accuracy for the testing set as compared to the directional accuracy for the training set. If no testing set is used, the directional accuracy for the cross validation set is used.

  This is significant when determining whether the training has produced a model that is good at making generalizations outside of the training set. If a model over-trains or simply memorizes the training data, it may perform very well at predicting values in the training set; however, it will tend to perform poorly at predicting the values outside of the training set. A good predictive model will perform equally well on data in the training, cross validation, and testing sets.

  Since the postprocessing values may be optimized on the cross validation data, the directional accuracy of the cross validation set will also be compared to that of the testing set if both are used.

  This message may appear if the samples to weights ratio is not adequate for the type of data being used. A good rule of thumb is to have about ten training samples for each weight in the network. Significantly lower ratios may allow the neural network to simply use the weights to memorize the data, rather than make effective generalizations about its characteristics. See the Prediction Model page for a report of this ratio and help for improving it.

- **Many of its long / short entry signals are contrary to the desired signal.**

  This is an analysis of the entry signals. Specifically, this message appears if at least 15% of the entry signals of a given type are being produced when the desired signal is in the opposite direction. This is useful for determining the reliability of the entry signals.

- **It is only producing hold signals.**

  This message is generated to indicate that only hold signals are being produced. This results in the model not producing any trades during signal analysis.

  This can occur if postprocessing is not used or it is not optimized for the current prediction. This is because the values produced by the neural network are all between the thresholds for exit long and exit short.

- **It is not producing entry signals.**

  This message is generated to indicate that no entry signals are being produced. This results in the model not producing any trades during signal analysis.

  This can occur if postprocessing is not used or it is not optimized for the current prediction. This is because the values produced by the neural network are all between the thresholds for enter long and enter short.

- **It is not producing long / short exit signals.**

  This message is generated when the indicated type of exit signal is not being generated. This results in the model entering one type of trade and not exiting it. Typically, this results in a delayed buy and hold signal.

This can occur when the underlying data moves primarily in one direction, resulting in a profitable buy and hold. If the model of the signal is not particularly good, the optimization of the postprocessing will simply optimize the entry condition and never exit.

- **It is specialized on positive / negative signals.**

  This is an analysis of the directional accuracy in the testing set, comparing the percentage of positive signals to negative signals. This is useful for determining the reliability of the signals.

If a problem occurred during the training or calculation phase, the analysis will be replaced with a description of the error. A summary of these error messages is displayed on the help for the Modify Field Dialog: Training Analysis page.

How Did I Get Here?

This is a sub-page of the Modify Field Dialog: Training Analysis page.

Training Analysis Page: Postprocessing Optimization

The Modify Field Dialog allows you to analyze and modify the properties of a field. The Training Analysis page allows you to view an analysis of the prediction results versus the desired values.

For help with predictions, see Predicting and Modeling Financial Data.

Postprocessing Optimization Sub-Page Data

This sub-page displays a graph of the fitness for each generation of the genetic optimization. This graph is the same graph that appears on the Status Dialog during optimization.

Note: The lower limit of this chart is limited to a specific value to ensure that the most relevant values are displayed. Optimization fitness values can be penalized if they do not meet certain criteria, resulting in large negative values which can distort the chart making it hard to differentiate relevant values.

In addition to the optimization curve, the following statistics are displayed.

- **Total Time**

  This value indicates the total amount of time that was taken in this genetic phase, including all passes. The maximum amount of time can be adjusted on the Modify Genetic Algorithm Settings Dialog.

- **Generation Yielding Best**

  This value indicates which generation produced the best cost.

- **Total Generations**

  This value indicates the number of generations that were run in the genetic optimization phase. The maximum number of generations can be adjusted on the Modify Genetic Algorithm Settings Dialog.

This sub-page is available if genetic optimization has previously been used during the postprocessing of this field. It continues to be available even if the postprocessing settings are modified afterwards without genetic optimization. If multiple genetic optimizations are performed on one field, only the statistics from the last optimization are displayed.

Adjusting Chart Ranges

The generation and value axes can be scaled to display specific portions of the data. The options for doing this are similar to those associated with the Chart View. For more information, see Adjusting Chart Ranges.

Postprocessing Optimization Sub-Page Analysis

The analysis presented on this page detects common characteristics of learning curves and recommends actions, if appropriate. Some common results include:

- **The best improvement on the learning was found in generation #n.**

  This is the normal analysis condition. The last improvement on the best cost occurred at the reported epoch.

- **The best improvement on the learning was found close to the end of optimization. Continued optimization may produce better results.**

  The last improvement on the best cost occurred within a few generations of the end of optimization. Typically, this indicates that better results can be achieved by performing more optimization. Optimization can be restarted from the Signal Postprocessing Values Dialog.

- **No improvement on the signal/learning was found during optimization.**

  This message appears when the best cost occurred in the initial generation.

If a problem occurred during the training or calculation phase, the analysis will be replaced with a description of the error. A summary of these error messages is displayed on the help for the Modify Field Dialog: Training Analysis page.

How Did I Get Here?

This is a sub-page of the Modify Field Dialog: Training Analysis page.

Modify Function Definition Dialog

Modify Group Dialog / Modify Portfolio Dialog

Modify Group Dialog: Properties

The Modify Group Dialog allows you to analyze and change the properties associated with a portfolio or portfolio subgroup. The Properties page allows you to change the name of the selected group and many of the properties of the underlying data. It also provides you with several quick actions that you can perform on the selected group.

For help with groups, see Managing Data with the Portfolio View.

Modifying Group Properties

The following settings are available for this group.

Group Name

This is the name of the group.

Note: Changes to this value will not occur until you press the **Apply Changes** button.

Modifying Underlying Data Properties

The following settings are available for the data contained in this group.

Note: Any changes to these settings will affect all of the data contained in this group. The changes will only be made when the **Apply Changes** button is pressed.

Periodicity

This value is a report of the periodicities of the data currently in this group. The value cannot be modified.

Exchange

This setting defines the exchange for which this data is associated. This is used primarily for determining when new data is available for updates.

Note: If the underlying data is defined as being from multiple exchanges, this entry will indicate **<Multiple Exchanges>**. This value will not change the underlying data if **Apply Changes** is pressed.

Note: If you would like to create a new exchange, press the **Edit…** button. This will display the Define Exchanges Dialog.

Data Source

This setting indicates where the data for the data series in this group is imported from.

Note: If all of the underlying data is defined as being imported from files or manually entered, this entry will indicate **<Files or None>**.

Note: If the underlying data is defined as using multiple data sources, this entry will indicate **<Multiple Data Sources>**. This value will not change the underlying data if **Apply Changes** is pressed.

☑ **Update when group is updated.**

This setting indicates whether the data in this group is updated when **Update data in the target group** is selected in the Import Data Wizard.

Note: This setting is useful for adding or removing entire subgroups from updates of the entire portfolio.

Note: This setting can be overridden for individual updates from the Update Options Dialog.

Note: This checkbox may appear slightly grayed, indicating some data has this option checked and some does not. This state will not change the underlying data if **Apply Changes** is pressed.

☑ **Include in intraday streaming updates.**

This setting indicates whether the intraday data in this group is updated when streaming is turned on.

For help with streaming data, see Streaming Intraday Data.

Note: This setting is only available when intraday day is included in this group.

Note: This checkbox may appear slightly grayed, indicating some data has this option checked and some does not. This state will not change the underlying data if **Apply Changes** is pressed.

Performing Quick Actions on a Group

This page has several different Quick Action buttons, which allow you to perform tasks on this group directly from the Modify Group Dialog. Most of these tasks are also available from other locations.

The following Quick Actions can be performed from this page:

- **Create / Modify Fields**
  This button displays the Data Fields page, which allows you to add new fields, as well as modify and delete existing fields in the selected group.

- **Create / Modify Subgroups**
  This button displays the Subgroups page, which allows you to add and delete subgroups to the selected group.

- **Change Display Fields**
  This button displays the Display page, which allows you to add, delete, and reorder the fields that are displayed in the Portfolio View for the selected group.

- **Import Data**
  This button displays the Import Data Wizard with the selected group as the target group.

- **Update Solution Service**
  This button updates the Solution Service.

  Note: This button appears for groups associated with the Solution Service in place of the Import Data button.

  For help with the Solution Service, see The TradingSolutions Solution Service.

What Do I Do Next?

When you are finished making any changes, press the **Close** button or select another property page. However, note that any changes on the Name page will not occur unless the **Apply Changes** button is pressed.

Additional Property Pages

The Modify Portfolio Dialog and Modify Group Dialog have the following property pages.

Properties
This page allows you to change the name of the selected group, as well as providing you with several quick actions to perform on it.

Data Fields
This page allows you to add new fields, as well as modify and delete existing fields in the selected group.

Subgroups
This page allows you to add and delete subgroups to the selected group.

Display
This page allows you to add, delete, and reorder the fields that are displayed in the Portfolio View for the selected group.

For help using property pages, see the help for Property Pages.

How Did I Get Here?

The Name property page appears when you select **Group Properties…** from the context menu for the portfolio or a portfolio subgroup in the Portfolio View. It also appears if you double-click on a group in the Portfolio View.

Modify Group Dialog: Data Fields

The Modify Group Dialog allows you to analyze and change the properties associated with a portfolio or portfolio subgroup. The Data Fields page allows you to add new fields, as well as modify and delete existing fields in the selected group.

In addition to working with the data fields defined for the selected portfolio or subgroup, placeholders are provided for the data fields in any underlying data series. This is useful for modifying the display format of fields sharing a common name or deleting those fields.

If no data series are currently included in this group, no options will be available from this page.

Understanding Group-Level Data Fields

There are two types of fields displayed on this page.

- **Overlays of Fields Defined at Other Levels**

  Typically, the majority of the fields that are displayed on this page are defined for specific data series. For example, raw data fields such as High, Low, Open, and Close are all defined for each data series individually. In addition, much of the processing and predicting that you perform will be on a data series-by-data series basis. However, all of these fields are listed here. This allows you to perform actions against all of the fields in a group with the same name. For example, you can delete all of the fields with a certain name. You can also create calculations and predictions for an entire group using fields common to all of the data series in that group.

- **Group-Level Field Definitions**

  The other type of field that is displayed on this page are fields that are defined for this group. For example, you can create a calculation or prediction for all of the data series in this group. Even after it is created, the definition remains at the group level. This allows you to make any modifications to this definition in only one place. It also ensures that if new data is added to this group, any definitions for the group will be applied to that new data.

Working with Fields

To create a new field for every data series in the selected group, press the **New…** button. This will display the Create a Field Wizard where you can define the properties of the new field.

Note: If you only want a field to apply to a few of the underlying data series, consider creating the new field only on those data series or placing those data series in a subgroup and creating the field there.

To modify an existing field, select the field in the selection tree, then press the **Modify...** button. This will display the Modify Field Dialog. You can also modify a field by double-clicking the field name in the selection tree.

To make a copy of an existing field, select the field in the selection tree, then press the **Copy** button. This will create a copy of the definition of the field.

Note: The copy option is only available for definitions for the entire group.

Note: The training weights associated with predictions will not be copied when a group prediction is copied.

To delete an existing field, select the field in the selection tree, then press the **Delete** button. If the field is not currently being used for other calculations, your action will be confirmed and the field will be deleted in all of the underlying data series.

Warning: Before you delete a field, make sure that you no longer need it. After deleting a field, you will not be able to get it back without using the steps you used to create it.

For help using the selection tree, see the help for Selection Trees.

What Do I Do Next?

When you are finished making any changes, press the **Close** button or select another property page.

Additional Property Pages

The Modify Portfolio Dialog and Modify Group Dialog have the following property pages.

Properties

This page allows you to change the name of the selected group, as well as providing you with several quick actions to perform on it.

Data Fields

This page allows you to add new fields, as well as modify and delete existing fields in the selected group.

Subgroups

This page allows you to add and delete subgroups to the selected group.

Display

This page allows you to add, delete, and reorder the fields that are displayed in the Portfolio View for the selected group.

For help using property pages, see the help for Property Pages.

How Did I Get Here?

The Data Fields property page appears when you select **Modify Fields…** from the context menu for the portfolio or a portfolio subgroup in the Portfolio View. It also appears if the **Modify Field Properties** toolbar button is selected when the portfolio or a subgroup is selected or when the **Create / Modify Fields** button is selected on the Name page.

Modify Group Dialog: Subgroups

The Modify Group Dialog allows you to analyze and change the properties associated with a portfolio or portfolio subgroup. The Subgroups page allows you add and delete subgroups to the selected group.

For help with groups, see Managing Data with the Portfolio View.

Creating a New Subgroup

To create a new subgroup, press the **New…** button. This will display the Create Subgroup Dialog where you can indicate the name of the new subgroup.

Changing the Display Order of Subgroups

To change the display order of the subgroups, select a subgroup in the list, then press the **Slide Up** or **Slide Down** buttons to move the selected subgroup. You can also use the mouse to drag the subgroups to a new position in the list.

For help changing the order of items in a list, see the help for Orderable Lists.

Deleting an Existing Subgroup

To delete an existing subgroup, select the subgroup in the list, then press the **Delete** button. Your action will be confirmed and the subgroup will be deleted, along with any subgroups or data series in it.

Warning: Before you delete a subgroup, make sure that you no longer need the data series in it. After deleting a data series, you will not be able to get it back without using the steps you used to create it.

Note: To delete a single data series without deleting the entire group, exit from this dialog and use the context menus in the Portfolio View.

What Do I Do Next?

When you are finished making any changes, press the **Close** button or select another property page.

Additional Property Pages

The Modify Portfolio Dialog and Modify Group Dialog have the following property pages.

Properties

This page allows you to change the name of the selected group, as well as providing you with several quick actions to perform on it.

Data Fields

This page allows you to add new fields, as well as modify and delete existing fields in the selected group.

Subgroups

This page allows you to add and delete subgroups to the selected group.

Display

This page allows you to add, delete, and reorder the fields that are displayed in the Portfolio View for the selected group.

For help using property pages, see the help for Property Pages.

How Did I Get Here?

The Subgroups property page appears when you select **Modify Subgroups…** from the context menu for the portfolio or a portfolio subgroup in the Portfolio View. It also appears when the **Create / Modify Subgroups** button is selected on the Name page.

Modify Group Dialog: Display

The Modify Group Dialog allows you to analyze and change the properties associated with a portfolio or portfolio subgroup. The Display page allows you add, delete, and reorder the fields that are displayed in the Portfolio View for the selected group.

If no data series are currently included in this group, no options will be available from this page.

For help with groups, see Managing Data with the Portfolio View.

Adding or Removing Display Fields in the Portfolio View

The fields available for display in the Portfolio View are divided into two groups: Common Display Fields and Other Display Fields. **Common Display Fields** include the categories listed below. **Other Display Fields** contains a complete list of all fields that are currently defined in the selected group.

To add a field from either list to the display, select the field and press **Add to Display**. This will transfer the field to the Current Display list. You can also add a field to the display by double-clicking the field name in the selection tree.

Note: Loading the information associated with display fields can significantly affect the amount of time it takes to start TradingSolutions. It is recommended that display fields only be used for the fields and subgroups of data that you will actually want to view in the Portfolio View.

For help using the selection tree, see the help for Selection Trees.

To remove a displayed field from the Portfolio View, select a field in the Current Display list, then press the **Remove From Display** button.

Note: Display fields inherited from a parent group cannot be removed.

Common Display Fields

The following categories are available in the Common Display Fields section of the selection tree.

- **Primary, Secondary, or Service Signal**

  This category allows you to display the current value or an analysis of any of the special signals.

  - **Current Value of Signal**

    This value will display the current value of the selected signal. This can be used to determine what action to take on each stock in the group.

  - ***Existing Signal Analysis Fields***

    Any previously created signal analysis fields for the selected signal will be listed so that they can be selected for display.

  - **(Create an analysis of this signal…)**

    This value allows you to easily create one or more new signal analysis fields for the selected signal. Adding this selection will display the Create Signal Analysis Fields Wizard.

  For more information on special signal designations, see Primary, Secondary, and Service Signals.

- **Common Data**

  This category allows you to select from common raw data fields, include the last closing price and volume.

- **Data Information**

  This category allows you to display special information about each of the data series in the group.

  - **Display Date**

    This value will display the date associated with the record currently being displayed in the Portfolio View. For example, if the Portfolio View is currently displaying data for a Sunday and the most recent data in a data series is for the preceding Friday, Friday's date will be displayed here.

  - **Start Date**

    This value will display the date of the first record in the data series.

Note: Group predictions and correlation studies are limited by the dates available in all of the data in the group. Displaying and sorting the Start Date field is an effective way to determine which data series have less data than others.

- **End Date**
  This value will display the date of the last record in the data series.

- **Total Samples**
  This value will display the total number of records in the data series.

- **Streaming Tick Information**
  This category allows you to display tick information for streaming data.

  Note: These values will only be displayed will streaming is turned on and only for data series for which streaming is turned on.

  For help with streaming data, see Streaming Intraday Data.

  - **Tick Price**
    This value will display the last price paid for this security. See the note below for information on the coloring of this field.

  - **Tick Volume**
    This value will display the number of shares traded in the last trade.

  - **Tick Time**
    This value will display the time at which the last trade occurred.

  - **Bid Price**
    This value will display the bid" price for this security, which is the price being offered by buyers. See the note below for information on the coloring of this field.

  - **Bid Size**
    This value will display the number of shares currently being requested to buy.

    Note: eSignal returns this value divided by 100.

  - **Ask Price**
    This value will display the ask" price for this security, which is the price being requested by sellers. See the note below for information on the coloring of this field.

  - **Ask Size**
    This value will display the number of shares currently being offered to sell.

    Note: eSignal returns this value divided by 100.

  - **Bid/Ask Time**
    This value will display the time at which the bid and ask information was last updated.

  Note: Tick, Bid, and Ask prices are highlighted in color to indicate the direction the prices have moved since the last update. If the new price is greater than the previous price, it is displayed in green. If the new price is less than the previous price, it is displayed in red. If the new price is the same, the previous color is preserved.

Changing the Order of Display Fields

To change the display order of the displayed fields, select a field in the Current Display list, then press the **Slide Up** or **Slide Down** buttons to move the selected field. You can also use the mouse to drag the fields to a new position in the list.

Note: Display fields inherited from a parent group cannot be split apart, reordered, or removed.

For help changing the order of items in a list, see the help for Orderable Lists.

What Do I Do Next?

When you are finished making any changes, press the **Close** button or select another property page.

Additional Property Pages

The Modify Portfolio Dialog and Modify Group Dialog have the following property pages.

Properties

This page allows you to change the name of the selected group, as well as providing you with several quick actions to perform on it.

Data Fields

This page allows you to add new fields, as well as modify and delete existing fields in the selected group.

Subgroups

This page allows you to add and delete subgroups to the selected group.

Display

This page allows you to add, delete, and reorder the fields that are displayed in the Portfolio View for the selected group.

For help using property pages, see the help for Property Pages.

How Did I Get Here?

The Display property page appears when you select **Modify Display Fields…** from the context menu for the portfolio or a portfolio subgroup in the Portfolio View. It also appears when the **Modify Display Fields** button on the toolbar is selected or when the **Change Display Fields** button is selected on the Name page.

Modify Options Dialog

Modify Options Dialog: General

The Modify Options Dialog allows you to modify default settings for the entire program. These settings are kept from session to session, so you do not need to modify them each time you start the program. The General page allows you to specify general options, such as startup behavior.

Specifying the Startup Behavior

The following options are available for setting what is displayed when the TradingSolutions program is started.

- **Display Welcome Dialog**

  This option causes the Welcome Dialog to be displayed. This dialog contains options for viewing introductory demos, step-by-step tutorials, and suggestions for getting started. This is the default when TradingSolutions is first installed.

- **Display Splash Screen Only**

  This option causes TradingSolutions to not display any dialogs after the initial splash screen.

  Note: This option is not available in the Evaluation version.

The charts and spreadsheets that were displayed when TradingSolutions was exited can be restored when the program is restarted. This is useful if you frequently look at the same charts and spreadsheets; however, it can take significantly longer for TradingSolutions to start since it must load all of the data associated with these views.

- **Do Not Restore Open Charts/Spreadsheets**

  This option will cause TradingSolutions to not restore the open charts and spreadsheets when it is started.

- **Request to Restore when Exiting Program**

  This option will cause TradingSolutions to ask whether it should save any open charts and spreadsheets when the program is being exited. If these views are saved, they will be restored when the program is restarted.

- **Always Restore Open Charts/Spreadsheets**

  This option will cause TradingSolutions to always restore any charts and spreadsheets that were open when the program was exited.

Note: Charts and spreadsheets are always saved when they are closed. This option only affects whether the most recent views are reopened when TradingSolutions is started.

Note: Only one chart and one spreadsheet are saved for each data series. Therefore, this option will not restore multiple charts or multiple spreadsheets for one data series.

Displaying Data in the Portfolio View

The Portfolio View can be modified to display data in any of the following formats.

- Display Name Only
- Display Name (Symbol)
- Symbol - Display
- Symbol Only

The **Display Name** is typically the company name of a stock or the name of the index. However, it can be set to anything by modifying the settings on the data series. The **Symbol** is the ticker symbol used to identify the stock.

Handling Information Panels

As you grow more familiar with TradingSolutions, you may elect not to display certain pages that are purely informative. A good example of this type of page is the introductory pages in the field creation wizards. Many of those pages include an option to stop displaying that introductory page.

If you would like to hide all of these information pages, press the **Hide All Information Panels** button. This has the same effect as selecting to stop displaying each page individually.

To restore these information pages so that they are displayed, press the **Restore Hidden Information Panels** button. This will cause all of the information panels to be displayed until you select to hide them again.

What Do I Do Next?

When you are finished modifying the program options, press the **OK** button to use your changes or select another property page. If you would like to exit from this dialog without saving your changes, press the **Cancel** button.

Additional Property Pages

The Modify Options Dialog has the following property pages.

General
This page allows you to specify general options, such as startup behavior.

Charting
This page allows you to specify defaults used for the Chart View.

Sounds
This page allows you to specify the sounds to play when different events occur.

Field Creation
This page allows you to view and modify the default values used when creating new fields.

Signal Analysis
This page allows you to specify the default values used for signal analysis.

For help using property pages, see the help for Property Pages.

How Did I Get Here?

The Modify Options Dialog appears when you select **Options…** from the **Tools** menu. The Modify Options Dialog: General page also appears when you select **Change Startup Behavior** from the Welcome Dialog.

Modify Options Dialog: Charting

The Modify Options Dialog allows you to modify default settings for the entire program. These settings are kept from session to session, so you do not need to modify them each time you start the program. The Charting page allows you to specify defaults used for the Chart View.

For help with charting, see Displaying Data in a Chart.

Data to Display in Default Chart

These options are used for setting the range that initially appears when opening the Chart View.

Periodicity

This setting indicates the periodicity for which the data settings are currently being displayed or modified. The periodicity indicates the number of minutes or days to include in each High / Low / Open / Close bar. The data settings for only one periodicity can be modified at a time.

Note: If **intraday** is selected, you will also be asked to specify the **Bar Size** in minutes.

The following settings are available for each periodicity:

Display chart for last…

This setting indicates the amount of data to display when a chart for data with this periodicity is first opened.

- **Use data for last…**
- **Use all available data.**

These settings indicate the amount of data to make available to display in the chart for data with this periodicity. Selecting larger amounts of data will cause the chart to open slower.

Note: Additional data can be loaded when the chart is opened or after it being displayed.

Values to Display in Default Chart

The following options are available for the default chart. These settings apply to all periodicities.

- **Closing Price Line**

  This setting displays the price as a single line based on the closing price.

- **Japanese Candlestick Chart**

  This setting displays the price as a vertical bar representing the range of prices between the opening and closing prices with vertical lines extending to the high and low prices. Bars in which the close is higher than the low are white. Bars in which the close is lower than the open are colored.

- **High/Low/Open/Close (HLOC) Chart**

  This setting displays the price as a vertical line representing the range of prices between the high and low prices. A horizontal line entering from the left represents the opening value. A horizontal line exiting to the right represents the closing value.

- **HLOC Chart with Closing Price Line**

  This setting displays the price as a combination of the HLOC chart and the closing price line.

☑ **Include Volume Subchart**

This setting indicates whether a subchart with the volume should be displayed.

☑ **Include Secondary Signal**

This setting indicates whether the Secondary Signal should be displayed when it is available.

Note: The Primary Signal is always displayed in the default chart, except when Solution Service information is being displayed, in which case only the Service Signal is displayed.

The default chart selections are used in the following situations:

- The **Chart** button on the Information View is pressed.
- There are no previous views to select for a data series.

- * Default Chart" is selected as the view to display on the Display Chart Dialog.
- **Display in Chart…** is selected for a signal field from the Portfolio View or the Modify Field Dialog: Overview Page, in which case the default price information will be added.

Mouse Lines to Display on Charts

The following options are available for displaying lines under the mouse while it is over the chart. These lines are also referred to as crosshairs. These settings apply to all periodicities.

☑ **Display Horizontal (Value) Line under Mouse**

This option displays a horizontal line under the mouse. This is useful for visually comparing values on multiple dates.

☑ **Display Vertical (Date) Line under Mouse**

This option displays a vertical line under the mouse across all sub-charts. This is useful for visually comparing multiple values for a single date.

What Do I Do Next?

When you are finished modifying the program options, press the **OK** button to use your changes or select another property page. If you would like to exit from this dialog without saving your changes, press the **Cancel** button.

Additional Property Pages

The Modify Options Dialog has the following property pages.

🗀 **General**

This page allows you to specify general options, such as startup behavior.

🗀 **Charting**

This page allows you to specify defaults used for the Chart View.

🗀 **Sounds**

This page allows you to specify the sounds to play when different events occur.

🗀 **Field Creation**

This page allows you to view and modify the default values used when creating new fields.

🗀 **Signal Analysis**

This page allows you to specify the default values used for signal analysis.

📖 For help using property pages, see the help for Property Pages.

How Did I Get Here?

The Modify Options Dialog appears when you select **Options…** from the **Tools** menu.

Modify Options Dialog: Sounds

The Modify Options Dialog allows you to modify default settings for the entire program. These settings are kept from session to session, so you do not need to modify them each time you start the program. The Sounds page allows you to specify the sounds to play when different events occur.

Understanding the Events That Generate Sounds

Sounds are used to notify you when specific events occur. Sounds can be associated with each of the following events. Each of these events is associated with a type of message displayed in the Messages and Alerts Window.

- **New Alert Generated**
  This sound is played when an alert issues a message based on new data.
  Note: Delayed alerts will play the sound associated wit informational messages.
- **Information Message**
  This sound is played when a low priority informational" message is displayed.
- **Warning Message**
  This sound is played when a medium priority warning" message is displayed.
- **Error Message**
  This sound is played when a high priority error" message is displayed.
- **Processing Complete**
  This sound is played after a significant amount of processing has completed.

Assigning Sounds to Events

When TradingSolutions is installed, the default sounds for each of these events is set automatically. This page can be used to define new sounds for these events or turn off any unwanted sounds.

In addition to the currently selected file, the following settings are listed in the combo box for each event.

- **(Default) *File Name***
  This setting indicates to use the default sound file associated with this event.
- **(None)**
  This setting indicates that no sound should be played for this event.

To specify a setting other than the default or none, select the combo box for the desired event and press the **Browse…** button. This will display a File Selection Dialog where you can select a sound (.wav) file to play for this event.

To preview the current selection for any event, select the combo box for the desired event and press the **Play** button.

What Do I Do Next?

When you are finished modifying the program options, press the **OK** button to use your changes or select another property page. If you would like to exit from this dialog without saving your changes, press the **Cancel** button.

Additional Property Pages

The Modify Options Dialog has the following property pages.

- **General**
  This page allows you to specify general options, such as startup behavior.
- **Charting**
  This page allows you to specify defaults used for the Chart View.
- **Sounds**

This page allows you to specify the sounds to play when different events occur.

Field Creation

This page allows you to view and modify the default values used when creating new fields.

Signal Analysis

This page allows you to specify the default values used for signal analysis.

For help using property pages, see the help for Property Pages.

How Did I Get Here?

The Modify Options Dialog appears when you select **Options…** from the **Tools** menu.

Modify Options Dialog: Field Creation

The Modify Options Dialog allows you to modify default settings for the entire program. These settings are kept from session to session, so you do not need to modify them each time you start the program. The Field Creation page allows you to view and modify the default values used when creating new fields.

Field Creation Values

The following options can be used to access field creation defaults.

- **Entry/Exit System and Committee Optimization**

  This button displays the Signal Optimization Settings Dialog, which allows you to modify the settings associated with optimizing trading signals associated with entry/exit systems and committees.

- **Training Settings…**

  This button displays the Modify Training Settings Dialog, which allows you to modify the settings associated with training and optimizing predictions.

- **Training Ranges…**

  This button displays the Modify Default Range Dialog, which allows you to modify the default size and distribution of the training data.

- **Signal Postprocessing…**

  This button displays the Postprocessing Optimization Settings Dialog, which allows you to modify the settings associated with the postprocessing of predicted signals.

What Do I Do Next?

When you are finished modifying the program options, press the **OK** button to use your changes or select another property page. If you would like to exit from this dialog without saving your changes, press the **Cancel** button.

How Did I Get Here?

The Modify Options Dialog appears when you select **Options…** from the **Tools** menu.

Modify Trading Solution Dialog

Modify Trading Solution Input Assignments Dialog

Modify Trading Solution Input Assignments Dialog: External Data

The Apply a Trading Solution Wizard allows you to create one or more predefined fields that typically perform interrelated functions. This page allows you to select which external data to use for solutions that use more than one data series.

For help with trading solutions, see Working with Complete Trading Solutions.

Selecting External Data

Trading solutions are created based on a field in a data series. When that field relies on information in fields from other data series, the trading solution created from that field is said to rely on external data. These fields from external data are stored with the symbol associated with their original data series. For example, a trading solution that uses the Dow Jones Industrial Average to predict stock prices may have external data with the name DJI".

The external data required by the selected trading solution is displayed in a list. If TradingSolutions can resolve the external data symbol to a ticker symbol in the portfolio, it will default to using that data series. In most cases, if you created the trading solution with data in this portfolio, you will not need to change anything on this page.

This page allows you to perform two tasks.

- **Adjust for inconsistent ticker symbols.**

  Companies have a predefined ticker symbol that is associated with their stock in the stock market. However, market indices, options, and indicators do not have specific ticker symbols. Different data services and sources may use different symbols to designate the same data. For example, the Dow Jones Industrial Average may be DJI" on one service and $INDU" on another.
  When using a trading solution provided from another trading solutions user, it may be necessary to adjust their external data symbols to point to the correct data. In the above example, if they use DJI" to point to the Dow Jones Industrial Average, but your data source labels this data $INDU", you can indicate to use your Dow Jones Industrial Average data.

- **Try a trading solution with different data.**

  When experimenting with financial data, it may be desirable to try several different sets of data to see which provides the best results. For example, after developing a trading solution that uses the Dow Jones Industrial Average, you may want to try the same approach with the S&P 100. Rather than changing each of the inputs, you can change the entire solution to use a different set of external data. This is especially useful when multiple fields from the external data series are used.

To select a data series to use for external data, select the data you would like to specify from the list of required external data. Then, select the data series you would like to use and press the **Select** button. If multiple external data series are required, the dialog will automatically proceed to the next required data series. You can also select to use a field by double-clicking the data series name in the selection tree.

For help using the selection tree, see the help for Selection Trees.

Importing Unresolved Data

Trading solutions do not include data. Therefore, trading solutions which require external data may require this data to be imported if it is not already available in the portfolio.

- **Import Unresolved Symbols**

  This button provides basic support for importing external data which has symbols that are not currently included in this portfolio. Settings for the data source, date ranges, and periodicity will all be taken from the data where the trading solution is being applied. Newly imported data is placed in a custom subgroup called Solution Data".

  Note: Cases where other periodicities need to be imported, other data sources should be accessed, or a larger date range is needed must currently be imported manually. This button is only meant to cover the majority of the cases where external data is used.

What Do I Do Next?

Press the **OK** button to save your changes or select another property page. If you would like to exit from this dialog without performing any changes, press the **Cancel** button.

Additional Property Pages

The Modify Trading Solution Inputs Dialog also includes a Solution Inputs page.

How Did I Get Here?

The Modify Trading Solution Inputs Dialog appears when you press the **Modify Inputs…** button on the Apply a Trading Solution Wizard: Create Fields page. The External Data page will only appear if the selected trading solution requires external data.

Note: After trading solutions are applied, the created fields cannot be modified as a solution. The individual fields are modified instead.

Modify Trading Style Dialog

Modify Trading Style Dialog: General Settings

The Modify Trading Style Dialog allows you to specify the settings associated with a particular trading style. The General Settings page allows you to set the name and general investment strategy of the trading style.

For help with trading styles, see Using Trading Styles.

Changing the Name of the Trading Style

The **Trading Style Name** can be set from this page. New trading styles are assigned a default name, such as My Trading Style".

Note: Trading style names must be unique within the group of all trading styles.

Setting the Investment Strategy

The following values can be set to define the investment strategy.

Types of Trades

This value indicates whether to trade using long or short trades, or both. Higher profits can typically be made by trading a stock both when its price is moving up and when it is moving down. Therefore, the default is to include both long and short trades. However, since short trades can add an additional layer of complexity to trading activity, many people prefer to begin with long trades only.

Investment

These values specify the amount to invest each time a new trade is entered. The following options are available:

- **Invest Entire Account**

  This setting indicates that the first trade should invest the amount specified here. Subsequent trades are made by investing all of the money returned from the previous trades. This is the default.

  Note: Trading will stop if the account no longer has enough money to cover the entry commission.

- **Invest Fixed Amount**

  This setting indicates that all trades should invest the amount specified here.

- **Trade Fixed Shares**

  This setting indicates that all trades should use the number of shares specified here. The actual amount invested is based on the current trading price.

  Note: Overall gains are calculated using the amount of the first trade.

Note: Annualized returns for all investment methods are calculated by determining the constant rate at which the first investment would have to change to reach the final account value.

Note: Many analysts use an alternative method called Internal Rate of Return (IRR) for calculating the annualized return, especially when dealing with fixed amounts and fixed shares. This method was investigated for use in TradingSolutions. However, in many cases, early single trades with high percent gain significantly skewed the results of a given analysis range. It was determined that, while numerically valid, the IRR does not produce returns that are good for comparison or optimization.

Commission

These values specify the amount to be deducted for commissions, both on the entry of each trade and the exiting of each trade. The following values are used together to set the commission:

Percentage of Trade Value

This value indicates the percentage of the trade value that should be paid as commission.

Note: Simulate variable percentage rate commissions using either the most likely percentage rate you will be paying, or the worst-case scenario.

Minimum Charge Per Trade

This value indicates the lowest commission you can pay for a trade. It overrides the percentage value.

For example, a broker with a 5% commission may have a minimum commission of $20. If the trade involves $1000, the commission would be 5%, or $50. If the trade involves $200, the commission would be $20, since 5% of $200 is less than the minimum commission.

Note: Flat-rate commissions, such as $10 per trade, can be indicated by setting the percentage to 0% and the minimum charge to the cost per trade.

Entry Strategy

This value allows you to simulate the use of limit orders when entering new trades. Limit orders can improve profitability by waiting for a better entry price for each trade. However, by waiting for a better price, there is a risk that the trade will not be executed. The following settings are available:

- **Enter At Market Value**

  This setting indicates to use the trading value to determine the entry price of the trade.

- **Enter Using A Limit Order**

  This setting indicates to enter the trade by placing a limit order a specified percentage away from the current price. This strategy allows you to try to name a better entry price, but may result in the trade not being placed if that price is not reached. For long trades, the limit price is lower than the current price. For short trades, the limit price is higher than the current price.

  For example, a trading style is using a 2% limit. If the signal indicates to enter long on the next bar and the current close is 50, then the trade will try to enter at 49 on the next bar. The trade will only take place if 49 is above or equal to the low of the next bar.

  Note: The field(s) used for the basis of the limit price can be selected on the Analysis Options and Fields page.

  Note: Simulated limit orders are evaluated only on the bar after they are entered. This happens since a new limit price is generated on each bar. This means they may not be realistic for use with intraday data.

  Note: Limit values are only used on the following bar. If a limit fails to be reached and a new entry signal is generated, a new limit will be generated based on the new limit basis.

Loss Protection

This value allows you to simulate the use of stop orders to protect individual trades from losing too much money. Stop orders automatically exit a trade if a target losing" price is reached. This is useful for cutting losses, but adds the risk that normally profitable trades will be exited early at unprofitable values. The following settings are available:

- **Trade Without Stop Orders**

  This setting indicates that stop orders should not be used.

- **Stop Orders Based On Entry**

  This setting indicates to place a stop order a specified percentage away from the entry price. For long trades, the stop price is lower than the entry price. For short trades, the stop price is higher than the entry price. The stop price remains the same for the entire trade.

  For example, if a long trade is entered at 30, a stop may be placed at 25 to protect against large losses. This stop will only be executed if the low price reaches 25 while the trade is open.

- **Trailing Stop Orders**

  This setting indicates to place a stop order a specified percentage away from the entry price. For each subsequent bar that the trade remains open, the stop price is then updated based on the current price. This protects profits gained during the course of the trade, but increases the likelihood that the stop will be executed.

  For example, if a long trade is entered at 30, a stop may be placed at 25 to protect against large losses. If the price increases to 35 on the next day, the stop may be updated to 30 to protect against losing the gains that have been made. In other words, the stop trails the price as it increases. It is left unchanged if the price decreases.

  Note: The field(s) used for the basis of the trailing stop price can be selected on the Analysis Options and Fields page.

  Note: Trailing stops are evaluated to be updated on each new bar of data. This means that they may not be realistic for use with tick data or intraday data with more than one bar of data per hour.

Re-enter Stopped Position on Entry

If stop orders are being used for loss protection, this value allows you to indicate when to re-enter stopped positions. This is useful for staying out of situations where a constant signal is contrary to the current direction of the market.

- **Always**

This setting indicates to always enter the market on a new entry signal.

- **After Any Other Signal**

  This setting indicates to delay re-entering the position until after any other signal is encountered.

  Example: An enter long will not be executed until after a signal other than an enter long is encountered.

- **After Hold or Exit**

  This setting indicates to delay re-entering the position until after a hold or exit signal is encountered. This includes opposing entry signals, but not opposing exit signals.

  Example: An enter long will not be executed after an exit short.

- **After Exit**

  This setting indicates to delay re-entering the position until after an exit signal is encountered. This includes opposing entry signals, but not opposing exit signals or hold signals.

  Example: An enter long will be executed only after it would have been exited normally.

- **After Opposing Entry**

  This setting indicates to delay re-entering the position until after an opposing entry signal is encountered.

  Example: An enter long will be executed only after an enter short is encountered.

Setting Additional Intraday Strategy Values

Additional settings are available for when the trading style is used for trading intraday data. Specifically, these settings allow the trading style to automatically exit from the market before the end of the trading session. They can also be used to avoid trading during an opening time period. These values are ignored for end-of-day data series.

☑ **Exit All Open Trades at End of Day**

This setting causes the simulated trading of intraday entry/exit signals to exit at the specified time. This is useful for limiting the effects of intraday trading to when the market is open. This protects intraday trades from the sometimes large changes that occur during after market trading.

Note: This setting does not modify the value of entry/exit systems or predicted signals. It is only used to simulate the exiting of positions that you would do manually.

Note: If this setting is used, no new trades will be entered after the specified time. Entry into new trades can be further limited with the setting below.

☑ **Limit Times When Trades Entered**

This setting causes the simulated trading of intraday entry/exit signals to ignore entry signals prior to the starting time and after the ending time. This is useful for avoiding the opening and closing of the market, which may be less predictable or have different characteristics from the midday market.

Note: This setting does not modify the value of entry/exit systems or predicted signals. It is only used to simulate the behavior of not entering new trades during certain hours.

Note: Optimal signals generated using these settings for intraday data will not generate entry signals outside of the specified times. Because of this, models of these optimal signals should always include some type of time information as inputs so that the neural network has an opportunity to learn that time is a factor in the signal value.

What Do I Do Next?

If you are finished modifying the settings associated with the trading style, press the **OK** button to save your changes or select another property page. If you would like to exit from this dialog without performing any changes, press the **Cancel** button.

Additional Property Pages

The Modify Trading Style Dialog has the following property pages.

General Settings

This page allows you to set the name and general investment strategy of the trading style.

Analysis Options and Fields

This page allows you to specify the signal analysis options and the fields to use for values during signal analysis.

Signal Optimization

This page allows you to specify the characteristics to take into account when optimizing an entry/exit signal.

For help using property pages, see the help for Property Pages.

How Did I Get Here?

The Modify Trading Style Dialog is displayed when you press the **Add New…** button or the **Edit…** button on the Define Trading Styles Dialog.

Modify Trading Style Dialog: Analysis Options and Fields

The Modify Trading Style Dialog allows you to specify the settings associated with a particular trading style. The Analysis Options and Fields page allows you to specify the signal analysis options and the fields to use for values during signal analysis.

For help with trading styles, see Using Trading Styles.

Changing the Signal Analysis Options

The following options can be set to adjust how entry/exit signals are analyzed using this trading style.

Trade fractional shares.

This setting indicates whether to purchase fractional shares when the amount being invested is not evenly divisible by the share price. If this option is not on, the number of shares purchased is reduced to the nearest whole number and the amount invested in adjusted accordingly.

Note: This option is not available when trading a fixed number of shares.

Slippage on Trades

These settings allow you to simulate the prices moving before a trade can be executed. When the slippage is not set to 0%, the actual entry and exit prices used for each trade are adjusted to less favorable values by the specified percentage. For example, long entry prices are increased and long exit prices are decreased. These values can be limited to the trading range for the given day by selecting **Restrict slippage to trading range**.

Note: Slippage is not applied to entries using limit orders.

Benchmark Data Series

This setting allows you to specify a benchmark data series to use when viewing the analysis of signals using this trading style. A new data series can be selected by pressing the **Select…** button. This will display the Select Data Series Dialog.

Selecting the Fields to Use for Signal Analysis Values

Signal analysis can be set to use different fields for determining the trading values to use during the analysis. Each setting can be set to the value of a specific field, or the average of multiple fields.

TradingSolutions is typically used as an end-of-day package, with data being downloaded after the closing price is available. Trades are typically entered the next day. Therefore, trading styles are often set up to use today's close or tomorrow's open as the trading price. When the trade is executed on the next day, it is compared to the high and low prices for that day.

Trading Value

This value is the price used for the market entry price and the exit price of each trade. Typical values are the next (tomorrow's) opening price or the current (today's) closing price.

For additional notes on using Next Open", see Using Trading Styles.

Basis for Limit Order

This value is the price used to create the limit price by adding or subtracting the specified percentage from it.

Note: It is not possible to physically trade values for the next bar other than the open. This is because the next bar would need to complete before these values are known, making it not possible to trade during that bar.

Note: Using a value from the next bar (tomorrow) will mean that display fields showing the limit price will not be available for the current day.

Basis for Trailing Stop

This value is the price used to create the trailing stop price by adding or subtracting the specified percentage from it.

Note: It is not possible to physically trade values for the next bar other than the open. This is because the next bar would need to complete before these values are known, making it not possible to trade during that bar.

Note: Using a value from the next bar (tomorrow) will mean that display fields showing the stop price will not be available for the current day.

Note: The initial stop price does not use this value. It is set based on the entry price.

Basis for Current Equity

This value is the price used when determining the current equity in the analyzed trading account. It does not affect the way the stock is traded.

For additional notes on this value, see Using Trading Styles.

Other Required Fields

This value indicates the other fields that are required to implement the settings for this trading style. For example, the High and Low prices may be required to calculate value ranges for stops, limits, and slippage.

Selecting **Select Other Fields…** for any of these entries displays the Select Trading Style Fields Dialog. From there, you can specify which specific field or fields to use for this value.

What Do I Do Next?

If you are finished modifying the settings associated with the trading style, press the **OK** button to save your changes or select another property page. If you would like to exit from this dialog without performing any changes, press the **Cancel** button.

Additional Property Pages

The Modify Trading Style Dialog has the following property pages.

General Settings

This page allows you to set the name and general investment strategy of the trading style.

Analysis Options and Fields

This page allows you to specify the signal analysis options and the fields to use for values during signal analysis.

Signal Optimization

This page allows you to specify the characteristics to take into account when optimizing an entry/exit signal.

For help using property pages, see the help for Property Pages.

How Did I Get Here?

The Modify Trading Style Dialog is displayed when you press the **Add New…** button or the **Edit…** button on the Define Trading Styles Dialog.

Modify Trading Style Dialog: Signal Optimization

The Modify Trading Style Dialog allows you to specify the settings associated with a particular trading style. The Signal Optimization page allows you to specify the characteristics to take into account when optimizing a signal for a prediction, entry/exit system, or committee.

For help with trading styles, see Using Trading Styles.

Selecting the Primary Fitness Value

When signals are optimized, the genetic optimization algorithm uses a concept called fitness" to determine whether one group of settings is better than another. An example of this would be using the percent gain of the signal as the fitness – higher fitness values indicate a better signal. However, other values can be used to produce signals which should be better at producing more consistent profits.

Optimize signals based on:

This value indicates the primary value to base the fitness on.

- **Profits only**

  This setting indicates to use the annual percent gain of the signal.

- **Profits, avoiding volatility (Sharpe Ratio)**

  This setting indicates to use the Sharpe Ratio, which is the average change in the equity over the standard deviation of those changes. Higher Sharpe Ratios indicate a greater amount of average profit could be made with less day-to-day volatility.

- **Profits, avoiding losses (Sortino Ratio)**

  This setting indicates to use the Sortino Ratio, which is the average change in the equity over the downside deviation of those changes. It is similar to the Sharpe Ratio, but only penalizes downward volatility instead of all volatility.

- **Profits, avoiding large losses (Calmar Ratio)**

  This setting indicates to use the Calmar Ratio, which is the annual percent gain of the signal over the maximum drawdown from high equity. It is similar to the Sharpe Ratio, but penalizes based on the worst case scenario, rather than volatility.

- **Trade Expectancy Score**

  This setting indicates to use the Expectancy Score, which is defined as the expected profit per dollar risked." Higher expectancy scores indicate a higher expected profit per trade and more opportunities to trade.

- **TradingSolutions v2.1 fitness settings**

  This setting indicates to use the fitness settings used in TradingSolutions v2.1, which allowed multiple values to be combined, but was difficult to configure for finding optimal values. Selecting this setting will display the **Fitness Settings…** button which will display the Modify Legacy Fitness Settings Dialog, where these values can be viewed and modified.

  Note: This setting is primarily included to support trading styles created in TradingSolutions v2.1 and earlier.

☑ **Risk-adjust profit calculations versus percentage of time in market.**

This setting indicates to divide the fitness setting by the percentage of bars spent in the market. The theory is that the less time your money is in the market, the less it is exposed to risk of drawdown. For example, a system gaining 5% while spending 10 bars in the market is considered less risky than a system gaining 5% while spending 50 bars in the market. This is because the first system is more targeted to opportunities and the second system is more vulnerable to external effects on price.

Note: Using this setting can result in significantly less profitable trading systems. Since systems are penalized based on their time in the market, this can yield in settings which result in only a few brief trades.

☑ **Risk-adjust trade expectancy versus average losing trade.**

This setting indicates to include a risk adjustment in the fitness calculation when **Trade Expectancy Score** is selected. The risk adjustment divides the trade expectancy by the average loss.

Optimizing on Trading Frequency and Length

The following options are available for adding additional criteria to the optimization. Some settings tried during optimization may result in a few lengthy trades which perform well on the optimization data, but do not perform well in the general case.

If these options are enabled and the criteria are not met, the fitness will be penalized by how far out of the range they are. In other words, after the primary fitness value is calculated, a penalty is applied proportional to the amount by which the range is missed. The penalties are very large, so penalized values may be displayed off of normal graphs associated with optimization performance.

☑ **Limit end-of-day trading frequency**

This setting indicates to limit the average annual trades to a given range. 50 annual trades would result in a trade approximately once per week.

☑ **Limit end-of-day trade length**

This setting indicates to limit the average trade length to a given range. 5 bars would result in the average trade lasting approximately one week.

☑ **Limit intraday trading frequency**

This setting indicating to limit the average weekly trades to a given range. The actual frequency of trades will be dependent on the periodicity of the data.

☑ **Limit intraday trade length**

This setting indicating to limit the average trade length to a given range. The actual length of trades will be dependent on the periodicity of the data.

Note: If you would like to use different settings for different intraday periodicities, you will need to different trading styles to use with the different periodicities.

What Do I Do Next?

If you are finished modifying the settings associated with the trading style, press the **OK** button to save your changes or select another property page. If you would like to exit from this dialog without performing any changes, press the **Cancel** button.

Additional Property Pages

The Modify Trading Style Dialog has the following property pages.

General Settings

This page allows you to set the name and general investment strategy of the trading style.

Analysis Options and Fields

This page allows you to specify the signal analysis options and the fields to use for values during signal analysis.

Signal Optimization

This page allows you to specify the characteristics to take into account when optimizing an entry/exit signal.

For help using property pages, see the help for Property Pages.

How Did I Get Here?

The Modify Trading Style Dialog is displayed when you press the **Add New…** button or the **Edit…** button on the Define Trading Styles Dialog.

Update Prophet Account Information Page

Update Prophet Account Information Dialog: Password

The Update Prophet Account Information Dialog allows you to update this information or cancel your account. This page allows you to change the password for your account.

For help importing data, see Importing and Exporting Data.

For help contacting Prophet Financial Systems by telephone, see the help for the Introduction page.

Changing Your Password

To change the password associated with your account, enter your current password and your new password on this dialog and press **Change Password**. This will display the Messages page with any messages returned from Prophet.

Note: The current password is required on this dialog to ensure that no one uses your computer to change your password without them knowing the current one.

Note: The username on this page is taken from the Modify Data Source Settings Dialog for the Prophet.net data source.. If the username is incorrect, return to that page and enter the correct username.

What Do I Do Next?

If you do not want to change your password, press the **OK** button or select another property page.

Note: Your password will not be updated with Prophet Financial Systems unless you press **Change Password**, which will display the Messages page.

Additional Property Pages

The Update Prophet Account Information Dialog has the following property pages.

Billing Information

This page allows you to update your billing information, as well as select your billing options.

Password

This page allows you to change your password.

Terms and Conditions

This page allows you to review the terms and conditions of using a Prophet Financial Systems account.

Messages

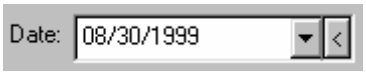
This page displays any messages returned from Prophet in response to requests for changes.

How Did I Get Here?

This page is available as part of the Update Prophet Account Information Dialog, which appears when you press the **Update Account…** button for the Prophet.net data source on the Configure Data Sources Dialog.

Help with Common Controls

Date Selection Controls



Date Selection Controls allow you to specify a date by modifying its month, day, and year. They also feature a dropdown calendar that can be used to select the desired date.

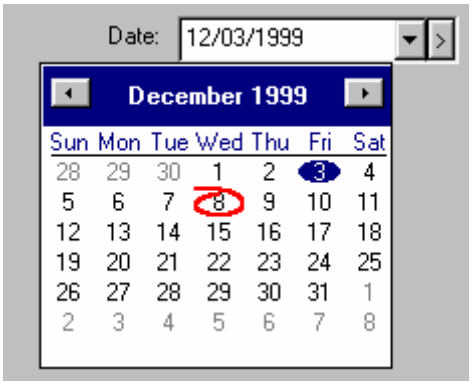
Adjusting the Month, Day, and Year

To adjust the month, day, or year in a date control, select the portion of the date you wish to modify, then type in the new value. You can advance to the next part of the date using the arrow keys or by typing the slash ('/') character.

Intraday data also features a time selection control that works similarly to the date control.

Using a Calendar to Adjust the Date

To use a calendar to adjust the date, press the large down arrow. This will display a calendar with the current date value selected. In addition, today's date will be circled in red for reference.



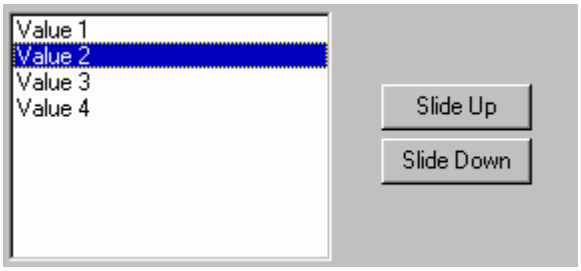
To specify a new date value with the calendar, click on the desired date. In addition selecting dates from the current month, other months can be displayed as follows.

- **Step Month-by-Month using the gray arrows.**
  The gray arrows at the top of the calendar can be used to step forward or backward one month at a time.
- **Use the arrow keys to step out of the month.**
  The arrow keys on your keyboard can be used to move the selected date. If the selected date is moved outside of the month, the next (or previous) month will be displayed as appropriate.
- **Left-click on the name of the month.**
  Clicking on the name of the month will display a list of the available months. Simply select the month that you would like to display.
- **Left-click on the year.**
  Clicking on the year will allow you to enter the desired year directly into the calendar. You can also step forward or backward using the spinner control that will appear next to the year.

Jumping to the First or Last Date

Many date controls associated with date ranges also have an additional button with a left or right arrow. These buttons allow you to move the start date back to the first date and the end date forward to the last date.

Orderable Lists



Orderable lists allow you to specify the order in which items should appear.

Using the Slide Buttons to Change Order

To change the order using the slide buttons, select the value you would like to move by selecting it with the mouse. To move that item earlier in the list, press the **Slide Up** button. To move the selected item later in the list, press the **Slide Down** button. If an item can not be moved any farther in a given direction, the button for that direction will be disabled.

Dragging Items to Change Their Order

The order of items can also be changed by dragging the items to new positions in the list. To drag an item, move the mouse to the item you wish to drag, then press and hold down the left mouse button. Then, while holding down the mouse button, move the mouse to the new position. The mouse pointer should change to a 123" to indicate that the order will be changed by this operation. A dashed line will also be displayed showing where the item will be inserted. When the dashed line is in the desired position, release the mouse button and the order will be updated.

For help with dragging, see Using Drag and Drop .

Using Drag and Drop

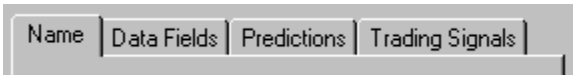
Some tasks can be performed by dragging objects from one location on the screen to another. For example, the order of items in some lists can be changed by dragging them to new locations in the list.

To drag an object, use the following steps.

1. Move the mouse to the object you wish to drag, then press and hold down the left mouse button.
2. While holding down the mouse button, move the mouse in order to move the selected object. When you are moving an object that can be dragged, the mouse pointer will change to reflect the action that is being performed.
3. Move the mouse to the desired new position.
4. Release the left mouse button to drop" the object in the new position.

Note: Dragging some objects, such as dragging data and groups in the Portfolio View, can perform one of several tasks. Dragging with the left mouse button will perform the most common task. To view a list of all dragging options, use the right mouse button to drag an object. When you release the right mouse button, a menu will appear listing all of the actions which that drag can perform.

Property Pages



Property pages allow you to view and modify many different sets of values associated with one object from within a single space. Each property page is labeled with a name that is associated with the type of information on that page.

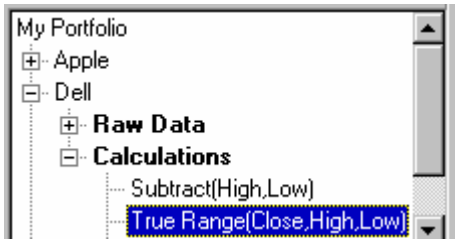
Viewing a New Property Page

The name of each available property page is displayed on a tab", much like the tabs on file folders in a filing cabinet. To view a property page, click the tab with the name of the page you would like to view. That property page will then appear on top.

If more property pages are available than can fit in the display area, a pair of arrow buttons may appear at the right side of the property page tabs.

These arrow buttons allow you to move left and right through the tabs associated with the property pages.

Selection Trees



Selection trees allow you to select items such as groups, data series, and fields from an organized list of all of the available items.

Understanding Selection Trees

Selection trees are read from top to bottom and from left to right. Dotted lines display the relationships between the various items in the tree.

For example, in the above selection tree, My Portfolio" contains items for the data series Apple" and Dell", among others. Dell" contains items called Raw Data" and Calculations". The Calculations" item in Dell" contains several calculations, one of which is currently selected.

The following icons are used for the items in selection trees:

Selection Tree Icons

	Portfolio Group
	Group of Data
	Solution Service Group
	End-of-Day Data
	Weekly Data
	Monthly Data
	Intraday Data
	Note: The number in an intraday data icon indicates the size of the bars in minutes. A question mark will appear for bar sizes that will not divide into 60 minute intervals.
	Category/Group of Fields
	Field (Raw Data or Definition) (field defined at current level)
	Field Overlaying Definitions (typically: field defined beneath current level)
	Field Underlying Group Definition (typically: field defined above current level)
	Field Locked by Solution Service
	Composite Field
	Field Sub-value
	Data Information
	Saved Chart or Spreadsheet View

Working with Selection Trees

To expand and collapse nodes of a selection tree, click on the plus and minus boxes next to the items. A plus box indicates that there are sub-items that can be displayed. A minus box indicates that the sub-items are currently being displayed, but they are able to be hidden. An item without a box has no sub-items or cannot be expanded or collapsed.

To select an item in a selection tree, click on the name of the desired item. This will cause the highlight to move to that item.

Most selection trees also have a default action that will be performed when you double-click on an item. See the help for the particular dialog that you are using to determine the default action for a given selection tree.

Selecting Multiple Items from a Selection Tree

Depending on the operation being performed, it may be possible to select multiple items at one time. For example, you can do this when selecting which fields to add to a spreadsheet or which fields to use as inputs to a prediction.

There are two ways to select multiple items. One is to select multiple individual items while holding down the **Ctrl** key on the keyboard. The other is to select an entire category, data series, or group by selecting that item in the tree.

Help with Formula Entry

Formula Entry

Common sets of controls are used to enter the formulas for function definitions and entry/exit system rules. They are divided into two major sections.

- **Formula View Area**

  This area displays the formula in its current state. It is located at the top of the dialog. Directly beneath the formula view area is a prompting line with information about what is currently being selected in the view area.

- **Entry Sub-Pages**

  This area contains sub-pages with options for what can be placed at the currently selected position in the view area.

Understanding the Formula View Area

The formula view area uses text highlighting to indicate the currently selected position in the formula, as well as additional information about different parts of the formula.

Inverse Text	Current selection in the formula.
Bold Text	Function containing the current selection.
Italicized Text	Undefined portion of the formula.
Underlined Text	Value provided by an input field.

As values are specified for each portion of the formula, the current selection will advance to the next position so that it can be defined. To jump to a specific position in the formula, simply click on the desired portion of the formula. The Formula View Area will automatically update with the correct highlighting.

As each new portion of the formula is selected, the prompt region will indicate what action will be taken by making a selection in the entry sub-pages. The formula entry sub-pages will also be updated to display what can be placed at the current position.

Entering a Formula

Formulas are entered into the formula view as a collection of functions, input fields, and numeric constants. They consist of a call to only one main function. However, the parameters to that main function can be calls to other functions.

In general, formulas are entered from the outside, in." In other words, the outermost functions are entered first and the parameters to those functions are the innermost functions. Typically, this is the reverse of the order that these functions would be performed by hand.

Example: A moving average is a summation of the *n* most recent values divided by *n*. As a formula, this would be entered as a division, which takes as its first parameter a summation.

Using the Formula Entry Sub-Pages

To specify a value for the currently selected position in the formula view, use the formula entry sub-pages. Different sub-pages are displayed depending on what is required at the current position in the formula. Most of the sub-pages have an insert button that allows you to insert things into the highlighted portion of the formula. This insert button will be labeled **Insert into Formula** if the highlighted selection has not yet been defined, or **Change in Formula** if the highlighted section contains a previous selection.

- **Function Definition**

  This sub-page is used to insert a function into the formula. To insert a function, select the function group from the Function Group list and select a function definition from that group, then press the insert button. You can also select a function definition by double-clicking on the function name.

  If you would prefer to see more entries in the function definition list, you can add or remove the description area using the **Display Descriptions** checkbox.

- **Input Field**

  This sub-page is used to insert an input field into the formula. Input fields are parameters that are given values when the function definition is used, either in an input field or in another function definition.

To specify a new input field, press the **Create New Input…** button. This will display the Modify Input Dialog, which will allow you to specify the name and type of the new input.

To use an existing input field again, select the input field from the input field list and press the insert button. You can also select an existing input field by double-clicking on the input field name.

To change the name or type of an input field, use the **Edit Selected Input…** button to display the Modify Input Dialog.

To change the order of the input fields, use the **Slide Up** and **Slide Down** buttons or drag the input to a new position in the input list.

Note: The order and number of the inputs cannot be changed when a function is being used by another definition. To modify the inputs of a function that is currently in use elsewhere, make a copy of the function and modify the copy.

Numeric Constant

This sub-page is used to insert a constant value into the formula. To insert a constant value, enter the value in the box and press the insert button.

Special Processing

This sub-page allows you to perform additional tasks at the currently select position.

- **Add Level**

  This button allows you to add an Identity function around the current selection. This is useful for adding additional processing to a formula without having to enter the whole formula again. Once the Identity function is added, it can be changed to any other function definition.

- **Remove Level**

  This button allows you to remove a function from the formula, replacing it with its first input as the current entry. This is the opposite of the **Add Level** button and is useful for removing unneeded processing.

☑ **Special Array Processing: Use Current Value…**

This checkbox allows you to use the current value of the selected function for all values in the surrounding array function. It is typically used in a Summation function when comparing the current value of a function to a series of previous values.

To use the current value of an input field instead of a function, place the input field inside of the Identity function.

Note: Array functions and functions that contain the Previous Value of Function" function cannot be selected for returning their current value. To return the current value of these functions, use Add Level to add the Identity function around them, then select the current value of the identity function.

Note: Array functions include: Summation, Median, Highest, Lowest, Was True, Bars Since Highest, Bars Since Lowest, and Bars Since Was True. They do not include functions that include these functions, such as Moving Average.

For an example of the uses of the **Add Level** button and the Special Array Processing checkbox, see Example: Writing an Absolute Difference Summation.

Examples of Entering Formulas

Example: Writing a Moving Average Function

Example: Writing an Absolute Difference Summation

How Did I Get Here?

Formula Entry is done from both the Modify Function Definition Dialog: Formula page and the Modify Rule Dialog.

Example: Writing a Moving Average Function

This is an example of how to enter a simple formula using the Formula Entry controls.

A moving average is a summation of the *n* most recent values divided by *n*. In formula notation, it would appear as follows:

Div (Sum (Data , Period) , Period)

In other words, take the summation of an input field called Value" over the last Period" values and divide that by Period".

To enter this as a formula, you would use the following steps:

1. Use the Function Definition sub-page to select the Divide function. To do this, choose the Divide function from the Function Definition list and press the **Insert** button. The current selection will automatically advance to the first parameter of the Divide function.
2. The text *Value 1*" should now be selected in the Formula View. This is the first parameter of the Divide function. Use the Function Definition sub-page to select the Summation function. Again, the current selection will automatically advance, this time to the first parameter of the Summation function.
3. The text *Data*" should now be selected in the Formula View. This is the first parameter of the Summation function, which adds the most recent *n* values of a data series together. The specific data series will be specified when the function definition is used, so we want to make this value an input field.

   To do this, use the Input Field sub-page and press the **Create a New Input…** button, which will display the Modify Input Dialog. To accept the default name and type, press the **OK** button. The first parameter of the Summation function will be replaced with Data", which indicates that it is an input field named Data".
4. The text *Period*" should now be selected in the Formula View. This is the second parameter of the Summation function. This is also the length of our moving average, which will also be specified when the function definition is used. Therefore, this value should also be an input field.

   To do this, use the Input Field sub-page and press the **Create a New Input…** button to create an input field called Period" in the same way the Data" input field was created.
5. The text *Value 2*" should now be selected in the Formula View. This is the second parameter to the Divide function. You can check this by noting that the Div" function in the Formula view is bold and the prompt at the bottom of the Formula View references the Divide function.

   Since we are dividing the summation by the length of our moving average, we want this value to be the same as the value we used for that length. In this case, we want to reuse the value of the Period input field. To do this, use the Input Field sub-page and select the Period input field, then press the **Insert** button.

How Did I Get Here?

This is an example of Formula Entry.

Example: Writing an Absolute Difference Summation

This is an example of how to enter an advanced formula using the Formula Entry controls. For an example of entering a simple formula, see Example: Writing a Moving Average Function.

Suppose you want to add together the absolute values of the differences of the ten most recent values of a series to the current value. You could do this by performing a summation of the absolute value of a subtraction of the current value of an input field from the input field. In formula notation, it would appear as follows:

Sum (Abs (Sub (Value , Current: Ident (Value))) , 10)

To enter this as a formula, you would use the following steps:

1. Use the Function Definition sub-page to select the Summation function.
2. For the *Data*" parameter of the Summation, select the Absolute Value function.
3. For the *Value*" parameter of the Absolute Value, select the Subtract function.
4. For the *Value 1*" parameter of the Subtraction, create an input field called Value".
5. For the *Value 2*" parameter of the Subtraction, we also want to use the same input field. For now, select the Value" input field.
6. For the *Period*" parameter of the Summation, we will use the numeric constant 10. To make this function more customizable, this could be made an input field instead of a numeric constant.

The formula should appear as follows:

Sum (Abs (Sub (Value , Value)) , 10)

This formula would add together the absolute values of the differences of the ten most recent values of a series to themselves. Unfortunately, subtracting a value from itself results in zero, so the summation and the entire formula would always return zero.

To indicate that the second value in the Subtraction should be the current value, we will use the Special Array Processing available from the Special sub-page. Since this processing operates on the value of a function, we will use the Identity function to return the value of the input field unmodified.

1. Select the second Value" in the Formula View. This should be the Value 2" input to the Subtract function.
2. From the Special sub-page, use the **Add Level** button to add an Identity function around the selection. The newly added Identity function will become the new selection.
3. Select the Special Array Processing: Use Current Value checkbox to indicate that the current value of this function should be used in the summation.

The formula should now appear as follows:

Sum (Abs (Sub (Value , Current: Ident (Value))) , 10)

This formula would add together the absolute values of the differences of the ten most recent values of a series. The difference between this formula and the previous formula is that the current value of the series is subtracted from each value.

How Did I Get Here?

This is an example of Formula Entry.

Performing Technical Analysis with TradingSolutions

Performing Technical Analysis with TradingSolutions: Overview

Technical analysis is performed in TradingSolutions by creating market timing signals which you can use to determine when to best enter and exit the market. These entry/exit signals can be developed using a combination of financial indicators, rule-based entry exit systems, neural network predictions, and other methods.

Note: Chart-based technical analysis can also be performed in TradingSolutions. For more information on using charts, see Displaying Data in a Chart.

The following topics are covered in this section:

- Calculating Values and Financial Indicators
- Creating and Analyzing Entry/Exit Signals
- Predicting and Modeling Financial Data
- Working with Complete Trading Solutions
- Developing Models with TradingSolutions Suite

Creating and Analyzing Entry/Exit Signals

Creating and Analyzing Entry/Exit Signals: Overview

Entry/Exit Signals are used to indicate when to enter and exit the financial market. Also known as Buy/Sell signals, these signals are the thing to watch when you want to know how you should be reacting to financial data.

The following topics are covered in this section:

- How Signals Are Displayed
- Analyzing Entry/Exit Signals
- Using Trading Styles
- Using Entry/Exit Systems to Generate Signals
- Writing Your Own Entry/Exit Systems
- Generating an Optimal Signal
- Combining Multiple Signals in a Committee

The following sections in other chapters also deal with this topic.

- Optimizing Signals and Predictions

How Signals Are Displayed

Entry/exit signals are displayed using a symbol. This symbol, typically a triangle, indicates the position that this signal recommends you should be in for the associated stock. Entry/exit signals also have an underlying value on which the symbol is based. This value can sometimes be interpreted as the strength of the signal relative to other values for that signal.

For help charting signals and other fields, see Displaying Data in a Chart.

Understanding Signal Symbols

Entry/exit signals indicate the position that should currently be being taken with the stock or data being analyzed. Remember that these recommendations are based on this particular set of calculations and/or predictions and may not necessarily be the best overall position to take.

- **Enter Long**
  An enter long signal indicates that you should currently be in a long position. A long position is one in which you own the stock or security. This is based on the belief that the stock price will increase. An enter long signal also indicates to exit any short positions (described below).

- **Enter Short**
  An enter short signal indicates that you should currently be in a short position. A short position is one in which you borrow the stock from your broker and sell it at the current price, with the understanding that you will buy replacement shares at a later time, hopefully at a lower price. This is based on the belief that the stock price will decrease. An enter short signal also indicates to exit any long positions.

- **Exit Long**
  An exit long signal indicates that you should currently exit any current long positions. This means that you should sell the shares of this stock that you currently own. This is typically based on the belief that the stock price will decrease, although not enough to warrant entering a short position.

- **Exit Short**
  An exit short signal indicates that you should currently exit any current short positions. Technically, this means that you are buying the stock at the current price to replace the shares you borrowed from your broker. This is typically based on the belief that the stock price will increase, although not enough to warrant entering a long position.

- **Hold**
  A hold signal indicates that no action is recommended. This is based on the belief that the stock price will not increase or decrease by a significant amount.

- **Hold During Increase**
  This hold signal indicates that no action is recommended. The price is anticipated to increase, but not enough to warrant any action.

- **Hold During Decrease**
  This hold signal indicates that no action is recommended. The price is anticipated to decrease, but not enough to warrant any action.

Understanding Signal Values

Entry/exit signals are stored as a single value, often with a range from -1 to 1. This single value is displayed as a combination of a symbol and a percentage.

The symbol displayed for a signal value is based on the following table.

Enter Long	>= 0.50
Exit Short	>= 0.20
Hold, Increase	> 0.00
Hold	= 0.00

Hold, Decrease	< 0.00
Exit Long	<= -0.20
Enter Short	<= -0.50

The percentage displayed with the symbol is the absolute value of the signal value. This value can sometimes be interpreted as the strength" of the signal relative to other values for that signal.

Note: It is typically not a good idea to compare strength values between two different signals. This is because different signals may be optimized differently, causing their strengths to be on a different scale. For example, the strength of some signals may be from 0% to 100%, while others may reach 1000% or higher.

The output of entry/exit systems and non-analog optimal signals are discrete values in these ranges. The following values are used for discrete signals.

Enter Long	1.00
Exit Short	0.30
Hold	0.00
Exit Long	-0.30
Enter Short	-1.00

Note: The strength value is displayed next to all signals in the Spreadsheet View. To see the strength in the Portfolio View, position your mouse over the signal and it will be displayed in a tip window.

Additional Signal Highlighting

Signals displayed in the Portfolio View are highlighted when they need to be brought to your attention. The following colors are used:

- **Pink Background**

  A pink background is displayed when an entry/exit signal results in a change in position from the previous values of that signal. For example, an exit long after an enter long or an enter long after an enter short.

  Note: Signal highlighting does not take into account stops or limits in trading styles. Because of this, enter signals may not be highlighted when previous trades were stopped out or did not occur due to failure to reach a price limit.

- **Light Gray Background**

  A light gray background is displayed when data for a data series may be out-of-date". Specifically, the last date in the data series is not equal to the last date in the portfolio.

  Note: When displaying previous display dates in the Portfolio View, a gray background is used to indicate that the date associated with the currently displayed data occurs prior to the display date.

- **Dark Gray Background**

  A dark gray background is displayed when a signal analysis field with an adjusted date range is displayed for a date prior to the last date in the data series. These values should not be used. Fields of this type contain valid data only for the last date in the data series.

  Example: A signal analysis field with a one-year percent gain only contains the analysis for one year of data on the last date of the data series.

Changing To and From a Signal Format

TradingSolutions will automatically select to display fields either in a numeric format or in an entry/exit signal format. In most cases, it will select the correct format. However, there are times when the wrong format may be selected.

When creating a new calculated field, you can set the new field to be formatted as a signal on the Calculate a Value Wizard: Select Name page. To select the format, simply select or deselect **Display this field as an entry/exit signal.**

After a field has been created, you can select a new format on the Modify Field Dialog: Overview page. Fields using the Signal" format will be displayed as signals. All other formats will be displayed in the specific numeric format.

For more information about field formatting, see Using Custom Field Formats.

For more help with signals, see Creating and Analyzing Entry/Exit Signals.

Analyzing Entry/Exit Signals

Ideally, entry/exit signals can be used to identify the best times to enter and exit a financial market. In order to test whether a particular signal is providing this type of information, it is useful to analyze the signal against previous data. This will give you an idea of how profitable the signal is given previous market conditions.

Every time you generate an entry/exit signal field, TradingSolutions automatically analyzes it for profitability. This includes signal fields generated by entry/exit systems, predictions, committees, and other methods. In addition, signal analysis fields can be generated to use this analysis in new calculations and charts.

For a step-by-step introduction to this topic, see the activities for the tutorial called Make a Traditional Prediction: Part 2.

For help with entry/exit systems, see Using Entry/Exit Systems to Generate Signals.

For help with predictions, see Predicting and Modeling Financial Data.

For help charting signals and other fields, see Displaying Data in a Chart.

Viewing the Automatic Signal Analysis

There are several ways to view the analysis of a trading signal field:

- **From the Portfolio View**

  Select **Analyze Signals…** from the context menu for a data series. This will display the Modify Data Series Dialog: Entry/Exit Signals page, which contains a comparative list of all of the trading signals for that data series. Individual signals can then be analyzed by selecting them from the list and pressing the **Analyze…** button.

- **From a Chart View**

  Select **Analyze Field…** from the context menu for a signal field in the chart.

- **From a Spreadsheet View**

  Select **Analyze Field…** from the context menu for the heading of a signal field in the spreadsheet.

- **From the Modify Data Series Dialog**

  Select the **Entry/Exit Signals** tab to display a comparative list of all of the trading signals for the data series. Individual signals can be analyzed by selecting them from the list and pressing the **Analyze…** button.

- **From the Modify Field Dialog**

  Select the **Signal Analysis** tab to display the analysis of a trading signal field.

  Note: Trading signal analysis only appears for fields at the data series level. For trading signal fields that were created at the portfolio or subgroup level, the analysis of those fields appears with each data series in the portfolio or subgroup.

Using any of these methods will display the Modify Field Dialog: Signal Analysis page.

Analyzing a Specific Signal

The Modify Field Dialog: Signal Analysis page contains several sub-pages that show you the results of trading the information in the data series using only that trading signal field. The sub-pages contain overview and summary information, as well as trade-by-trade and bar-by-bar analysis.

For more help with this analysis page, see the help for the Modify Field Dialog: Signal Analysis page.

Comparing Multiple Signals

The Modify Data Series Dialog: Entry/Exit Signals page contains a comparative list of all of the trading signal fields currently applied to a data series. This list enables you see which trading signals would have been the most profitable using a common date range for a data series.

For more help with this comparison page, see the help for the Modify Data Series Dialog: Entry/Exit Signals page.

Changing Signal Analysis Options

By default, TradingSolutions will analyze trading signals using the closing price as a trading price over the entire date range available in the data series. It performs both long and short entries and uses a standard investment size and commission rate. To change any of these characteristics for a particular data series, press the **Options…** button on the Modify Data Series Dialog: Entry/Exit Signals page. This will display the Signal Analysis Options Dialog where you can change these options.

The default signal analysis options can also be changed. To do this, select **Options…** from the **Tools** menu. This will display the Modify Options Dialog , from which you can select the Signal Analysis page.

Storing the Signal Analysis as Fields

Signal analysis is available on a day-by-day (by bar) basis on the Modify Field Dialog: Signal Analysis page. This type of analysis can also be recreated as one or more fields for use in calculations or sorting in the Portfolio View.

To create a signal analysis field, open the Create a Field Wizard and select to create a new field to **Analyze a signal**. This will begin the Create Signal Analysis Fields Wizard, which allows you to specify the signal analysis settings and which analysis values to save as fields.

Charting the Equity or Profit of a Signal

You can view the equity or profit of the simulated trading of an entry/exit signal in a chart. To do this, generate the signal analysis as a field, as described above. Then, simply display this field in a chart.

For help with charts, see Displaying Data in a Chart.

For more help with signals, see Creating and Analyzing Entry/Exit Signals.

Using Trading Styles

TradingSolutions uses a concept called Trading Styles" to help you to analyze and optimize your entry/exit signals based on the way you trade.

Understanding Trading Styles

Trading styles are named collections of settings that you use to indicate how you like to trade. Here is an overview of the types of values they include.

- **Types of Trades**
  Indicate whether you perform both long and short trades, or just buy and sell stocks using long trades.
- **Investment Size and Commission Rate**
  Indicate how much you typically trade each time you enter the market and the amount you pay in commissions.
- **Entry Strategy and Loss Protection**
  Indicate if you use special types of trades, such as limit and stop orders to increase the profitability of your trades.
- **Signal Analysis Options**
  Adjust signal analysis settings such as whether to factor in slippage and the rounding of prices.
- **Signal Analysis Fields**
  Specify alternate fields to use for calculating values such as the price shares are trading at.
- **Signal Optimization Values**
  Indicate the factors to consider when evaluating optimized entry/exit signals. In addition to optimizing the overall profit, statistics such as the volatility, length, and frequency can be optimized.

Multiple trading styles can be used to try new ideas. For example, if you normally perform simple long trades and want to see how short trades or stop orders might affect your profitability, simply create a new trading style and use it for your calculations.

Creating Trading Styles

New trading styles can be created by selecting **Define Trading Styles…** from the **Tools** menu. This will display the Define Trading Styles Dialog, where you can add new trading styles, copy or modify existing ones, or delete ones you no longer need.

Using Trading Styles

Trading styles are used in several locations in TradingSolutions. Here is a brief listing of where they are used.

- **Signal Analysis**
  Trading styles are primarily used during the automatic analysis of each entry/exit signal. A default Trading style is available for the entire portfolio. In addition, defaults can be set for each data series, as well as being selected for each entry/exit signal. These trading styles can be set from the Modify Options Dialog: Signal Analysis page and the Signal Analysis Options Dialog.
- **Signal Analysis Fields**
  Signal analysis fields use trading styles in the same way as automatic signal analysis. The Trading style for signal analysis fields can be modified from the Modify Field Dialog: Trading Parameters page.
- **Optimal Signal Fields**
  Optimal signal fields use trading styles to determine the conditions under which the signal will be traded. The trading style for optimal signal fields can be modified from the Modify Field Dialog: Signal Parameters page.

  Note: Optimal signals are based on profit only. They do not use the evaluation settings associated with the selected trading style.
- **Optimization of Entry/Exit Systems and Committees**

Entry/exit system fields and committee fields use trading styles to rate the fitness of each potential solution during optimization. The trading style for optimizing these types of fields can be modified from the Signal Optimization Settings Dialog.

- **Optimization of Predicted Signals**

  Models and predictions of signals use trading styles to rate the fitness of each potential solution, both when optimizing the neural network settings and when optimizing the postprocessing of predicted signals. The trading style for optimizing predicted fields can be modified from the Signal Postprocessing Settings Dialog.

Note: It is recommended that the same trading style be used for optimal signal, the optimization of the prediction of the optimal signal, and the analysis of those signals. This will typically improve the profitability of the modeled signal and the accuracy of the analyses.

For more help with entry/exit signals, see Creating and Analyzing Entry/Exit Signals.

Using Next Open" for Analysis

By default, trading styles use the **Next Open** price as the **Trading Value**. This means that each entry or exit signal will be traded using the Open price for the bar after the signal. There are a few things to consider when analyzing signals based on values in the net bar:

- **Basis for Current Equity**

  The **Basis for Current Equity** setting is used for determining the price to use when calculating the current equity and percent gain. If this value is set to (Trading Value)" or Next Open", the current equity will be based on the Next Open. This means that the current equity will NOT be available for the last bar since the next opening price is not yet available.

- **Basis for Limit Order**

  The **Basis for Limit Order** setting is used for determining the price to use when entering new trades with limit orders. If this value is set to (Trading Value)" or Next Open", the limit price will be based on the Next Open. This means that the current limit price will NOT be available as a display field since the next opening price is not yet available.

  Note: Using other values from the next bar may not be physically tradable. For example, it is not possible to set an entry limit for the next bar based on that bar's high, low, or close.

- **Basis for Trailing Stop**

  The **Basis for Trailing Stop** setting is used for determining the price to use as a trailing stop. If this value is set to (Trading Value)" or Next Open", the trailing stop will be based on the Next Open. This means that the current trailing stop value will NOT be available as a display field since the next opening price is not yet available.

  Note: Using other values from the next bar may not be physically tradable. For example, it is not possible to set a trailing stop for the next bar based on that bar's high, low, or close.

- **Buy/Hold Starts on the Second Bar**

  The Buy/Hold analysis in TradingSolutions uses a trading style to determine the amounts to be traded and which values to use for pricing. If Next Open" is used as the trading value, the initial buy will take place on the bar after the start date since the entry signal will be generated on the first bar and the purchase will occur on the next open.

  Note: The Buy/Hold analysis that appears in the Modify Data Series Dialog: Entry/Exit Signals page uses the default trading style for that data series.

Migrated Trading Styles

TradingSolutions may generate trading styles called Migrated Trading Styles" when it is processing fields that were created with a previous version of TradingSolutions. This can occur when a trading solution created with a previous version is used to create new fields. It can also occur when an existing work directory is migrated to a new version of TradingSolutions.

Note: Trading styles were introduced in TradingSolutions Version 1.2. Therefore, migrated trading styles will primarily be seen when dealing with portfolios and trading solutions created with Version 1.0 or Version 1.1.

Note: TradingSolutions will reuse an existing trading style if it matches the settings for the field being migrated.

Migrated trading styles can be used just like other trading styles. They can be modified or renamed to fit your own preferences.

Note: If you modify a migrated trading style that was created by applying a trading solution, the trading solution will not be updated. To update a trading solution, you will need to update the processing. This will cause its current trading style settings to be saved. You can do this from the Modify Trading Solutions: Source Field page.

Since versions of TradingSolutions that did not have trading styles optimized signals on profitability, the evaluation values of migrated trading styles are set to optimize using annual profit only.

Primary, Secondary, and Service Signals

TradingSolutions uses special signal designations to allow you to easily track and analyze your favorite entry/exit signals for each data series.

Special Signal Designations

The following special signal designations are available.

- **Primary Signal**
  This signal designation is typically used to indicate the signal you are currently trading for a data series.

- **Secondary Signal**
  This signal designation is typically used to indicate an alternate signal you would like to watch for a data series.

- **Service Signal**
  This signal designation is used to indicate the signal that is currently being generated by the Solution Service for a data series.

  Note: The Service Signal designation is only available in the Active Solutions group of the Solution Service. Selection of the Service Signal is controlled by the Solution Service.

  For information about the Solution Service, see The TradingSolutions Solution Service.

Specifying Primary and Secondary Signals

The Primary and Secondary signal for a data series can be specified from the Modify Data Series Dialog: Entry/Exit Signals page. Simply select the signal that you would like to specify as the primary or secondary signal and press the **Make Primary** or **Make Secondary** button. An icon will appear next to the selected signals.

Note: Optimal signals cannot be designated as Primary or Secondary signals since they cannot be actively traded.

Note: The setting of the current Primary or Secondary signals can be cleared from the same panel by selecting the Buy/Hold entry and pressing the **Clear Primary** or **Clear Secondary** button.

If a Primary Signal is not currently selected for a data series, the next signal that is created for that data series will automatically be designated as the Primary Signal.

Uses of Special Signals

Fields that are designated as Primary, Secondary, or Service signals can be selected using their special designation in a variety of places:

- **Display Fields**
  Add the current value of Primary or Secondary signal as a display field and easily track the current position you should be in for each stock in your portfolio.

- **Signal Analysis Fields**
  Create signal analysis fields for an entire group and automatically have them apply to your favorite signals. You can even add these analysis fields as display fields to track signal performance or sort the winners from the losers.

- **Other Calculated Fields**
  Function definitions that take signals as inputs can use special signals. This allows you to use Signal Processing Functions and other types of functions on all of the Primary or Secondary signals in a group.

- **Chart and Spreadsheet Selection**
  When selecting the fields to display in a chart or spreadsheet, you can select the current Primary or Secondary signal as fields to display.

- **Trading Solution Creation**
  When selecting the source field for a trading solution, you can specify to use the current Primary or Secondary signal field.

Note: One current restriction of Primary and Secondary signals is that they cannot be selected from external data series. For example, a chart for one stock cannot select to include the Primary signal of another stock. The field itself can be selected and used, but the selection Primary Signal" will not be available for the external data.

For more help with signals, see Creating and Analyzing Entry/Exit Signals.

Using Entry/Exit Systems to Generate Signals

Values in TradingSolutions data series are stored in fields. Like functions, entry/exit systems produce their output in data fields. However, unlike functions, the output of entry/exit systems is a market entry/exit signal that is produced based on rules for when to enter or exit a financial market. Entry/exit system rules can also be looked at as conditions to watch for".

For a step-by-step introduction to this topic, see the tutorial called Make a Traditional Prediction: Part 2.

Creating a New Signal Field with an Entry/Exit System

To apply an entry/exit system to create a signal field, open the Create a Field Wizard and select to create a new field to **Apply a rule-based entry/exit system**. This will begin the Apply an Entry/Exit System Wizard.

The Apply an Entry/Exit System Wizard begins with the Select Entry/Exit System page, which allows you to select which entry/exit system to use for generating a signal. The entry/exit systems are broken into groups that have different purposes. A brief description of each group and entry/exit system is displayed when they are selected, helping you to understand what the selection includes.

The wizard continues with the Select Inputs page, which allows you to select which inputs to provide to the selected entry/exit system. Inputs to functions are typically data fields from the data series to which the signal field is being added; however, they can also be numbers (constant values) or data fields from other data series in the portfolio.

Note: If a data field is selected from a data series that does not have the same dates or periodicity as the target data series, TradingSolutions will use the last known value as the input. For example, if quarterly data is used for an entry/exit system in a daily data series, the value from the preceding quarter will be used until a new quarter is reached. This holding of values can also be seen when charting values from different data series.

The final page of the Apply an Entry/Exit System Wizard is the Select Name page. TradingSolutions provides several suggestions for names for the new field based on the entry/exit system and inputs selected. Any of these names can be used directly from the combo box, or you can enter your own. The name of a field should be something meaningful so that you know what the values in the field are without having to see how they are calculated.

For more help applying an entry/exit system, see the help for the Create Signal Analysis Fields Wizard.

Using the Output of the Entry/Exit System

The output of entry/exit systems is an entry/exit signal of discrete values that indicate which of the rules was true. The rules are checked in the following order to produce the corresponding values.

Enter Long	1.00
Enter Short	-1.00
Exit Long	-0.30
Exit Short	0.30
Hold	0.00

This value can be interpreted as the direction that the rules of the entry/exit system indicate that the data is moving. Positive values indicate the price will increase, requiring a short exit or a long entry. Negative values indicate the price will decrease, requiring a long exit or a short entry. A value of zero indicates that no significant increase or decrease is expected, so the current position should be held.

These signals can be displayed in a Chart View, a Spreadsheet View, or in the Portfolio View in a display field.

For more help with entry/exit systems, see Creating and Analyzing Entry/Exit Signals.

For help with optimizing entry/exit systems, see Optimizing Entry/Exit Systems.

Writing Your Own Entry/Exit Systems

TradingSolutions comes with many built-in entry/exit systems for you to use. However, there may be many situations in which you want to write your own entry/exit systems. In fact, one of the core purposes of TradingSolutions is to help you develop and refine your own entry/exit systems. To this end, adding a custom entry/exit system to TradingSolutions is simply a matter of entering the rules for when to enter and exit the market.

For a step-by-step introduction to this topic, see the tutorial called Writing Custom Entry/Exit Systems.

Creating a New Entry/Exit System

To begin creating a new entry/exit system, use the **Define Entry/Exit Systems** button in the toolbar or select **Define Entry/Exit Systems…** from the **Processing** menu. Either of these options will display the Define Entry/Exit Systems Dialog, from which you can view existing entry/exit systems and create new ones. From this dialog, select the **New…** button beneath the list of systems. This will display the Create an Entry/Exit System Wizard.

Tip: TradingSolutions uses groups to separate entry/exit systems and make them easier to find. When creating a new entry/exit system, try to place it in an appropriate group to make it easier to find later. This can either be an existing group or a new group that you use just for your own systems.

The Create an Entry/Exit System Wizard begins with the Basic Information page. This page allows you to enter the name and description of the new entry/exit system, as well as assign it to a group.

Tip: Try to name your entry/exit systems something that will help you to remember what they do. Using a name like Enter on Upswing" will probably be more useful than a name like Dan's First Entry/Exit System" when you go back to use it.

The next page in this wizard is the Enter Rules page. This is the page where you actually enter the rules for your new entry/exit system using combinations of function definitions. This can be a fairly complex process to get used to, but after writing a few entry/exit systems or functions, it should become a very intuitive process.

For help entering formulas in general, see Formula Entry.

The final pages of the Create an Entry/Exit System Wizard are the Verify Inputs page and, optionally, the Enter Notes page. These pages allow you to verify the order and types of inputs that you will specify when you want to use it. In addition, you can specify any notes about using the entry/exit system at this time.

For more help creating entry/exit systems, see the help for the Create an Entry/Exit System Wizard.

Modifying an Existing Entry/Exit System

There are two ways to modify an existing entry/exit system. The easiest way is to actually modify the definition itself. To modify a definition directly, simply select the entry/exit system definition you would like to modify on the Define Entry/Exit Systems Dialog and press **Edit…**. This will display the Modify Entry/Exit System Dialog, where you can modify the name, rules, input order, or descriptions.

Note: Entry/exit systems that are provided with TradingSolutions are protected from changes. Instead of modifying these directly, you should make a copy and modify the copy.

If you would like to modify an existing entry/exit system without changing the original, you can create a copy of the definition and modify it to suit your needs. For example, if a provided entry/exit system uses one type of moving average and you would like to use another type, you can copy the entry/exit system and replace the type of moving average that is being used.

To copy an entry/exit system, begin by creating a new one. As described above, this is done from the Define Entry/Exit Systems Dialog by pressing the **New…** button beneath the list of entry/exit systems. Then, from the Create an Entry/Exit System Wizard: Basic Information page, press the **Copy another Entry/Exit System…** button. This will display the Copy Entry/Exit System Dialog, where you can select which definition to copy.

Once you select an entry/exit system to copy, your new system will have copies of the rules, descriptions, and notes ready for you to modify. Simply continue through the Create an Entry/Exit System Wizard as you would when creating a new entry/exit system.

For more help with entry/exit systems, see Creating and Analyzing Entry/Exit Signals.

For help distributing your entry/exit systems, see Sharing Your Functions with Other Users.

Generating an Optimal Signal

Sometimes it is useful to see what the optimal trading signal against a data series would be. Using this information, you could compare it to your entry/exit systems to search for ways to improve them. You could also model the optimal trading signal using a neural network in order to predict the best action to take.

TradingSolutions includes an optimal signal generator that uses its knowledge of the future in a data series to determine whether to be in or out of the market at any given point. Since TradingSolutions doesn't have access to future from the present day, this signal can't be used for active trading. However, it is useful for determining the key entry and exit points in historical data.

For a step-by-step introduction to this topic, see the tutorial called Model the Optimal Signal.

Generating an Optimal Signal Field

To create an optimal signal field, open the Create a Field Wizard and select to create a new field to **Generate an optimal entry/exit signal**. This will begin the Generate an Optimal Signal Wizard.

The Generate an Optimal Signal Wizard begins with the Signal Parameters page, which provides you with the ability to select the parameters for how this optimal signal should be generated. Different signals are available depending on whether you will be using the signal for modeling or for seeing where the maximum profit could have been made. In addition, profit criteria can be established so that only trades that generate a certain percentage of profit will be signaled.

For help setting these parameters, see the help for the Signal Parameters page.

The wizard concludes with the Select Name page. TradingSolutions provides several suggestions for names for the new field based on the entry/exit system and inputs selected. Any of these names can be used directly from the combo box, or you can enter your own. The name of a field should be something meaningful so that you know what the values in the field are without having to see how they are calculated.

For more help with optimal signal fields, see the help for the Generate an Optimal Signal Wizard.

How the Optimal Signal is Generated

The optimal signal is based primarily on the specified minimum profit. The optimal signal for each day is based on the potential profit of a trade made on that day and held anywhere from one sample to the specified number of samples into the future. Stepping forward one sample at a time, the potential profit is examined. If the profit would be enough to clear the minimum profit after commissions, an entry signal is generated. The direction of the entry signal is based on the direction of the price movement.

Note: If the **Maximum Profit Signal** type is selected, entry signals will be delayed until the maximum profit can be obtained. For example, if the price decreases one percent in the next sample, then increases ten percent in the following sample, an enter long signal will not be generated for the current day since more profit can be made by entering the trade on the next sample.

If an entry signal is not generated in the specified number of samples, the same range is checked for exit criteria. If the current price is the lowest price over all of the samples, an exit short is generated. If it is the highest, an exit long is generated. The rationale for these exits is that the value of the trade will not improve if the trade is held. Similarly, exits are not generated if the value of an existing trade will improve.

If no entry or exit signals can be generated, a hold signal is generated. This indicates that the price will not change enough in the near future to warrant entering the market. However, there is no advantage to be gained by immediately exiting the market.

If the **Analog Value Signal** type is selected, the actual value of the signal is modified to reflect the underlying price changes. For entry signals, stronger signals are generated for larger price changes. For exit and hold signals, stronger signals are also generated for larger price changes. However, these values are kept within the thresholds for the signals they are generating.

The **Thresholded Analog Signal** type does not contain price strength information.

Using an Optimal Signal

Optimal signal fields can be used like entry/exit system signal fields. They can be displayed in charts and analyzed using the signal analysis tools. As stated above, since they are based on future knowledge, they cannot be used

directly as an entry/exit system. However, they can be used as a desired output of a neural network prediction so that you can try to model the optimal signal to produce an entry/exit signal.

Why Optimal Signals appear Less Than Optimal"

When you display an optimal signal in a chart with price information, it may appear to be making less than optimal, or even losing trades. Here are some common reasons for this impression.

- **The trading style specifies to trade on tomorrow's open.**

  The most common reason for the optimal signal appearing to make bad" trades is that the optimal signal is being displayed with the closing price, but the actual trades are analyzed for the price at the next day's open. This setting is specified in the trading style. In most cases, the closing price and next open are very similar. However, after-hours trading can cause the opening price to be significantly different from the closing price. To correct this in the chart, display the opening price instead of the closing price. Then, use Change Display Properties of Field…" to shift the optimal signal forward one day.

- **The default values allow for draw-downs.**

  You may notice small draw-downs after the optimal signal indicates to enter the market. This is because the optimal signal looks primarily at whether a profit of the specified percent can be made in the next *n* bars while allowing for a small draw-down.

  Note: Including small draw-downs in the optimal signal typically makes it easier to model with neural networks. This is because it allows the optimal signal to concentrate on larger price trends rather than smaller fluctuations in the price which may mask the beginning of a trend.

Using Alternate Values for the Optimal Signal

For most users, using the default optimal signal and adjusting its parameters will provide the results they are looking for. However, there are some advanced situations where you may want to use an alternate optimal signal.

The optimal signal is a mathematical answer to the question when would have been the best times for me to trade?". It has parameters for you to fine-tune the answer to the data you are working with and the relative frequency you want to trade using that data. If the optimal trading you would like to model is more complex than a specific percentage change, alternate calculations can be used to create an optimal signal.

One approach is to change the values used for the values being analyzed. The prices used for trading analysis are defined in the Trading Style. By default, the opening price of the next bar is analyzed. However, any field or combination of fields can be used. For example, an optimal signal could be created which trades against the median price or price normalized by dividing it by an index price.

Note: The values used should typically be raw, averaged or normalized price values. Change, percent change, and indicator values will typically not work well.

Note: When using values not in the normal price range, it is important to set all of the basis" prices to be equal to the Trading Value in the Trading Style. In addition, stops and limits cannot be used since they would require the High and Low to be evaluated.

For help with trading styles, see Using Trading Styles.

Another approach would be to create your own optimal signal using calculations. To do this, create a new entry/exit system and define rules based on the Lead" function. For example, you can create a longer term optimal signal that trades based on price changes over the next 30, 60, and 90 bars.

For more help with signals, see Creating and Analyzing Entry/Exit Signals.

Combining Multiple Signals in a Committee

There may be times when you want to combine the results of multiple fields into a single field. For example, you may have several entry/exit system signals and want to form a consensus signal. You may also have multiple prediction fields and want to combine those values into a single predicted value. Either of these tasks can be achieved using a committee field.

Creating a Committee Field

To create a committee field, open the Create a Field Wizard and select to create a new field to **Combine values with a committee**. This will begin the Create a Committee Wizard.

The Create a Committee Wizard begins with the Select Fields page, which allows you to select which fields will be used to form the committee. Any number of fields can be used in the committee. In addition, specific fields can be given multiple numbers of votes" in order to shift the value in favor of a particular field.

Note: Committees basically take the average of the values of selected input fields. Fields with multiple votes are simply included in the average multiple times. Therefore, giving every field in the committee three votes will have the same effect as giving all of the fields one vote.

The wizard concludes with the Select Name page. TradingSolutions provides several suggestions for names for the new field based on the entry/exit system and inputs selected. Any of these names can be used directly from the combo box, or you can enter your own. The name of a field should be something meaningful so that you know what the values in the field are without having to see how they are calculated.

Creating a Committee of Signal Fields

When you create a committee of signal fields, some additional information is needed for determining how a signal field will vote. This is because many entry/exit signals tend to only be triggered on specific events, such as when one value line crosses another. If these signal values were combined directly into a committee, an entry or exit signal would only be produced when all of the signals were triggered at the exact same time.

To combine signal fields effectively, it is usually desirable to hold some portion of the signal value after it has been triggered. The concept behind this is that a signal indicates when it is a good time to act on the market and that that action will still be valid for a short time after it is generated. Therefore, when creating a committee of signal fields, you can indicate to hold or decay a portion of the signal value. This allows signals that are triggered at close to the same time to be combined into a consensus signal.

For help with the individual settings for these options, see the help for the Create a Committee Wizard.
For help with optimizing committees, see Optimizing Committees of Signals.
For more help with signals, see Creating and Analyzing Entry/Exit Signals.

Calculating Values and Financial Indicators

Calculating Values and Financial Indicators: Overview

There are two types of data in TradingSolutions. One type is the raw data that you import or type in from other sources. The remainder of the data in TradingSolutions is created from calculations and predictions based on that raw data.

New values that are not predictions or entry/exit signals are typically generated using functions. Functions include simple mathematical functions, such as addition and subtraction, and more complex functions, such as financial indicators. In all cases, functions take values that are currently in one or more data series and produce a new value from those values. You can think of either of them as a calculator that produces values for all of the dates in your data series.

The following topics are covered in this section:

- Using Functions to Calculate Values
- Writing Your Own Functions
- Sharing Your Functions with Other Users

Using Functions to Calculate Values

Values in TradingSolutions data series are stored in fields. When you want to take the values in those fields to calculate new values, you create new fields in which to hold those values. For example, if you want to subtract the low price for the day from the high price for the day, you would create a new field to hold the difference between those two values. That new field can be displayed in a chart or used to create other fields.

When you create calculated field, you select a function from within TradingSolutions to perform a calculation. Functions take the values from one or more fields, apply some math to them, and produce a new value. Functions can be simple or complex and, as you will see in later sections, new functions can be created easily by combining existing functions.

For a step-by-step introduction to this topic, see the tutorial called Calculate a Financial Indicator.

Creating a New Calculated Field

To create a new calculated field, open the Create a Field Wizard and select to create a new field to **Calculate an indicator or value**. This will begin the Calculate a Value Wizard.

The Calculate a Value Wizard begins with the Select Alert page, which allows you to select which alert definition to use for this alert. The alert definitions are broken into groups. A brief description of each alert group and definition is displayed when they are selected, helping you to understand what the selection includes.

The wizard continues with the Select Inputs page, which allows you to select which inputs to provide to the selected function. Inputs to functions are typically data fields from the data series to which the field is being added; however, they can also be numbers (constant values) or data fields from other data series in the portfolio.

Note: If a data field is selected from a data series that does not have the same dates or periodicity as the target data series, TradingSolutions will use the last known value as the input. For example, if quarterly data is used for a calculation in a daily data series, the value from the preceding quarter will be used until a new quarter is reached. This holding of values can also be seen when charting values from different data series.

For more information on working with multiple periodicities, see Understanding Periodicity.

Note: If you have selected a function that does not take any inputs, such as date functions, the Select Inputs page will not be displayed.

The final page of the Calculate a Value Wizard is the Select Name page. TradingSolutions provides several suggestions for names for the new field based on the function and inputs selected. Any of these names can be used directly from the combo box, or you can enter your own. The name of a field should be something meaningful so that you know what the values in the field are without having to see how they are calculated.

For more help calculating a value, see the help for the Calculate a Value Wizard.

For more help with functions, see Calculating Values and Financial Indicators.

Writing Your Own Functions

TradingSolutions comes with over 250 built-in functions. However, there may be many situations in which you want to write your own functions. You may have your own financial indicator that you want to test. Or, you may have a series of functions that you perform frequently from which you only need the final value. In both of these cases, you can add your own function to TradingSolutions simply by combining existing functions into a new formula.

For a step-by-step introduction to this topic, see the tutorial called Writing Custom Functions.

Creating a New Function

To begin creating a new function, use the **Define Functions** button in the toolbar or select **Define Functions…** from the **Processing** menu. Either of these options will display the Define Functions Dialog, from which you can view existing functions and create new ones. From this dialog, select the **New…** button beneath the list of functions. This will display the Create a Function Definition Wizard.

Tip: TradingSolutions uses function groups to separate functions and make them easier to find. When creating a new function, try to place it in an appropriate function group to make it easier to find later. This can either be an existing function group or a new function group that you use just for your own functions.

The Create a Function Definition Wizard begins with the Basic Information page. This page allows you to enter the name and description of the new function, along with assign it to a function group.

Functions in TradingSolutions have two names – a descriptive name that appears in selection lists and a short name that is used in formulas. For example, a moving average function might have a selection name of Moving Average" and a formula name of MA". Also, both names must be unique. This is to help you from having to decide which of three Moving Average" functions you wanted.

Tip: Try to name your functions something that will help you to remember what they do. Using a name like Add Three Numbers" will probably be more useful than a name like Dan's First Function" when you go back to use it.

The next page in this wizard is the Enter Formula page. This is the page where you actually enter the formula for your new function using combinations of existing functions. This can be a fairly complex process to get used to, but after writing a few formulas, it should become a very intuitive process.

For help entering formulas using this dialog, see Formula Entry.

The final pages of the Create a Function Definition Wizard are the Verify Inputs page and, optionally, the Enter Notes page. These pages allow you to verify the order and types of inputs that you will specify when you want to use it. In addition, you can specify any notes about using the function at this time.

For more help creating functions, see the help for the Create a Function Definition Wizard.

Modifying an Existing Function

There are two ways to modify an existing function. The easiest way is to actually modify the function itself. To modify a function directly, simply select the function definition you would like to modify on the Define Functions Dialog and press **Edit…**. This will display the Modify Function Definition Dialog, where you can modify the name, formula, input order, or descriptions.

Note: Functions that are provided with TradingSolutions are protected from changes. Instead of modifying these directly, you should make a copy and modify the copy.

If you would like to modify an existing function without changing the original function, you can create a copy of the function and modify that to suit your needs. For example, if a provided function uses one type of moving average and you would like to use another type, you can copy the function and replace the type of moving average that is being used.

To copy a function, begin by creating a new function. As described above, this is done from the Define Functions Dialog by pressing the **New…** button beneath the list of functions. Then, from the Create a Function Definition Wizard:

Basic Information page, press the **Copy another Function Definition…** button. This will display the Copy Function Definition Dialog, where you can select which function to copy.

Once you select a function to copy, your new function will have copies of the formula, descriptions, and notes ready for you to modify. Simply continue through the Create a Function Definition Wizard as you would when creating a new function.

For more help with functions, see Calculating Values and Financial Indicators.

Sharing Your Functions with Other Users

TradingSolutions includes the ability to import and export function definitions, entry/exit systems, and alerts. This is useful for letting other users try your entry/exit systems or trying out ideas that other people have written.

Exporting Definitions

To export your functions, entry/exit systems, and alerts to a file, select **Export Functions…** from the **File** menu. This will display the Export Function Selection Dialog, which allows you to select which functions and entry/exit systems should be included in this export operation. After selecting what to include, press the **OK** button to continue.

For help with the Export Function Selection Dialog, see the help for Selection Tree Dialogs.

Once you have selected which definitions to export, you will see a file selection dialog labeled **Export Functions As**. This dialog allows you to specify the name of the file to export the functions to. Once you have selected a file name and directory, press the **Save** button.

For help with the file selection dialog, see the help for the File Selection Dialog.

Your selected definitions are now in a file that you can distribute to other TradingSolutions users. This file can be distributed like any other file, including transferring it by disk, sending it with e-mail, or placing it on a website.

Importing Definitions

To import exported definitions from a file, select **Import Functions…** from the **File** menu. This will display a file selection dialog labeled **Select Files with Functions to Import**. This dialog allows you to select which file to import definitions from. Typically, TradingSolutions Function files have the extension .tsf". Once you have selected a function file to import, press **Open**.

For help with the file selection dialog, see the help for the File Selection Dialog.

Opening a function file to import displays the Import Function Selection dialog. By default, any definitions that have names that you do not currently have in the program will be selected. You can use this dialog to deselect functions you do not want to import. You can also use it to select updates to functions you want to import over existing definitions. After selecting which definitions to import, press the **OK** button to start the import.

For help with the Import Function Selection Dialog, see the help for Selection Tree Dialogs.

Updating TradingSolutions Functions and Entry/Exit Systems

New versions and updates to TradingSolutions occasionally include new functions, entry/exit systems, and alerts or updates to existing ones. To integrate these changes into your portfolio, import the TradingSolutions Function Seed file NDTSSeed.tsf" included with the update.

Note: TradingSolutions will automatically detect when this file has changed and offer to import the updated definitions. Therefore, it is rarely necessary to manually import this file.

For more help with functions, see Calculating Values and Financial Indicators.

For more help with entry/exit systems, see Creating and Analyzing Entry/Exit Signals.

For more help with alerts, see Using Alerts to Highlight Events.

For help sharing trading solutions, see Sharing Your Solutions with Other Users.

Predicting and Modeling Financial Data

Predicting and Modeling Financial Data: Overview

TradingSolutions features powerful neural network technology that lets you model historical data in order to predict future values and conditions. Using the defaults, these predictions can be created quickly and easily without any knowledge of neural networks. In addition, in-depth model customization and the ability to use Custom Solution Wizard DLLs provide unlimited flexibility to advanced neural network users.

The following topics are covered in this section:

- Using Neural Networks to Predict Values
- Analyzing Predictions
- Configuring Neural Network Models
- Combining Multiple Predictions in a Committee
- Detecting Leading Indicators with Correlation Analysis

The following sections in other chapters also deal with this topic.

- Optimizing Signals and Predictions

Using Neural Networks to Predict Values

Neural networks are mathematical models that are inspired from studies of the brain and the nervous system. They are similar to the brain in that they learn by experience, using data to build a map from a set of inputs to one or more outputs. In mathematical terms, neural networks are adaptive, non-linear systems that model data based on known values. And, once a neural network model has been trained on a set of data, it can be used to classify unknown conditions or predict future values.

For an overview of how neural networks work, see What is a Neural Network?

Predictions in TradingSolutions require a set of inputs and a desired output in order to create a model. For example, if you were trying to predict what the closing price of a stock will be three days from now, you would train the prediction using whatever historical data was relevant to the movement of the closing price as inputs and previous closing prices as desired outputs. The prediction could then be used with the current values of the inputs to predict what the closing price would be in the future.

Like other values in TradingSolutions, predicted values are stored in fields. These values can be displayed in a chart or used to create other fields, such as calculations or trading signals. Therefore, when you want to create a prediction, you do so by creating a new field to hold a predicted value.

For a step-by-step introduction to this topic, see the tutorial called Making Your First Predictions.

Creating a New Predicted Field

To create a predicted field, open the Create a Field Wizard and select to create a new field to **Predict or model a value**. This will begin the Predict a Value Wizard.

Selecting a Desired Output

When you create a predicted field, you begin by selecting a field that holds the history of the value you are trying to predict. This is called the desired output. The desired output can be any field you would like to predict, including price data, financial indicators, and optimal signals.

The Predict a Value Wizard begins with the Select Desired Outputs page. This page allows you to indicate which field you would like to predict, along with how far in advance you would like to predict it for.

You can select to preprocess the desired outputs by predicting the change or percent change in the value, rather than the actual value. This is useful for predicting values such as price data, where new values are strongly related to preceding values. By default, non-signal data is automatically set for preprocessing.

Note: Preprocessed outputs are also post-processed so that the predicted value is in the same scale as the desired value.

When you select a desired output, you must also specify a name for the predicted field. TradingSolutions provides several suggestions for names for the new field based on the field being predicted. Any of these names can be used directly from the combo box, or you can enter your own. The name of a field should be something meaningful so that you know what the values in the field represent.

Most predictions have a single desired output. However, it is also possible to create neural network models that produce multiple predictions. This may be useful when predicting interrelated fields, such as high and low prices for a trading day. The Select Desired Outputs page allows you specify multiple outputs.

Selecting Inputs to a Prediction

After you have selected the values you are trying to predict, you need to select a set of fields to use as inputs on which to base the model. The selection of inputs is the most important aspect to creating a useful prediction, as it represents all of the knowledge that is available to the model to base the prediction on. Conversely, if you put useless garbage into a neural network, you will typically get useless garbage back out.

The Select Inputs page of the Predict a Value Wizard allows you to select which data fields to provide as inputs to your prediction. The data fields can be from the same data series as the desired output or from any other data series in the portfolio.

Note: If a data field is selected from a data series that does not have the same dates or periodicity as the target data series, TradingSolutions will use the last known value as the input. For example, if quarterly data is used for

a prediction in a daily data series, the value from the preceding quarter will be used until a new quarter is reached. This holding of values can also be seen when charting values from different data series or displaying them in a spreadsheet.

For more information on working with multiple periodicities, see Understanding Periodicity.

Any number of inputs can be used for a prediction. However, it is possible to provide too many inputs to a neural network. If a model is trained with lots of irrelevant inputs, it may take significantly longer to train or not be able to train at all. And, if a model is trained with many inputs for a relatively small number of samples, it may be subject to over-training, in which the model simply memorizes the training data and doesn't do well at predicting new values.

Note: Users familiar with neural network concepts occasionally ask if their inputs need to be normalized". TradingSolutions neural networks automatically normalize all data that is fed into them so that you don't have to worry about this additional step.

Selecting a Neural Network Model

The next page in the Predict a Value Wizard is the Select Options page. This page allows you to set general options for how to make your prediction. By default, TradingSolutions will select appropriate pre-configured options for the type of prediction you are making. In most cases, beginning and intermediate users can simply continue from this panel without changing any options.

For help with Custom Solution Wizard DLL's, see Developing Models with NeuroSolutions.

Using the Predicted Fields

Predicted fields can be used like any other fields. Predicted price values and indicators can be displayed in charts and used in calculations and trading systems. Predicted signals can be displayed in charts and analyzed for profitability. You can even use predicted fields as inputs to other predicted fields.

For a step-by-step introduction to this topic, see the tutorial called Making Your First Predictions.

For more help with predictions, see Predicting and Modeling Financial Data.

Analyzing Predictions

Once you have created and trained a prediction for a data series, you will probably want to analyze the prediction to evaluate how well it modeled the historical data. Every time you train a prediction, TradingSolutions automatically analyzes the predicted values against the desired outputs to determine the fitness of the model.

Viewing Prediction Analysis

There are several ways to view the analysis of a prediction:

- **From the Portfolio View**

  Select **Analyze Predictions…** from the context menu for a data series. This will display the Modify Data Series Dialog: Predictions page, which contains a list of all of the predictions for that data series. Individual predictions can then be analyzed by selecting them from the list and pressing the **Analyze…** button.

- **From a Chart View**

  Select **Analyze Field…** from the context menu for a predicted field in the chart.

- **From a Spreadsheet View**

  Select **Analyze Field…** from the context menu for the heading of predicted field in the spreadsheet.

- **From the Modify Data Series Dialog**

  Select the **Predictions** tab to display a list of all of the predictions for the data series. Individual predictions can be analyzed by selecting them from the list and pressing the **Analyze…** button.

- **From the Modify Field Dialog**

  Select the **Training Analysis** tab to display the analysis of a prediction.

  Note: Prediction analysis only appears for fields at the data series level. For prediction fields that were created at the portfolio or subgroup level, the analysis of those fields appears with each data series in the portfolio or subgroup.

Using any of these methods will display the Modify Field Dialog: Training Analysis page.

Analyzing a Specific Prediction

The Modify Field Dialog: Training Analysis page contains several sub-pages that display the analysis of the training of the model. The sub-pages contain a summary of the training information, as well as a comparison of the results to the desired output.

For more help with predictions, see Predicting and Modeling Financial Data.

Configuring Neural Network Models

TradingSolutions comes with several general neural network models that you can use to develop predictions. By default, the program automatically selects an appropriate pre-configured model for the prediction being made. However, there may be times when you want to select a different model or modify the pre-configured model.

Creating Predictions Using General Models

By default, TradingSolutions selects an appropriate pre-configured model for the type of prediction you are making. If you would like to use a general model instead of a pre-configured one, select **Use a general model and configure it now** from the Predict a Value Wizard: Select Options page while you are creating a prediction. Selecting this option will cause the **Next** button to proceed to the Configure Model page where you can select and configure a general model. Additional help with configuring models is below.

For more help with the Predict a Value Wizard, see the help for the Predict a Value Wizard.

Modifying Pre-Configured or General Models

Once a predicted field has been created using either a pre-configured model or a general model, the model can be modified using the Modify Field Dialog: Prediction Model page. Changing any of the options for the model will cause the model to be retrained automatically to account for the new changes. Additional help with configuring models is below.

For more help with the Modify Field Dialog, see the help for the Modify Field Dialog.

Selecting a Neural Model

TradingSolutions comes with several general neural network models. These are broken into two basic types: static neural networks and dynamic neural networks.

Static neural networks train and predict using only current input information. This makes them good for classification problems in that they treat each set of inputs as a separate case. Static networks can also be used for time-series predictions by providing multiple historical samples as inputs. Static neural networks include multilayer perceptrons (MLP), modular networks, and Jordan/Elman networks.

Dynamic neural networks train and predict using current input information, as well as a memory of recent input values and other training values. This makes them good for time-series predictions, such as price predictions, since they automatically maintain a memory of recent information to apply against the current information. Dynamic neural networks include time-lag recurrent networks and recurrent networks.

Most of the processing of a neural network takes place in its hidden layers. All of the neural models in TradingSolutions can have one or two hidden layers. Having fewer hidden layers simplifies a neural model, allowing it to train more easily. Having more hidden layers allows a neural model to learn more complex patterns, but makes it more difficult to train.

Each general neural model in TradingSolutions has a list of characteristics, or subtypes, that can be selected from in order to further refine the model. These primarily vary how the various components of the model are connected, but can also be used to select different types of memory in dynamic networks.

Modifying Individual Neural Network Components

After selecting a neural model on the Predict a Value Wizard: Configure Model page or the Modify Field Dialog: Prediction Model page, you can further modify the neural model by pressing the **Advanced Topology Settings…** button. This will display the Advanced Topology Settings Dialog, from which you can customize the processing elements, memory depths, and learning rates of individual components. By default, TradingSolutions will automatically maintain the best estimates for all of these values.

For more help with this dialog and the individual components, see the Advanced Topology Settings Dialog help.

For more help with predictions, see Predicting and Modeling Financial Data.

Combining Multiple Predictions in a Committee

There may be times when you want to combine the results of multiple fields into a single field. For example, You may have multiple prediction fields and want to combine those values into a single predicted value. You may also have several entry/exit system signals and want to form a consensus signal. Either of these tasks can be achieved using a committee field.

Creating a Committee Field

To create a committee field, open the Create a Field Wizard and select to create a new field to **Combine multiple signals or values using a committee**. This will begin the Create a Committee Wizard.

The Create a Committee Wizard begins with the Select Fields page, which allows you to select which fields will be used to form the committee. Any number of fields can be used in the committee. In addition, specific fields can be given multiple numbers of votes" in order to shift the value in favor of a particular field.

Note: Committees basically take the average of the values of selected input fields. Fields with multiple votes are simply included in the average multiple times. Therefore, giving every field in the committee three votes will have the same effect as giving all of the fields one vote.

The wizard concludes with the Select Name page. TradingSolutions provides several suggestions for names for the new field based on the entry/exit system and inputs selected. Any of these names can be used directly from the combo box, or you can enter your own. The name of a field should be something meaningful so that you know what the values in the field are without having to see how they are calculated.

For help creating a committee of signal fields, see Combining Multiple Signals in a Committee.

For help with predictions, see Predicting and Modeling Financial Data.

Detecting Leading Indicators with Correlation Analysis

Neural networks work by modeling the relationship between the inputs and the outputs. The stronger that this relationship is, the more likely that a neural network will be able to model an appropriate output for each set of inputs.

To facilitate finding good inputs, TradingSolutions includes the Correlation Analysis Wizard, which allows you to compare potential desired outputs to potential inputs to determine if there is a relationship between them.

Correlation analysis uses the Pearson product moment correlation coefficient (r") to determine whether two values increase and decrease at the same times by the similar amounts. It performs this analysis on the previous values of potential inputs to determine the best potential leading indicators based on this type of analysis.

Note: Since correlation analysis uses a linear relationship and neural networks detect non-linear relationships, correlation analysis does not find all possible inputs or even the best possible inputs. However, it can identify strong relationships that may be useful for predictions.

Analyzing Data for Correlations

Correlation analysis is begun by selecting a primary field to analyze. This field is then compared to a list of other fields to determine if there is a correlation between them. The analysis can check if other fields may be good inputs for predicting this field. It can also be reversed to determine if this field may be a good input for predicting other fields.

The primary field for the correlation analysis can be a field in a data series or a field in a group. If a group field is selected, all of the underlying data fields are analyzed as primary fields at the same time.

For example, if you select the Close field for the entire portfolio, the closing price of every data series in the portfolio will be examined against whichever fields you specify.

Depending on whether you are analyzing a data series field or a group field, there are several ways to start the Correlation Analysis Wizard.

If you would like to analyze a field in a data series:

- **From the Portfolio View**

  Select **Analyze Correlations…** from the context menu for a data series. This will display a field selection tree dialog that allows you to select which field to analyze.

- **From the Modify Field Dialog for a data series field**

  Press the **Correlation Analysis** button from the Quick Actions section of the Overview page.

- **From a Chart View**

  Select **Analyze Field…** from the context menu for a field. If a prediction or signal field is selected, a training analysis or signal analysis will appear instead of a correlation analysis. In this case, simply switch to the Overview page and press the **Correlation Analysis** button.

- **From a Spreadsheet View**

  Select **Analyze Field…** from the context menu for the heading of a field in the spreadsheet. However, if a prediction or signal field is selected, a training analysis or signal analysis will appear instead of a correlation analysis. In this case, simply switch to the Overview page and press the **Correlation Analysis** button.

If you would like to analyze a field for an entire group:

- **From the Portfolio View**

  Select **Analyze Correlations…** from the context menu for the portfolio of a subgroup. This will display a field selection tree dialog that allows you to select which field to analyze.

- **From the Modify Field Dialog for a group field**

  Press the **Correlation Analysis** button from the Quick Actions section of the Overview page.

If a correlation analysis has been performed for the selected field, the results of the previous analysis will be displayed on the Modify Field Dialog: Correlation Analysis page. Otherwise, the Correlation Analysis Wizard will be displayed.

Note: If you would like to replace an existing analysis with a new analysis, you can either press the Change Analysis button to modify the existing analysis or press the Delete Analysis button and then start a new one. Both of these buttons appear beneath the current analysis on the Modify Field Dialog: Correlation Analysis page.

Using the Correlation Analysis Wizard

The Correlation Analysis Wizard begins by asking what type of analysis you would like to perform. As stated above, you can check if other fields may be good inputs for predicting this field or determine if this field may be a good input for predicting other fields.

The next page of the wizard is the Analysis Fields page, which allows you to select which fields to analyze. Any field in the portfolio can be analyzed. To narrow the search significantly, you can elect to analyze only one or two fields from each data series. For example, if you are searching for leading indicators to the Close field for IBM, you may want to only analyze the Close fields of other technical stocks, rather than all of the fields in those stocks.

After selecting the fields to analyze, the Correlation Analysis Wizard concludes with the Analysis Options page, which includes settings for the date range to analyze and other options. It is important to note that the date range is restricted to dates that all of the data has values for. This means that if one or more short-term data series are included in the analysis, only a limited date range may be available for analysis.

Once the Correlation Analysis Wizard is completed, TradingSolutions will begin the analysis process. If a large number of fields and leads has been selected, this may take a significant amount of time, especially when analyzing group fields. The Status Dialog will quickly determine a good estimate of the length of the overall process and display that while the analysis is taking place.

Once the analysis has completed, the Modify Field Dialog: Correlation Analysis page will be displayed with the results of the analysis, sorted in order of the strength of correlation. Since a large analysis could potentially produce tens of thousands of results, only the top results are kept and displayed.

This information can be used directly from this page to create new predictions. For data field predictions, simply select the fields you would like to include in a prediction and press **Create a New Prediction from the Selected Fields…**. For group field predictions, select one primary data field to predict and press **Display Correlation for Selected Data Field Only…**. Once the display has been narrowed to one data field, you can create a prediction the same as if the analysis had been run for only that field.

Creating a prediction using this method can be a good way to identify an initial set of potential inputs. As stated above, these inputs may not be the only inputs or the best possible inputs. However, one or more highly correlated inputs should provide a good basis for a new prediction.

Optimizing Signals and Predictions

Optimizing Signals and Predictions: Overview

TradingSolutions features flexible genetic algorithms which allow the software to intelligently search through a large number of settings to arrive at the best solution much faster than trying each possibility one at a time. This allows you to have TradingSolutions search for the optimal settings for creating signals and predictions.

The following topics are covered in this section:

- Understanding Genetic Optimization
- Optimizing Entry/Exit Systems
- Optimizing Committees of Signals
- Optimizing Predictions
- Optimizing Postprocessing of Predicted Signals

Understanding Genetic Optimization

TradingSolutions features flexible genetic algorithms which allow the software to intelligently search through a large number of settings to arrive at the best solution much faster than trying each possibility one at a time. This allows you to have TradingSolutions search for the optimal settings for creating signals and predictions.

For example, let's say you have an entry/exit system that trades when the values of two moving averages cross each other. If you want to find the optimal values of these moving averages between 1 and 100 bars, you could potentially try up to 10,000 potential combinations of the two moving average lengths (100 x 100) in order to find the optimal solution. Genetic optimization can typically find a very good solution to a problem of this type by trying less than 1000 potential combinations.

What Happens Behind the Scenes

Genetic algorithms start with a small group of potential answers called a **population**. Each member of the population is called a **chromosome**, which represents one group of settings – in this case, a pair of moving average lengths. Each setting in a chromosome is called a **gene**.

Genetic optimization begins by testing each chromosome in the population and assigning a value indicating how good a solution it is, called a **fitness**. After the entire population is tested, a new population is created based primarily on the chromosomes with the best fitness using methods such as **crossover**, which combines elements of two chromosomes, and **mutation**, which modifies a gene in a random direction.

Each new population is called a **generation**. Since all possible settings are not being tried, **termination criteria** need to be established to determine when to stop. These criteria typically take the form of a maximum amount of time or a maximum number of generations. In the end, the chromosome with the best fitness is kept and used to return the best settings.

For a more complete overview of how genetic optimization works, see What are Genetic Algorithms?

Optimizing Signals for the Best Results

The goal of technical analysis is to produce effective systems for generating profits in your future trades. In TradingSolutions, these systems help you decide when to trade by providing entry/exit signals. These entry/exit signals can be produced by rule-based entry/exit systems, neural network models of optimal signals, or committees of signals. In each case, genetic optimization can be used to optimize the parameters and settings associated with how the signal is produced so that it is more effective at generating profits.

The fitness of the signal should be a measure of how effective it is at generating profits in future trades. Since future data is not available, the settings are optimized to produce the best results over a set of historical data called the **optimization range**.

A potential problem with optimizing settings based on a specific range of data is that the values selected by the optimization may be overly specialized on that data. In other words, the final solution may be very good at producing profits on the historical data, but not good at producing profitable trades as new data arrives. Because of this, it is important to take several things into consideration when optimizing a signal.

The first consideration is the selection of a fitness measure. Fitness values are how the genetic algorithm rates how good a particular solution is. Therefore, the best fitness values should indicate that a solution will be profitable in all trading, not just trading in the optimization range.

An example that occurs frequently when optimizing on profit is that the most profitable settings for the optimization range may be due to it locating one or two key trades. Unfortunately, the rest of the time, the system provides only marginal performance. When this system is applied to new data, the marginal performance typically continues since the events that caused the key trades occurred only in the optimization range.

To prevent this from happening, better fitness measures are often those which emphasize the consistency of profitability, rather than profitability itself. Examples of these types of measures are the Sharpe Ratio, the Sortino Ratio, and the Calmar Ratio, all of which balance profitability against a negative aspect of the approach, such as volatility or maximum drawdown.

Note: TradingSolutions automatically defaults to a fitness measure such as the Sharpe Ratio. Other fitness measures can be selected in the Trading Style being used to simulate the trading of the signal being optimized.

Another consideration is whether the market conditions in the optimization range are similar to the market conditions that will affect upcoming trading. In most cases, the market conditions will be similar enough to create effective signals. However, if a stock has been going through a massive growth phase during the optimization range and it is now trading in a relatively flat price range, optimizing over this historical data may be ineffective at producing profitable new signals.

To help prevent this from happening, the optimization range is broken up in to three regions. A **training** set is data which is used to calculate the fitness for each chromosome. An optional **cross validation** set is used to determine whether each new generation is producing better general values versus just better results in the training set. Finally, a **testing** set is set aside for you to test the results of the optimized system on new data.

Why Genetic Optimization Can Take A While

The amount of time taken by a genetic algorithm depends primarily on the amount of time it takes to calculate the fitness. If one group of settings (chromosome) takes 1 second to test, 10 generations of 25 chromosomes will take 250 seconds (~4 minutes). However, if each chromosome takes 10 seconds to test, the overall process will take 10 times longer, or about 40 minutes.

As mentioned above, the amount of time taken by genetic optimization is significantly less than trying every potential setting. However, depending on the complexity of the test, this can still be a large amount of time.

In TradingSolutions, the longest tests occur during the optimization of predicted signals. For each chromosome, the following steps need to take place to arrive at a single fitness value:

1. Calculate the values of any optimized inputs.
2. Iteratively train the neural network for a given number of epochs and passes.
3. Optimize the postprocessing of the predicted signal.
4. Simulate the trading of predicted signal to determine the fitness.

Depending on the amount of data being used to train the prediction and the speed of your computer, steps 2 and 3 can take seconds, tens of seconds, or even minutes. This causes the overall optimization to potentially take several hours.

For more help with optimization, see Optimizing Signals and Predictions.

Optimizing Entry/Exit Systems

The parameters to entry/exit systems can be optimized to produce more effective signals. By default, TradingSolutions automatically optimizes any new entry/exit system fields when they are created.

Defining Entry/Exit Systems for Optimization

Entry/exit systems can be defined or modified using the Modify Entry/Exit System Dialog. From the Input and Output Values page, the characteristics of the inputs to the system can be specified by selecting an input and pressing the **Edit…** button. This displays the Modify Input Dialog.

By default, most numeric inputs are set to be optimized. This option can be toggled using the **Include this input during optimization** setting. The default values available to try during optimization are set using the **Optimization Range** controls. These values default to the settings used in the first underlying function where this input was used.

Example: If a Period input is created for a moving average function to the entry/exit system, this input will default to the characteristics of the moving average period.

For more information on defining entry/exit systems, see Writing Your Own Entry/Exit Systems.

Optimizing New Entry/Exit System Fields

Entry/exit system fields are created using the Apply an Entry/Exit System Wizard. The inputs to the entry/exit system are specified on the Select Inputs page.

Inputs which are defined to use constant values can be set to be optimized by selecting **Include this value in optimization**. The range of values available during optimization are set using the **Range** controls.

Optimization of the selected constant inputs will only occur if the **Optimize Inputs Now** control is selected. Optimization settings, such as which trading style and optimization data to use, can be viewed and modified by pressing the **Optimization Options…** button, which will display the Signal Optimization Settings Dialog.

Note: The value used for the fitness calculation is defined in the trading style specified to be used for simulated trading.

Note: If no inputs are defined as constant values or no constant values are included in optimization, optimization will not be available.

Optimizing Existing Entry/Exit System Fields

Entry/exit system fields which have already been created can be optimized (or re-optimized) from the Modify Field Dialog: Entry/Exit System Inputs page. Selecting the **Optimize Inputs Now** control will cause the entry/exit system to be optimized from its current settings when the **OK** button is pressed. Fields which are defined for an entire group can be re-optimized by unchecking and re-checking this control.

For help with general optimization principles, see Understanding Genetic Optimization.

For help with entry/exit systems, see Using Entry/Exit Systems to Generate Signals.

Optimizing Committees of Signals

The number of votes assigned to each member of a committee of signal fields can be optimized to produce more effective signals. By default, TradingSolutions automatically optimizes any new committees of signal fields when they are created.

Optimizing New Committee Fields

Committee fields are created using the Create a Committee Wizard. The members of the committee are specified on the Select Fields page.

If all of the members of a committee are entry/exit signals, the number of votes assigned to each member can be optimized to produce more effective combined signals.

Optimization of the votes will only occur is the **Optimize Voting Now** control is selected. Optimization settings, such as which trading style and optimization data to use, can be viewed and modified by pressing the **Optimization Options…** button, which will display the Signal Optimization Settings Dialog.

Note: The value used for the fitness calculation is defined in the trading style specified to be used for simulated trading.

Note: Optimization is only available if all of the members are signals.

Optimizing Existing Committee Fields

Committee fields which have already been created can be optimized (or re-optimized) from the Modify Field Dialog: Committee Fields page. Selecting the **Optimize Voting Now** control will cause the committee to be optimized from its current settings when the **OK** button is pressed. Fields which are defined for an entire group can be re-optimized by unchecking and re-checking this control.

For help with general optimization principles, see Understanding Genetic Optimization.

For help with committees in general, see Combining Multiple Signals in a Committee.

Optimizing Prediction Inputs and Settings

Many different settings associated with neural network predictions can be optimized to produce more effective signals and values. By default, TradingSolutions automatically optimizes many new predictions when they are created.

Note: This section discusses the optimization of prediction inputs and settings. This is separate from the optimization which occurs for the postprocessing of predicted signals. For more information about that, see Optimizing Postprocessing of Predicted Signals.

Optimizing Prediction Fields

The following settings associated with each prediction can be optimized:

- Input selection
- Optimizable function" input parameters
- Memory depth
- Hidden layer processing elements
- Weight update sample size
- Learning momentum rate
- Learning step size

For predictions of signals, such as the optimal signal, the optimization defaults to maximizing the fitness of the signal. The calculation of this fitness is defined in the trading style being used for postprocessing. This trading style defaults to the trading style used to define the desired output. It can be viewed and modified from the Signal Postprocessing Settings Dialog.

For predictions of values other than signals, the error in the prediction is minimized. The error is defined as the difference between the output of the network and the desired output.

Optimizing Prediction Inputs

When creating a prediction, you can select any combination or existing fields and optimizable functions as inputs. During optimization, these inputs can be enabled or disabled until the set of inputs giving the best results can be determined. In addition, the constant parameters associated with optimizable functions can be optimized.

By default, all inputs are included in optimization. Individual existing field inputs can be excluded from optimization by selecting it and pressing **Modify Input…**, which will display the Modify Prediction Input Dialog. Individual optimizable function inputs are always included in optimization. The settings associated with optimizing individual parameters for optimizable functions can be modified by selecting it and pressing **Modify Input…**, which will display a Modify Field Dialog: Function Inputs page.

After optimization, any optimizable functions which are included in the best solution will automatically create new fields based on the selected parameters and these fields will be added to the input list. If you elect to re-optimize the prediction, TradingSolutions will ask to remove these created fields from the prediction so that the previous results of the optimizable function do not affect the current results.

After optimization, inputs which are being used by the prediction will have a check next to them on the Modify Field Dialog: Prediction Inputs page. References to any other inputs, including optimizable functions, can be removed without modifying the value of the prediction.

Note: Predictions optimized with TradingSolutions v2.1 and earlier require any disabled inputs to reproduce their value since the inputs to the neural network were allocated based on the number and order of the overall inputs. Emulation of this previous requirement is controlled form the Modify Training Settings Dialog.

Optimizing Other Neural Network Settings

By default, TradingSolutions optimizes the inputs and memory depth associated with each prediction. It also automatically maintains all of the other settings associated with the neural network to their default values based on the number of inputs and memory depth being used. These automatic settings are based on the same rules of thumb used when modifying the inputs and memory depth through the interface.

Optimization can also be set to modify the settings in the neural network directly. This is controlled from the Training Optimization Settings Dialog. In order to keep the samples-to-weights ratio at a reasonable level, the optimization can be set to penalize low samples-to-weights ratios. This prevents the optimization from selecting a neural network which is likely to specialize only the training data due to having too many free parameters available.

Optimizing New Prediction Fields

Prediction fields are created using the Predict a Value Wizard. The optimization of new predictions is controlled from the Select Options page. The optimization settings for individual inputs can be accessed from the Select Inputs page.

Two types of optimization defaults are available for optimizing predictions – brief and full optimization. The primary difference between these two settings is the number of generations and maximum time allowed for optimization. Other optimization settings can be used by pressing the **Optimization Settings…** button. The defaults for brief and full optimization can also be adjusted from the Modify Options Dialog: Field Creation page.

Optimizing Existing Prediction Fields

Prediction fields which have already been created can be optimized (or re-optimized) from the Modify Field Dialog: Training Settings page. Selecting **Re-optimize neural network inputs and settings on save** will cause the prediction to be optimized from its current settings when the **OK** button is pressed. Fields which are defined for an entire group can be re-optimized by unchecking and re-checking this control.

Note: As mentioned above, TradingSolutions will request to remove any inputs associated with optimizable functions when a field is re-optimized.

For help with general optimization principles, see Understanding Genetic Optimization.

For more help with predictions, see Predicting and Modeling Financial Data.

Optimizing Postprocessing of Predicted Signals

Neural network predictions train by adjusting their weights in order to reduce the difference between the neural network output and the desired output. If the neural network does not have adequate information in its inputs to make a perfect prediction, it will tend to adjust towards the mean (average) desired output value. When predicting signals, this mean value is typically around zero, which represents a hold signal.

Due to the noise and volatility associated with price data, predicted signals based on price data often remain around this mean of zero even when informative inputs are present. This does not mean that the predicted value does not have any meaning, just that the signal may be compressed towards zero.

To extract the predicted information and turn it into a tradable signal, genetic optimization is used to locate the best values to amplify the predicted output. This optimization occurs automatically for all predicted signals. By default, it is based on the trading style which was used to create the desired output.

The settings associated with signal postprocessing can be viewed or modified from the Signal Postprocessing Settings Dialog.

For help with general optimization principles, see Understanding Genetic Optimization.

For more help with predictions, see Predicting and Modeling Financial Data.

Working with Complete Trading Solutions

Working with Complete Trading Solutions: Overview

Trading solutions are a way to bundle multiple fields together into one concept that can be applied to new data series or exported so that it can be given to other users. This is useful, especially when an entry/exit signal requires multiple predictions or processing steps to create.

The following topics are covered in this section:

- Using Trading Solutions to Create Fields
- Creating Your Own Trading Solutions
- Sharing Your Solutions with Other Users

Using Trading Solutions to Create Fields

Values in TradingSolutions data series are stored in fields. When you apply a trading solution to a data series, you are recreating the steps that were used to create the fields that are stored in that trading solution. For example, if you have an entry/exit signal that compares the outputs of two predictions, you can create a trading solution that, when applied, will recreate this entry/exit signal with these required predictions.

For a step-by-step introduction to this topic, see the tutorial called Applying a Trading Solution.

Applying a Trading Solution

To apply a trading solution to a data series (or group of data) to create new fields, select **Apply a Trading Solution…** from the context menu for that item in the Portfolio View. You can also use the Create a Field Wizard and select to **Apply a trading solution**. Either action will start the Apply a Trading Solution Wizard.

The **Apply a Trading Solution Wizard** begins with the Select Trading Solution page. This page allows you to select which trading solution to apply. Like functions and entry/exit systems, trading solutions are broken into groups that have different purposes. A brief description of each group and trading solution is displayed when they are selected, helping you to understand what the selection will do.

Note: When applying a trading solution to a data series, an additional group is added containing all of the trading solutions that have been created based on the selected data series. Only trading solutions that have been created or updated with TradingSolutions Version 2.0 or later will be included in this list.

The final page of the wizard is the Create Fields page. This page allows you to confirm the primary field that will be created by this trading solution. In addition, advanced options can be accessed to adjust the inputs being used and fields being created.

Note: Trading solutions can be modified to use different external data and inputs. To do this, view the advanced options and press the **Modify Inputs…** button.

For more help applying trading solutions, see the help for the Apply a Trading Solution Wizard.

For more help with trading solutions in general, see Working with Complete Trading Solutions.

Creating Your Own Trading Solutions

TradingSolutions includes several sample trading solutions for you to use. However, the main power of trading solutions is the ability for you to bundle your own working solutions to apply them to other problems or distribute them to other users.

For a step-by-step introduction to this topic, see the tutorial called Creating Trading Solutions.

Creating a New Trading Solution

To begin creating a new trading solution, use the **Define Trading Solutions** button in the toolbar or select **Define Trading Solutions…** from the **Processing** menu. Either of these options will display the Define Trading Solutions Dialog, from which you can view existing trading solutions and create new ones. From this dialog, select the **New…** button beneath the list of solutions. This will display the Create a Trading Solution Wizard.

Tip: TradingSolutions uses trading solutions groups to separate functions and make them easier to find. When creating a new trading solution, try to place it in an appropriate group to make it easier to find later. This can either be an existing group or a new group that you use just for your own solutions.

The Create a Trading Solution Wizard begins with the Basic Information page. This page allows you to enter the name and description of the new trading solution, along with assign it to a group.

Tip: Try to name your trading solutions something that will help you to remember what they do. Using a name like Enter on Upswing" will probably be more useful than a name like Dan's First Trading Solution" when you go back to use it.

The next page in this wizard is the Select Source Field page. From this page, you select the entry/exit signal field or other data field to use as the basis for this trading solution. When you select a field from this page, all of the fields that are required to recreate this field that are not raw data are automatically included in the trading solution.

Note: See below for information on including multiple fields in a single trading solution.

Since most trading solutions are based on entry/exit signals, only that type of field is displayed by default. In addition, if the required fields include any predictions, you can select to include the training weights from those predictions with the solution. Typically, this is only useful if you will be exporting this solution for other people to use on the same data.

The final pages of the Create a Trading Solution Wizard are the Verify Inputs page and, optionally, the Enter Notes page. These pages allow you to verify the order and types of inputs that you will specify when you want to use it. In addition, you can specify any notes about using the trading solution at this time.

For more help creating trading solutions, see the help for the Create a Trading Solution Wizard.

Bundling Multiple Fields in a Single Trading Solution

When you create a trading solution, it automatically includes all of the fields required to create the selected source field. For example, let's say you select a model of an optimal signal as a source field. The trading solution will include that model, the optimal signal, and any calculated indicators required as inputs.

If you would like to include an analysis of the trading of a signal in a trading solution, you can do this by first creating an analysis of the signal. Then, create the trading solution using one of the analysis fields. Since the analysis requires the signal in order to be calculated, it will automatically include the signal and any calculations it requires in the trading solution.

Note: In order to select a signal analysis, such as percent gain, as a source field for your trading solution, you will need to select **Display non-signals in the list of potential source fields.**

If you would like to include multiple unrelated values in a single trading solution, you can do this by creating a single field that uses all of the desired values as inputs. This single field can then be used as the source field for your trading solution. The easiest way to do this is to create a committee of the desired fields, then use the committee as the

source field. The trading solution based on this committee will then automatically include all of the desired fields and the fields required to create them.

Note: The committee being created in this case is only being used as a flexible way to create a list of multiple fields. It is not necessary to set the votes or worry about the value of the committee itself.

For help creating a committee, see the help for the Create a Committee Wizard.

Modifying an Existing Trading Solution

To modify an existing trading solution, select the solution you would like to modify on the Define Trading Solutions Dialog and press **Edit…**. This will display the Modify Trading Solutions Dialog, where you can modify the name, source field, input order, or descriptions. This includes the ability to update an existing trading solution if you have modified the processing of the source field.

For more help with trading solutions, see Working with Complete Trading Solutions.

Sharing Your Solutions with Other Users

TradingSolutions includes the ability to import and export trading solutions. This is useful for letting other users try your solutions or trying out ideas that other people have written.

For a step-by-step introduction to this topic, see the tutorial called Creating Trading Solutions.

Exporting Trading Solutions

To export your trading solutions to a file, select **Export Trading Solutions…** from the **File** menu. This will display the Export Trading Solution Dialog, which allows you to select which trading solution to export. You can also use this dialog to create a new trading solution from a source file and export it directly.

Once you have selected which solution to export, you will see a file selection dialog labeled **Export Trading Solution As**. This dialog allows you to specify the name of the file to export the solution to. Once you have selected a file name and directory, press the **Save** button.

For help with the file selection dialog, see the help for the File Selection Dialog.

Your selected trading solution is now in a file that you can distribute to other TradingSolutions users. This file can be distributed like any other file, including transferring it by disk, sending it with e-mail, or placing it on a web-site.

Note: Only one trading solution can be exported to a file. If you would like to bundle multiple trading solutions together, you can use external file compression tools, such as WinZip.

Importing Trading Solutions

To import exported trading solutions from a file, select **Import Trading Solutions…** from the **File** menu. This will display a file selection dialog labeled **Select Files with Solutions to Import**. This dialog allows you to select one or more files to import solutions from. Typically, TradingSolutions Solution files have the extension .tss". Once you have selected a solution file to import, press **Open**. The trading solution will now be available for you to apply to data series in your portfolio.

For help with the file selection dialog, see the help for the File Selection Dialog.

For more help with trading solutions, see Working with Complete Trading Solutions.

Developing Models with the TradingSolutions Suite

Developing Models with the TradingSolutions Suite: Overview

NeuroSolutions is general neural network creation software from NeuroDimension, the makers of TradingSolutions. NeuroSolutions can be used in conjunction with TradingSolutions to develop new neural network models and functionality. Data can be exported from TradingSolutions to use in NeuroSolutions. And NeuroSolutions, with the Custom Solution Wizard, can be used to generate new models that can be used in TradingSolutions.

TradingSolutions, NeuroSolutions, NeuroSolutions for Excel, and the Custom Solution Wizard are available as a complete package called the TradingSolutions Suite.

The following topics are covered in this section.

- Exporting Data for Use in NeuroSolutions
- Generating Custom Models with the Custom Solution Wizard

For help using TradingSolutions data with other programs, see Exporting Data for Use in Other Programs.

Exporting Data for Use in NeuroSolutions

TradingSolutions can export the training, cross validation, and testing sets of a prediction field to files for use in NeuroSolutions. This is useful for developing your own neural network models for use with the financial data. Once created, most neural models can be generated into DLL's using the Custom Solution Wizard and used directly from TradingSolutions. The created models can also be used directly from within NeuroSolutions.

Exporting Data Associated with a Predicted Field

To export the data associated with a predicted field, view the Modify Field Dialog: Training Settings page for that field and press the **Export Training Data for use in NeuroSolutions…** button. This will display a file selection dialog labeled **Export Training Data As**. This dialog allows you to specify the name of the main file to export the data to. Once you have selected a file name and directory, press the **Save** button.

For help with the file selection dialog, see the help for the File Selection Dialog.

The data for the training set will be saved in the file name selected. If a cross validation set is allocated, the cross validation set will be saved in the same file name with _CrossVal" added. If a testing set is allocated, the testing set will be saved in the same file name with _Testing" added.

Note: Field names with characters that cannot be handled by the NeuroSolutions file component will automatically be converted for use in NeuroSolutions.

Using the Exported Data in NeuroSolutions using the Neural Wizard

On the **Training Data** page of the Neural Wizard, select to use the training set file by pressing the **Browse…** button and selecting the file using the file selection dialog. Only the training set file should be selected from this dialog.

For help with file selection dialogs, see the help for the File Selection Dialog.

Once the file is selected, the exported fields should be listed in the **Training Data** page. These fields include both the input fields and the desired output fields. Any conditional input fields are handled in TradingSolutions. Prior to continuing, the desired fields should be tagged as Desired using the **Desired** button.

Note: The Prediction checkbox should be left unselected. Selecting Prediction mode would indicate that the neural model should predict future values of the inputs, rather than predicting the desired output.

The next page that should be displayed is the **Cross Validation and Test Data** page. Select to read the cross validation and testing sets from a separate file and using the **Input CV…** and **Input Test…** buttons to select the appropriate files. Once these files are selected, NeuroSolutions will automatically detect that the desired values are also in these files.

After the files have been selected, continue to use the Neural Wizard as normal.

Using the Exported Data in NeuroSolutions from an Existing Breadboard

To use the exported data in NeuroSolutions from an existing breadboard, you will need to place file components on the input axon and the criterion and attach the files manually.

- **Adding a File Component to the Input Axon**

  Select the File component from the Input tool palette and stamp it on the pre-activity access point of the input axon. The pre-activity access point is on the lower left of the input axon.

- **Adding a File Component to the Criterion**

  Select the File component from the Input tool palette and stamp it on the desired signal access point of the criterion. The desired signal access point is on the right side of the criterion. If you cannot locate this access point, stamp the file component on the pre-activity access point and use the Inspector for the newly added file component to change the access point to Desired Signal using the Access tab.

- **Selecting the Input Files**

  Use the Inspector for the file component on the input axon and select the **File List** tab. Any current files should be removed. Press the **Add…** button and use the file selection dialog to select the exported training set file. Press the **Open** button, then associate the file with the ASCII - Column" translator and the Training data set. Press the **Close** button.

  Since this is the input file component, you will want to skip the desired output columns by selecting the desired output column and pressing the **Skip** button. When you are finished, press the **Close** button. The selected file

should now be listed in the File List for the file component.

Repeat the above process for the cross validation and testing files. It is not necessary to specify which columns to skip for these additional files.

- **Selecting the Desired Output Files**

  Use the Inspector for the file component on the criterion axon and select the **File List** tab. Repeat the process used for selecting the input files, except indicate to skip all of the input fields and leave the desired output field.

The NeuroSolutions breadboard is now set up to use the exported data.

Generating Custom Models with the Custom Solution Wizard

TradingSolutions comes with several general neural network models that will satisfy the requirements of most types of user predictions. However, advanced neural network users may want to try their own neural network designs. To do this, use NeuroSolutions to design your neural network topology, then use the Custom Solution Wizard to generate those designs as Dynamic Link Libraries (DLLs). These programs are separate from TradingSolutions, but greatly extend the users ability to work with non-standard neural network designs.

Limitations of Using Custom Solution Wizard DLLs

TradingSolutions is limited to using Custom Solution Wizard DLLs that are capable of learning. Specifically, generation of these DLLs requires the Developers level of the Custom Solution Wizard. It also requires that the NeuroSolutions breadboard not be recall-only. TradingSolutions will check any DLLs automatically to make sure that they meet this requirement.

Since custom neural networks can be of any design, TradingSolutions cannot be used to customize the neural network in the Custom Solution Wizard DLL. The number of hidden layers, number of processing elements, memory depths, and learning rates all must be configured through NeuroSolutions. Because of this, genetic optimization is also not available from within TradingSolutions for Custom Solution Wizard DLLs.

Note: DLLs produced with Custom Solution Wizard version 1.02 or earlier have additional limitations. The number of inputs and outputs must be set in the breadboard. Also, the samples per exemplar" setting must be set manually to be compatible to with the total number of training samples for dynamic networks. In addition, the learning curve and other training information will not be available.

Creating Predictions Using Custom Solution Wizard DLLs

By default, TradingSolutions selects an appropriate pre-configured model for the type of prediction you are making. If you would like to use a Custom Solution Wizard DLL instead of an internal model, select **View or modify the neural network model for this prediction** from the Predict a Value Wizard: Select Options page while you are creating a prediction. Then, on the Configure Model page, set **Model Type** to **Use a Custom Solution Wizard generated DLL**.

TradingSolutions will automatically look for a weights (.nsw) file with the same name as the DLL in the same directory as the DLL. This file is typically not required, but is used to restore any weights from the NeuroSolutions breadboard that may have been set manually and are not updated during training. When moving or renaming the DLL, be sure to include the weights file.

Training Custom Solution Wizard DLLs

Static networks will be trained using the settings on the breadboard.

Dynamic networks will be trained using the Online/Batch and Samples Per Exemplar settings on the breadboard. However, if the number of samples per exemplar in the DLL is larger than the number of samples in the training set, the number of samples per exemplar will be lowered to the number of samples available.

For more help with the Predict a Value Wizard, see the help for the Predict a Value Wizard.

For more help with predictions, see Predicting and Modeling Financial Data.

Customizing the TradingSolutions Software

Customizing TradingSolutions

Many of the defaults and characteristics of TradingSolutions can be tailored to meet the preferences of individual users. This section provides an overview of the options and customizations that can be made to the TradingSolutions program.

The following topics are covered in this section:

- Changing Global Defaults
- Using Custom Field Formats

In addition, several topics in other sections also deal with customization issues:

- Customizing Toolbars
- Customizing Sounds
- Managing Data with the Portfolio View
- Configuring Neural Network Models
- Writing Your Own Functions
- Writing Your Own Entry/Exit Systems
- Creating Your Own Trading Solutions
- Developing Models with NeuroSolutions

Changing Global Defaults

Changing Defaults for this Portfolio

Many of the default settings in TradingSolutions can be changed to fit individual preferences. To change most of these general options, select **Options…** from the **Tools** menu. This will display the Modify Options Dialog, which contains several property pages for modifying program settings.

The following options can be changed from the Modify Options Dialog:

- **Charting Defaults**

  The Charting page allows you to control the amount of data displayed by default when you open a chart. It also allows you to select which fields are displayed when you press the Chart button in the Information View.

- **Field Creation Defaults**

  The Field Creation page allows you to change many of the defaults used when creating new optimized or predicted fields.

- **Portfolio Contents**

  The General page allows you to control whether the Portfolio View will display the name associated with the data, the symbol, or both.

  Note: To change which fields are displayed in the Portfolio View, see Using Display Fields.

- **Signal Analysis Defaults**

  The Signal Analysis page allows you to change the default trading style and date range to use when automatically analyzing signals for display on the Modify Data Series: Entry/Exit Signals page.

- **Sounds**

  The Sounds page allows you to change the sounds associated with certain events in TradingSolutions.

- **Startup Behavior**

  The General page allows you change whether the Welcome Dialog is displayed when TradingSolutions is started. It also allows you to select whether to restore previously open charts and spreadsheets.

  Note: This page can also be reached by selecting **Change Startup Behavior** from the Welcome Dialog.

For help modifying the field formats, see Using Custom Field Formats.

Changing the Work Directory

By default, TradingSolutions will store all of your data in a subdirectory called **Work** beneath the directory where TradingSolutions was installed. If you would prefer to have your data in another location, use the **Change Work Directory…** option from the **File** menu. This will display a Folder Selection Dialog, which will let you select a new Work directory.

Using Custom Field Formats

TradingSolutions determines how to display numeric values in the Portfolio View and Spreadsheet View using Field Formats. Each time a field is created or imported, it is assigned a default format based on the type of information it appears to contain.

In addition to several standard formats included with TradingSolutions, custom formats can be created and used to adjust the way fields are displayed. For example, additional decimal places can be added to the display. Or, alternate methods can be used for displaying negative numbers.

Selecting a Format for a Field

TradingSolutions will automatically select to display fields either in a numeric format or in an entry/exit signal format. In addition, signal analysis fields are assigned specific numeric formats based on the information they contain.

When creating a new calculated field, you can set the new field to be formatted as a signal on the Calculate a Value Wizard: Select Name page. To select the format, simply select or deselect **Display this field as an entry/exit signal.**

After a field has been created, you can select a new format on the Modify Field Dialog: Overview page. Fields using the Signal" format will be displayed as signals. All other formats will be displayed in the specific numeric format. If a field is changed to the Signal" format, it will be analyzed as an entry/exit signal and be displayed on the Modify Data Dialog: Entry/Exit Signals page. If a field is change from a Signal" format, its analysis will be removed.

Modifying or Creating Field Formats

The field formats included with TradingSolutions can be modified to display numeric values to best fit your needs. In addition, new field formats can be created to use in different situations. To modify or create field formats, select **Define Field Formats** from the **Tools** menu. This will display the Define Field Formats dialog.

Answers to Common Questions

Answers to Common Questions

Occasionally, TradingSolutions users have questions about the operation of the program. This section contains the answers to many of the commonly asked questions. Since new questions are always being asked, answers to additional questions may also be found on the TradingSolutions web site.

This section is divided into the following topics:

- Questions about using TradingSolutions
- Questions about the Chart View
- Questions about the Spreadsheet View
- Questions about Importing and Exporting
- Questions about Functions
- Questions about Trading Systems
- Questions about Predictions

Questions about using TradingSolutions

Questions about Files

How do I save my work?

TradingSolutions operates directly from your hard disk. All of your changes are made directly to files as you enter them. You do not need to indicate to save changes since all of your changes are saved automatically.

What TradingSolutions files should I copy when I am backing up my system?

All of your work is saved in the **Work** subdirectory. By default, this subdirectory is located beneath the TradingSolutions directory on your system. Backing up the contents of this directory will save all of your functions, data, and most customization settings.

I am running out of disk space on the hard drive with TradingSolutions on it. How can I move where my data is stored?

All of your work is saved in the **Work** subdirectory. By default, this subdirectory is located beneath the TradingSolutions directory on your system. To move where your data is stored, move this subdirectory to another location. Then, the next time you run TradingSolutions, select **Change Work Directory…** from the **Tools** menu to point to the new location.

I will be running TradingSolutions from a read only location on a computer running Windows NT. How can I set where my data will be stored?

All of your work is saved in the **Work** subdirectory. By default, this subdirectory is located beneath the TradingSolutions directory on your system. To change where your data will be stored, create a subdirectory (folder) where your work can be stored. When TradingSolutions is started, it will ask for a location that it can use for a Work directory.

Note: The location of the Work subdirectory is stored with the user settings. If multiple users will be logging onto the Windows NT system, the location of the Work subdirectory must be set for each user. Each user can be set to use a different subdirectory or they can all share the same subdirectory. However, multiple users should not be set to use the same Work subdirectory if they will be logged on at the same time.

Questions about Installation

How can I run TradingSolutions on both my workstation and my laptop?

NeuroDimension has special options for this type of installation. Please send mail to info@tradingsolutions.com for more information about this.

I just added a new hard drive to my computer and would like to move the TradingSolutions program to the new hard drive. What is the best way to do this?

The best way to move TradingSolutions to a new place on your computer is to uninstall it using the Windows Control Panel Add/Remove Programs", then reinstall it from the CD or installation download. Prior to doing this, it is a good idea to backup any Work directories you may be using.

If you would simply like to move your work to a new hard drive, just move the **Work** subdirectory to the new hard drive. Then, the next time you run TradingSolutions, select **Change Work Directory…** from the **Tools** menu to point to the new location.

Questions about the Chart View

General Questions

How can I display more data in a chart window?

This question can have several different meanings, each of which is answered below.

If you would like to change the date range being displayed, right-click on the date axis at the bottom of a chart and select a new date range from the context menu. You can display all of the data in the data series of the first item by selecting **Display Entire Range**.

If you would like to make the Chart View window larger to display more data, you can maximize that window by pressing the maximize gadget in the title bar of the chart window. The maximize gadget is the button with a square in it, next to the button with an X in it.

You can also make more room for the Chart View and Spreadsheet View windows by temporarily hiding the Portfolio View. To do this, press the **Toggle Portfolio View** button in the toolbar, or select **Toggle Portfolio View** from the **View** menu. Select this option again to restore the Portfolio View.

If you would like to add additional fields to a Chart View, select **Add/Change Fields in Chart…** from any chart context menu. This will display the Display Fields in Chart Dialog.

Questions about the Date Axis

Why are the lines for the days of the month and the month labels not aligned?

Charts can be zoomed such that the date axis displays selected days of the month on top and the month of the year on the bottom. When the date axis displays these values, the major lines on the top represent the beginning of a week (typically Monday). When the first trading day of a month is not on a Monday, the line representing the start of the month will not be aligned with the line for the start of the week.

Why does the date axis appear collapsed or bunched around some dates?

The date axis may appear collapsed or bunched if there are holes in the data. In other words, if a data series is missing date records for the month of November, the date axis in the chart view will collapse, causing October to be followed by December. To eliminate this effect, the holes in the date range can be filled in using the Spreadsheet view to add the missing dates to the data series.

Questions about the Spreadsheet View

General Questions

How can I display more data in a spreadsheet?

This question can have several different meanings, each of which is answered below.

If you would like to reduce the size of the text in the spreadsheet, select **Zoom Out** from the context menu for the Date column heading. You can also use the mouse wheel of Microsoft Intellimouse to adjust the scaling by holding down the **Ctrl** key while moving the mouse wheel.

If you would like to make the Spreadsheet View window larger to display more data, you can maximize that window by pressing the maximize gadget in the title bar of the chart window. The maximize gadget is the button with a square in it, next to the button with an X in it.

You can also make more room for the Chart View and Spreadsheet View windows by temporarily hiding the Portfolio View. To do this, press the **Toggle Portfolio View** button in the toolbar, or select **Toggle Portfolio View** from the **View** menu. Select this option again to restore the Portfolio View.

If you would like to add additional fields to a Spreadsheet View, select **Change Spreadsheet…** from the context menu for any column heading. This will display the Display Fields in Spreadsheet Dialog.

Questions about Calculated Fields

Why are there empty cells at the start of some of my calculated and predicted fields?

Empty cells represent null values. Null values are typically produced when there is not sufficient data to calculate a value. This can be due to one of the inputs to a calculation or prediction being null, or a calculation or prediction requiring a previous value that is not yet available. For example, a moving average is an average of the current value with the specified number of previous values. A moving average of ten requires nine previous values to be calculated. Therefore, the first nine records for a moving average will be null.

Null values are propagated. For example, a moving average of a moving average will be null until the first moving average has enough values to calculate the second moving average. In this case, a moving average of ten of a moving average of ten will begin with eighteen null values – nine for the first moving average and nine for the second.

Predictions require all of their inputs to be non-null to produce a value. If you are using the change in a value as an input, it is important to note that this requires the current value and the previous value to be calculated.

> Note: This restriction only applies to the inputs to the neural network. The memory included in some neural network topologies will produce values as long as all of the current inputs are available. However, it is important to be aware that random values may be used in the memory at the beginning of the data.

Why are there empty cells at the end of my optimal signal field?

Empty cells represent null values. Null values are typically produced when there is not sufficient data to calculate a value. This can be due to one of the inputs to a calculation or prediction being null, or a calculation or prediction requiring a previous value that is not yet available. In this case, an optimal signal field uses a specified number of future samples to generate an appropriate signal. If the required future samples are not available, the optimal signal will not be able to be generated.

Questions about Importing and Exporting

Questions about Text Files

Why are some of the dates from my text file are missing?

If you imported a file using space as a field delimiter, it may be possible that different numbers of spaces were separating the fields in some records. If this is the case, the file import may have skipped over those records since they appeared invalid.

If this is the case, make sure that the file is not a fixed width column file rather than a space delimited file. Fixed width column files separate columns by allocating a certain number of characters to each column. This is different from a delimited file, which uses a specific character to denote the start of a new column.

Questions about Downloading from ProphetFinance.com

Why is some of my data not being updated when I select to update from the Internet?

Prophet associates a type with each data symbol. This type can be seen on the Modify Data Series Dialog: Name page. If Prophet indicates that it does not recognize a data symbol or that your account currently does not include that type of data, the type will be set to Other (Not Updated)". This will cause TradingSolutions to not try to update this data.

If you would like to use update for data that currently has the type Other (Not Updated)", simply change the type to any other value.

Questions about Processing after Import

Why was a stock split detected when one didn't occur?

After you import new data into an existing data series, TradingSolutions checks to see if the newly imported data changes by a significant amount from the existing data on the previous day. Although TradingSolutions uses several rules to detect for splits, the basic rule is that if the data changes by more than 25%, a split may have occurred.

This analysis is only performed for data series that have both a Close field and a Volume field. The data that is examined is the Close field. This means that if you have a Close column with non-price data, it will still be checked. Or, if your price data does not contain a Close field, it will not be checked.

It is important to remember that this analysis is performed on the transition date between the existing data and the newly imported data. This is because most historical data is already split-adjusted. This check is performed so that you can adjust your existing data to match the split-adjusted data. Therefore, the date associated with this check is typically not the date of the actual stock split.

Stock split processing is always optional. TradingSolutions simply reports all of the potential times when a split adjustment may be necessary. If you do not perform a split adjustment when it is suggested after import, you can perform it manually from the Spreadsheet View by selecting **Split Adjust From This Date…** from the context menu for a particular date.

Why do some fields take longer to update than others following an imported update?

You may notice that following an import update that some calculated fields process very quickly, while others take several seconds. This is because the processing of some fields is dependent on any previous processing that may have occurred. For example, function definitions that depend on the previous value of the function and signal analysis fields are recalculated from the beginning. Predictions are also recalculated from the beginning since many neural network topologies are dependent on the current state of the model.

Questions about Functions

Questions about Writing Functions

How can I add additional processing to a function I have written?

From the Modify Function Definition: Formula page, select the portion of the formula that you would like to add processing around. Then, select the Special sub-page and press the **Add Level** button. This will add an Identity function around the selected section. This identity function adds no additional processing in itself; however, it can now be selected and replaced with another function definition.

How can I specify the end of the range for functions that take a period as an input?

Many functions, such as Summation, Moving Average, Highest, and Lowest, that take a period of time as an input. In most cases, this period is the number of samples to include in the calculation, up to and including the current sample. However, there are times when it may be desirable to calculate these values for a range that does not include the current example. For example, you may want to calculate the highest value between 10 and 14 bars ago.

You can do this by using the Lag function around the function you are performing. The Lag function delays the value of its input by a specified number of samples. Therefore, you can use this function to report a previous value of functions such as the Summation, Moving Average, Highest, and Lowest.

For example, calculating the highest value between 10 and 14 bars ago could be entered as Lag(Highest(Value,5),10). In other words, the highest value over a period of 5 bars from 10 bars ago.

Questions about Calculated Fields

Why are there empty cells at the start of some of my calculated fields?

Empty cells represent null values. Null values are typically produced when there is not sufficient data to calculate a value. This can be due to one of the inputs to a calculation or prediction being null, or a calculation or prediction requiring a previous value that is not yet available. For example, a moving average is an average of the current value with the specified number of previous values. A moving average of ten requires nine previous values to be calculated. Therefore, the first nine records for a moving average will be null.

Empty values are propagated. For example, a moving average of a moving average will be empty until the first moving average has enough values to calculate the second moving average. In this case, a moving average of ten of a moving average of ten will begin with eighteen null values – nine for the first moving average and nine for the second.

Questions about Entry/Exit Systems and Signals

Questions about Entry/Exit Systems

Why are my entry/exit systems not producing exit signals when the exit rules are true?

The rules associated with an entry/exit system are checked in the following order:

- Enter Long
- Enter Short
- Exit Long
- Exit Short

In other words, the exit rules will only be evaluated when the entry rules are not true.

The order of rule evaluation cannot be changed. However, you can add logic to your entry rules to check for relevant exit conditions and not enter in those situations.

So that you do not have to enter the same logic in the entry and exit rules, you can create a function definition with the logic for when to exit. Then, evaluate this function as part of both the entry and exit rules.

Questions about Optimal Signal Generation

Why did the optimal signal generator not generate any signals?

The optimal signal generator uses several parameters to determine when to generate entry and exit signals. Two of these parameters are the number of samples into the future that are available and the minimum profit per trade. If the minimum profit is set too high for the number of samples being examined, no signals will be generated. This can happen when the trading price is relative stable.

Example: If the minimum profit is set to 10% and the number of samples into the future is set to 5, the trading price will need to change by enough in a five day period to create a 10% profit after the entry and exit commissions are deducted. For a $1000 investment and $10 commission, the trading price would need to change by a little over 12% in five days.

Why did the optimal signal generator produce losing or low profit trades?

The primary thing to check here is to make sure that the signal analysis you are looking at is using the same trading style as the optimal signal field. The trading values for automatic signal analysis can be viewed from the Signal Analysis Options Dialog. Remember, there are both global settings and data-level settings for this analysis. If a data series has its own settings, they will override the global settings. The trading values for signal analysis fields can be viewed from the Modify Field Dialog for the signal analysis field. If the optimal signal is being analyzed using different trading values than it was analyzed for, it may produce losing or low profit trades.

Losing and low profit signals can also be produced for the analog and thresholded analog types of optimal signals. This occurs when the market appears to be a good opportunity for a short trade on one day and a good opportunity on a long trade soon afterwards. With the maximum profit type of optimal signal, the signal would wait for the peak or valley before changing position. However, with the analog and thresholded analog types of optimal signals, an opposing entry signal may be generated before the profit of the first signal is realized.

Why are there empty cells at the end of my optimal signal field?

Empty cells represent null values. Null values are typically produced when there is not sufficient data to calculate a value. This can be due to one of the inputs to a calculation or prediction being null, or a calculation or prediction requiring a previous value that is not yet available. In this case, an optimal signal field uses a specified number of future samples to generate an appropriate signal. If the required future samples are not available, the optimal signal will not be able to be generated.

Why did my prediction produce a higher gain than the optimal signal?

There are several situations in which an entry/exit system or a model of the optimal signal can produce higher gains than the optimal signal.

The primary reason that this will occur is that the optimal signal is not calculated at the end of the data series. Since the optimal signal generator uses a given period of future prices to determine the best position, it can not be calculated when those prices are not available. This causes the optimal signal to not change positions during that period, possibly resulting in losses or missed trading opportunities.

Another reason that the optimal signal can be beaten is the way it is calculated. The optimal signal is generated so that it only takes advantage of changes that produce a minimum gain. By default, this minimum gain is 5%. However, trades yielding lesser gains can be effectively used to greatly increase the overall gain. Because of this, models of the optimal signal can produce better gains than the original optimal signal. This is especially true since these models are optimized for maximum profit by default.

An additional reason is that the analog optimal signal is not an optimal signal that produces the maximum profit. The analog optimal signal will produce an entry signal as soon as it is possible to make the minimum profit. However, the maximum profit may have been gained if the trade was delayed. This is reflected in the strength of the analog signal. To analyze or chart the maximum profit signal, set the type of the optimal signal to maximum profit.

Note: The maximum profit optimal signal does not include strength information and, therefore, may be more difficult to predict.

Questions about Signal Analysis

Why is the By Bar analysis delaying executing my signals by one bar?

When a signal is generated, it typically requires the values on the current bar to be available. The earliest possible time that this signal could be executed would be during the next bar. (The exception to this is when daily bars are used and after hours trading is considered. Unfortunately, after hours trading does not have a bar associated with it.)

To account for this, signal analysis executes a generated signal at the start of the bar after it was generated. This being said, the price used for this trade can be set to be based on the opening price for that bar, the closing price from the bar that the signal was generated, or other values.

Why does the amount of equity at the end of the By Bar analysis not match the overall or By Trade analysis?

In order to simulate completed trades, the overall analysis and the By Trade analysis both close the last trade internally, causing an exit commission to be paid. The By Bar analysis does not pay this exit commission.

Why are my optimization targets not being reached even though I have a positive fitness value?

If you have set target values in a trading style and these targets are met, you will typically get a positive fitness value. Likewise, if you get a negative fitness value, one or more of the targets may not have been met. However, when you are looking at the signal analysis, you may encounter values that do not reach their targets even though a positive fitness has been reported. Why is this?

The primary thing to do is to compare the date range of the signal analysis to the date range used for the optimization. The fitness values were set based on the ability of the targets to be reached within a specific date range. The values for another date range may be significantly different.

Another thing to consider is that it is possible to get positive fitness values even when some targets are not reached. This is especially true for targets set for low importance, or targets that were narrowly missed relative to the overall expected range of values.

Why is the final gain (loss) on a trade larger than the maximum loss?

The maximum loss for each trade is set using the trading value. In other words, this is the worst loss you could receive by performing a normal exit from the trade without slippage. A larger loss may be incurred if the stop price is reached and this price is worse than any preceding trading prices.

Why does the signal analysis have a different number of trades from the charted entry/exit signal?

The analysis displayed on the Modify Field Dialog: Signal Analysis page may not match the entry/exit signals displayed in a Chart View or Spreadsheet View. Here are some common causes for this:

- **Trades Excluded by Analysis Date Range**

  The date range being analyzed may not include all of the data. This can cause entry signals that appear in a chart or spreadsheet to not be included in the analysis.
  This date range is reported on the **Overview** page as the **Analysis Date Range** and can be modified in two

places. The default signal analysis options can be set from the Modify Options Dialog: Signal Analysis page. The signal analysis options for this data series can be overridden from the Signal Analysis Options Dialog.

- **Trades Excluded by Analysis Activity**

  The signal analysis may be only performing long or short trades. This can cause all long or short entry signals that appear in a chart or spreadsheet to not be included in the analysis.
  The analysis activity can be set in two places. The default signal analysis options can be set from the Modify Options Dialog: Signal Analysis page. The signal analysis options for this data series can be overridden from the Signal Analysis Options Dialog.

- **Entry Signal for First Trade Does Not Appear in Chart View**

  By default, entry/exit signals that are displayed in the Chart View do not include redundant signals. For example, once an Enter Long signal has been displayed, no Enter Long signals will be displayed until after an Enter Short or Exit Long signal has been displayed. Therefore, if the signal analysis date range does not start at the beginning of the data, a redundant entry signal that is not displayed in the chart may start the first trade. Redundant entry/exit signals can be displayed in the Chart View by changing the display characteristics for a charted entry/exit signal from the Change Display Properties Dialog.

Why does the percent equity value for my signal analysis field not match the value I had in TradingSolutions Version 1.0/1.1?

Signal analysis fields that report equity values as a percentage may report different values than those reported in TradingSolutions Version 1.0/1.1. The difference appears specifically on the bar that signals are generated. This is because the entry commission was previously charged at the end of the bar on which the signal was generated. Now, the entry commission is charged at the start of the following bar. This value is otherwise unchanged.

Questions about Predictions

Questions about Defining Predictions

Why does my group-level prediction have a limited date range available?

Predictions that are defined for all of the data series in a group are restricted to using only the dates that are available in all of the data series in that group.

This can be a problem if a group contains data series that have less data available than others. A quick way to view the start and end dates of all of the data series in a group is to add the Start Date and the End Date as display fields in the portfolio view. These values can be sorted to quickly identify individual stocks that may be limiting the available range.

For help with display fields, see Using Display Fields.

How do I set my prediction date range to allow for a production set”?

A production set” is a secondary testing set which can be used for additional out-of-sample analysis of a prediction. By default, TradingSolutions includes the data up to the end of the currently known values in its predictions and sets aside the last portion of this for normal out-of-sample testing.

To use two ranges of data for out-of-sample testing, any of the following options can be used:

- **Analyze the Testing Set as two ranges.**
  While only one portion of the optimization range is set aside for out-of-sample testing, you can perform signal analysis on any date range. Therefore, you could limit your initial usage of the testing set to a portion of the data available.
- **Manually adjust the Optimization Range.**
  The optimization range associated with a prediction or optimization defaults to use the most recent data. However, this range can be adjusted from the Modify Optimization Range Dialog to exclude recent data so that it can be used as a production set.
- **Delay the importing recent data.**
  Since the optimization range associated with a prediction is limited to data available in your portfolio, you can exclude recent data from the optimization range by delaying importing it until you are ready to use it for testing. You can modify the date range being imported from data services on the Import Data Wizard: Select Data to Download page.

Questions about Training

Why did my prediction stop training?

The training phase will stop either when the maximum number of epochs has been reached or when the error on the cross validation set does not improve after a given number of epochs. It can also be stopped manually by pressing the **Stop Training** button on the Status Dialog during the training phase.

Typically, this question is asked when the training stops before 100% of the status has completed. This occurs when the error on the cross validation set increases after it does not improve after a given number of epochs. This is normally an indication that the training of the model is beginning to over-specialize on the training set, making it less effective at generalizing values outside of the training set. The number of epochs to wait for an improvement can be set on the Modify Training Settings Dialog.

Why did my prediction remain at 0.0000% improvement, but not stop training?

The improvement displayed on the Status Dialog is the percent change in the cross validation error over each epoch. Since this value is rounded to four decimal places, subtle improvement may still be taking place.

In addition, training is only stopped when the error on the cross validation set increases. If the error remains unchanged, training will continue since the training is not over-specializing on the data in the training set and further training may produce improvements.

Why do the training passes have different learning curves for the same data?

Each training pass is started with a random set of weights in the neural network. These weights are the values that are adjusted during the training of the network. The learning curve is a measure of the error produced by the current set of weights in the network. Since each pass begins with a random set of weights, the learning curves will appear different. This includes not only the starting position, but the overall shape since the training is approaching reducing the error from different initial conditions.

How can I view the learning curve after the training phase has completed?

The learning curve is available on the Learning Curve sub-page of the Modify Field Dialog: Prediction Analysis page.

How can I change, retrain, or optimize a prediction without losing my current training weights?

If you would like to improve an existing model but would also like to keep the current training weights in case you are not able to improve upon them, there are several ways to accomplish this.

The best way to do this is to make a copy of the prediction you would like to modify and then make your changes to the copy. To make a copy of a prediction, create a new prediction field and select to **Copy Another Prediction** on the Predict a Value Wizard: Select Desired Outputs page. This will duplicate the settings associated with the original prediction, but will not copy the weights. Therefore, any changes or new training should take place on this new copy. However, note that if you have other fields that use the results of the original prediction, they will continue to use that field unless they are modified to use the copy.

Another way to save the current training weights of a prediction is to create a trading solution based on the prediction. When you create a trading solution, you are given the option to save the weights associated with the predicted fields in the solution. Once the trading solution is created, you can modify the original prediction directly. The original prediction can be restored by applying the trading solution. However, note that when you apply a trading solution, it will create a new field with the original weights. It will not overwrite the original prediction field.

For help with trading solutions, see Working with Complete Trading Solutions.

How can I view the actual values of the input and desired outputs being used for training the neural models?

The preprocessed values of the inputs and desired outputs for a prediction can be exported from TradingSolutions from the Modify Field Dialog: Training Settings page. The **Export Training Data for use in NeuroSolutions…** button can be used to create files containing the preprocessed values of the training, cross validation, and testing sets in comma-separated text files.

Questions about Genetic Optimization

Why is the optimization phase not evaluating all of the chromosomes (tests) in a generation?

When the genetic algorithm used in the genetic optimization phase produces a new generation, it is possible that chromosomes will be produced that are the same as those in the previous generation. If a chromosome has been evaluated in a previous generation, it is not re-evaluated.

The likelihood of duplicate chromosomes being produced can be reduced by increasing the mutation rate on the Modify Genetic Algorithm Settings Dialog. This will make it more likely that random elements will be introduced into the population. However, this can also make it more difficult to evolve better chromosomes from previous best chromosomes.

How can I resume genetic optimization after I use the Stop Genetic button?

If you select **Re-optimize neural network inputs and settings on save.** from the Modify Field Dialog: Training Settings page and restart the training, the current model will be used to generate the initial generation of the genetic optimization. This is similar to resuming the genetic optimization, except that the remainder of the last genetic population will not be recreated.

If you press the **Resume Training** button on the Modify Field Dialog: Overview page or the Training Analysis: Overview sub-page, only the best training from the genetic optimization will be resumed.

How can I view the genetic optimization graph after the optimization phase has completed?

The genetic optimization graph and statistics are available on the Training Optimization sub-page of the Modify Field Dialog: Prediction Analysis page.

Why does the graph of the genetic optimization worst cost contain spikes with a value of 1?

When the genetic algorithm used in the genetic optimization phase produces a chromosome that is invalid, it technically has an infinite cost. This cost is reduced to 1 for the purposes of evaluation and graphing. This typically appears when genetic optimization of prediction inputs is being used and an offspring is produced which has no inputs enabled.

Questions about Prediction Analysis

Why is the word failed" next to the name of my prediction in the selection trees?

The word failed" appears next to prediction fields when the field cannot be trained due to an error. There are several reasons that predictions can fail. For more detailed information on why this prediction failed, see the Modify Field Dialog: Prediction Analysis page.

Questions about Predicted Values

Why did my prediction not produce any values?

There are several things you will want to examine to determine why a prediction did not produce any values.

First, make sure that the prediction has been trained for this data series. This can be checked quickly from the Modify Data Series Dialog: Data Fields page. If the prediction has the word failed" next to the name of the field, the field could not be trained due to an error. There are several reasons that predictions can fail. For more detailed information on why this prediction failed, see the Modify Field Dialog: Prediction Analysis page.

If the prediction has the word deferred" next to the name of the field, either the training or the prediction was deferred or cancelled. To resume the processing of deferred fields, press the **Calculate Pending Fields** button at the bottom of the Modify Data Series Dialog: Data Fields page. You can also resume deferred processing by selecting **Resume Deferred Processing…** from the **Tools** menu or by selecting **Resume Deferred Processing** from the toolbar.

If no messages are listed next to the field name, the next thing to check is the current inputs to the prediction. Use the Modify Fields Dialog: Prediction Inputs page to view which fields are required as inputs to the prediction. After verifying that these are the desired inputs, display these fields in the spreadsheet view to ensure that these fields have values. If any of the input fields to a prediction do not have values, the prediction will not have a value.

Why are there empty cells at the start of my predicted fields?

Empty cells represent null values. Null values are typically produced when there is not sufficient data to calculate a value. This can be due to one of the inputs to a calculation or prediction being null, or a calculation or prediction requiring a previous value that is not yet available. Predictions require all of their inputs to be non-null to produce a value. If you are using the change in a value as an input, it is important to note that this requires the current value and the previous value to be calculated.

> Note: This restriction only applies to the inputs to the neural network. The memory included in some neural network topologies will produce values as long as all of the current inputs are available. However, it is important to be aware that random values may be used in the memory at the beginning of the data.

Why does my predicted value appear to lag the actual price by a few bars?

When predicting a desired output with change or percent change preprocessing, the neural network may find that the least error it can produce with the given inputs is to predict no change in price. This causes the predicted value to appear to lag the actual price by the number of bars associated with the prediction since it is predicting that no change will occur from the previous value. This is typically a sign that the neural network does not have enough information to produce a good model. Better results may be achieved with additional relevant inputs.

Glossary

TradingSolutions Glossary

Glossary_TA B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Absolute Value

The unsigned portion of a number. Specifically, any negative numbers are converted to positive numbers.

Account Equity

See Equity.

Account Profit

See Profit.

Accounts Payable

A term used in annual and quarterly reports to indicate the amount of money a company owes to its suppliers.

Accounts Receivable

A term used in annual and quarterly reports to indicate the amount of money a company is owed by its customers.

Accumulation

The beginning of a bull market. After most investors are discouraged with the declining prices of a bear market, new investors begin accumulating shares at their new low price.

Alert

A way of highlighting when certain conditions occur. Alerts are a type of field that generates a message when a given set of rules are true.

For help with alerts, see Using Alerts to Highlight Events.

Alert Definition

A definition associated with generating an alert. Alert definitions include the format of the message to generate and the rules to check for when to generate that message.

For help with alert definitions, see Writing Your Own Alert Definitions.

Alpha

The amount an investment performs relative to the entire market. Typically, this is a comparison to the performance of the Dow Jones Industrial Average or the S&P 500.

American Stock Exchange

A stock exchange in the United States dealing primarily with small and medium-sized companies.

AMEX

See American Stock Exchange.

Analog Value Signal *(Optimal Signals Usage)*

A type of optimal signal. Analog value signals adjust the strength of the signal based on the potential profitability of the signal.

For help with optimal signals, see Generating an Optimal Signal.

Annualized Return

The annualized gain or loss from an initial investment. It can be used to evaluate the overall profitability of the signal. This value is the annualized return on the investment from its initial value to its final value. Additional background information is available on the help for the Modify Trading Style Dialog.

Annual Trades

The average number of trades that took place over the period of an entire year.

Artificial Neural Network

See Neural Network.

ASCII File

See Text File.

Ask Price

The lowest price an investor will accept to sell a stock.

At the money *(Options Trading Usage)*

An option that has a strike price equal to the price of the underlying security.

Axon

A type of component in a neural network. Axons represent the place where information enters or is processed in the neural network. This is different from synapses, which combine and weigh the information in the axons.

For help with neural network components, see the Advanced Topology Settings Dialog help.

TradingSolutions Glossary

Glossary_TA BGlossary_B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Backpropagation

When training a neural network, using the difference between the current neural network output and the desired output to adjust the weights that produced that output.

For an overview of how neural networks work, see What is a Neural Network?

Backtesting

Applying a trading strategy to historical data to determine its effectiveness against previous market conditions.

For help analyzing signals, see Creating and Analyzing Entry/Exit Signals.

Bar

One unit of data. For daily data, a bar represents the data for a single trading day. This is also referred to as one sample of data.

Batch Weight Update

An update of the training weights based on the cumulative information of the entire training set. Batch weight updates are more stable than online weight updates, but are more subject to settling on a global average solution.

For help with neural network settings, see the Advanced Topology Settings Dialog help.

Bear Market

A long term trend in the market in which the prices generally decrease.

Bearish

An indication or belief that the prices in the market will decrease.

Benchmark

A value used for comparison. Typically, this is a broad market index, such as the performance of the Dow Jones Industrial Average or the S&P 500. In TradingSolutions, benchmarks can be set as part of a trading style.

For help with trading styles, see Using Trading Styles.

Beta

The amount an investment changes relative to the entire market. Typically, this is a comparison to the performance of the Dow Jones Industrial Average or the S&P 500.

For help with signal analysis values, see the Modify Field Dialog: Signal Analysis page help.

Bias Axon

A component in a neural network that linearly adjusts all of the values that pass through it by a bias, or multiplier.

For help with neural network components, see the Advanced Topology Settings Dialog help.

Bid-Ask Spread

The difference between the bid and ask prices.

Bid Price

The highest price an investor will to pay to buy a stock.

Blank Cell

See Empty Cell.

Bond

A debt that is taken over a period of more than a year. Buying a bond is technically lending money to the seller of the bond for the period of time specified.

Breadth

The number of stocks that are participating in the movement of the general market.

Bull Market

A long term trend in the market in which the prices generally increase.

Bullish

An indication or belief that the prices in the market will increase.

Buy/Hold

The value that an investment would have if a security was bought at the beginning of an analysis period and not sold during that period.

Buy/Sell Signal

An indication of the best time to buy or sell a stock based on one or more factors in the market. In TradingSolutions, these are referred to as Entry/Exit Signals to include other types of market trading.

For help with entry/exit signals, see Creating and Analyzing Entry/Exit Signals.

TradingSolutions Glossary

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Calculated Field

A field that uses a function definition on a set of inputs to produce a result.

For help with function definitions, see Calculating Values and Financial Indicators.

Call Option *(Options Trading Usage)*

An option contract that gives the purchaser the right, but not the obligation, to purchase the underlying security at a specific price on or before a specific date. In the case of European options, the purchase must occur on a specific date.

Calmar Ratio

This value is the annual percent gain over the maximum drawdown from high equity. It is similar to the Sharpe Ratio, but penalizes based on the worst case scenario, rather than on volatility.

Candlestick Chart

A charting method that displays the high, low, open, and closing prices of a security. Originally developed in Japan, it displays rises in the open/close price as white boxes and declines as black boxes. In TradingSolutions, black boxes are displayed as colored boxes so that multiple charts can be displayed at one time.

For help creating candlestick charts, see Displaying Data in a Chart.

Channel

A charting method that plots two lines, one above and one below the average price of a security. These two lines form an area, or channel, where the price is normally found. Prices that move above or below the channel are often considered to be indications of new trends.

Chart View

A TradingSolutions window that can display a chart of one or more data fields in a portfolio.

For help with the Chart View, see Displaying Data in a Chart.

Chromosome *(Genetic Algorithms Usage)*

A member of a population during genetic optimization. A chromosome represents one potential set of values or settings to be analyzed during the optimization process. If the values in a chromosome produce good results, it is more likely to be used in the creation of new chromosomes through crossover and mutation.

For help with optimization, see Optimizing Signals and Predictions.

Close

The price that a security was trading at when the markets closed for a given day.

Closing Bell

A bell traditionally rung at the end of a normal trading day in the New York Stock Exchange. This sound is also used in TradingSolutions as the Processing Completion sound.

For help with setting sounds, see the help for the Modify Options Dialog: Sounds page.

Comma-Delimited File

A text file in which the columns are separated by commas. In other words, a file that uses the comma character (,) as the field delimiter.

For help with text files, see Importing Data into TradingSolutions.

Commission

The amount paid to a broker or trading organization to execute a trade. Commissions are typically paid both when entering the market and exiting the market.
TradingSolutions simulates commissions by deducting a specified amount when each trade is entered and exited.

For help setting the commission, see Using Trading Styles.

Committee

A collection of multiple fields that are combined to make a single value by voting" for a result. Technically, this is a weighted average of the values of the included fields. It is useful for combining multiple predictions into one predicted value or multiple signals into one signal.

For help with committees, see Combining Multiple Predictions in a Committee or Combining Multiple Signals in a Committee.

Composite Field

A general term for a line in the Chart View that requires more than one field. Data in candlestick charts and HLOC charts are examples of composite fields.

For help with the Chart View, see Displaying Data in a Chart.

Constant

A value that does not change from use to use or record to record.

Context Axon

A component used in Jordan/Elman networks to apply processing to previous information.

For help with neural network components, see the Advanced Topology Settings Dialog help.

Context Menu

A menu of options for a specific object in TradingSolutions. Context menus are displayed by right-clicking on the object you would like to perform an action on.

Correction

A movement of the price in the opposite direction of the previous movement by about 1/3 to 2/3 of the previous change. This is caused by the previous movement taking the price beyond the perceived worth of the security, causing the price to move back to an appropriate value.

Correlation

A tendency for two values to move in the same direction by the same relative amount. TradingSolutions uses correlation as part of its analysis of predictions. The Correlation Analysis Wizard is also available to identify leading and lagging indicators.

For help analyzing predictions, see Analyzing Predictions.

Cover Short

See Exit Short Signal.

Criterion

A component in a neural network that examines the amount by which the value produced by the neural network differs from the desired value. During training, the criterion uses this information to adjust the training weights through backpropagation.

For help with neural network components, see the Advanced Topology Settings Dialog help.

Cross Validation Set

A set of data used during the training of a neural network. The cross validation set is used to determine if the training weights are specializing on the data in the training set, rather than improving on the general case. It is important to note that the training weights are not adjusted based on the cross validation set; it is used only for determining the best set of weights for the general case.

For help with predictions, see Predicting and Modeling Financial Data.

Crossover *(Genetic Algorithms Usage)*

An activity during genetic optimization during which a portion of one chromosome is combined with the portion of another chromosome. In effect, taking half of a good chromosome and half of another good chromosome in an attempt to produce a better result. When a crossover occurs, a random crossover point is selected and both of the combinations of the genes from before and after the crossover point are analyzed.

For help with optimization, see Optimizing Signals and Predictions.

CSW

See Custom Solution Wizard.

Current Tasks Window

A window in TradingSolutions that displays the tasks that TradingSolutions is currently working on.

For help with the Current Tasks Window, see The Current Tasks Window.

Custom Solution Wizard (CSW)

An add-on product for NeuroSolutions which enables you to generate neural network breadboards into callable dynamic link libraries (DLLs). TradingSolutions can use Custom Solution Wizard DLLs for processing.

For help using the Custom Solution Wizard with TradingSolutions, see Developing Models with NeuroSolutions.

Custom Solution Wizard DLL (CSW DLL)

A dynamic link library (DLL) produced by the Custom Solution Wizard. Custom Solution Wizard DLLs contain the functionality of breadboards created with NeuroSolutions.

For help using the Custom Solution Wizard with TradingSolutions, see Developing Models with NeuroSolutions.

TradingSolutions Glossary

Glossary_TA B C DGlossary_D E F G H I J K L M N O P Q R S T U V W X Y Z

Data Field

See Field.

Data Groups

See Subgroups.

Data Series

A collection of data fields associated with a single ticker symbol. A typical data series for a stock may have high, low, open, close, and volume fields, along with other fields that process that data.

Date Delimiter

The character used to separate the components of a date. For example, the date 08/30/1966 uses the forward slash (/) as the date delimiter.

Date Order

The order of the month, day, and year components of a date. For example, MDY would indicate the date would appear in the order month, day, year (08/30/1966).

Date Range

The range of data used for a particular operation, delineated by the dates associated with that data. Date ranges typically have a start and end date. If a start date is not specified, the first available date is used. If an end date is not specified, the last available date is used.

Decimal Places

The number of digits after the decimal point used to express fractional numbers. Values beyond the specified number of decimal places are rounded.

Deferred Fields

Fields that still require processing because the previous processing for them has been cancelled. To process deferred fields, select **Resume Deferred Processing** from the **Tools** menu or press the **Resume Deferred Processing** button on the toolbar. If these options are not available, no fields are currently deferred.

Delay Synapse

A component in a neural network that behaves the same as a synapse, but delays the output for one sample.

For help with neural network components, see the Advanced Topology Settings Dialog help.

Delta *(Options Trading Usage)*

The amount that the price of an option will change for a one point move of the price of the underlying security.

Description

A short text describing the usage of a function definition, entry/exit system, or trading solution. A more complete text on the usage and values can be stored in the notes for that definition. Descriptions are also available for the groups that contain these definitions.

Desired Output

A field used during the training of a neural network to indicate the value that should result from a given set of inputs. The value of the desired output is compared to the value being produced by the network to determine the error to be used during backpropagation.

Dialog

A window in the interface that appears above the rest of the program windows. In most cases, a dialog must be dismissed by pressing an **OK** or **Cancel** button before any new activities in the program can be performed.

Display Date

The date that is associated with the display fields in the Portfolio View. By default, the display date is set for the current day; however, it can be set to previous days to compare previous values.

Display Field

A value that is displayed in the Portfolio View. Typically, display fields are used to keep an eye on the current entry/exit signals for the stocks you are interested in. However, they can also be used to compare aspects of different stocks.

Distribution

The beginning of a bear market. After most investors are discouraged with the rising prices of a bull market, current investors begin selling shares at their new high price.

DLL

See Dynamic Link Library.

Drag and Drop

A general term referring to a way of interacting with the program. Drag and drop involves putting the mouse over an item, pressing and holding down the left mouse button, moving the mouse to a new location to which the item should be moved, and releasing the button.

Draw Down

The maximum amount of equity that a trade or trading strategy loses during open trades. This can be calculated from the initial investment or from the highest equity.

Dynamic Link Library (DLL)

A file that contains a library of functions usable by other programs. Dynamic link libraries (DLLs) typically have the extension .dll". The Custom Solution Wizard can be used to produce DLLs with the functionality of breadboards created with NeuroSolutions.

Dynamic Neural Network

A type of neural network that includes memory elements or recursion that allow it to identify patterns that occur over multiple samples. This is different from a static neural network, which examines only the patterns between the current set of inputs. Time-lag recurrent networks and recurrent networks are examples of dynamic neural networks.

For help with neural network topologies, see the Modify Field Dialog: Prediction Model page help.

TradingSolutions Glossary

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Earnings Per Share

The total annual profit of a company divided by the number of outstanding shares.

Empty Cell

A cell in the Spreadsheet View that does not contain a value. This is also called a null value.

End Date

The last date in a range of data used for a particular operation, delineated by the dates associated with that data. Date ranges typically have a start and end date. If an end date is not specified, the last available date is used.

Enter Long Signal

An entry/exit signal that indicates the best time to buy a stock to take advantage of an upcoming price increase. An enter long signal implies that any short sales should be exited, as well.

For help with entry/exit signals, see Creating and Analyzing Entry/Exit Signals.

Enter Short Signal

An entry/exit signal that indicates the best time to short sell a stock to take advantage of an upcoming price decrease. An enter short signal implies that any currently owned shares (long entries) should be exited, as well.

For help with entry/exit signals, see Creating and Analyzing Entry/Exit Signals.

Entering the Market

The act of taking a trading position in the market. This can involve buying a stock (entering long) or short selling a stock (entering short).

Entry Signal

An Entry/Exit signal that indicates the best time to enter the market. An enter long signal indicates when to buy the stock to take advantage of an upcoming price increase. An enter short signal indicates when to short sell the stock to take advantage of an upcoming price decrease. An entry signal also implies that any opposite trades should be exited, as well.

For help with entry/exit signals, see Creating and Analyzing Entry/Exit Signals.

Entry/Exit Rules

The conditions that make up an entry/exit system, indicating when to generate an entry or exit signal.

Entry/Exit Signal

An indication of the best time to buy or sell a stock based on one or more factors in the market. These are also called Buy/Sell signals when referring specifically to long trading.

For help with entry/exit signals, see Creating and Analyzing Entry/Exit Signals.

Entry/Exit System

A collection of rules (conditions) that analyze one or more factors in the market to produce Entry/Exit Signals.

For an overview on entry/exit systems, see What is an Entry/Exit System?

For help using entry/exit systems, see Creating and Analyzing Entry/Exit Signals.

Entry/Exit System Group

A collection of entry/exit systems. Groups are used to separate definitions during selection. Typically, the definitions in a group share common characteristics.

Epoch

A single presentation of all of the data in the training set during the training of the neural network. This also includes any analysis of the cross validation set.

Equity

The total worth of a trading account. This includes the current value of any investments and any amounts not invested.

For help with entry/exit signals, see Creating and Analyzing Entry/Exit Signals.

Equity By Bar

The analysis of the equity of a trading account on a record-by-record basis. For daily data, this is the same as examining the data on a day-by-day basis.

For help with entry/exit signals, see Creating and Analyzing Entry/Exit Signals.

Equity By Trade

The analysis of the equity of a trading account on a trade-by-trade basis.

For help with entry/exit signals, see Creating and Analyzing Entry/Exit Signals.

Equity Curve

The total worth of a trading account charted against time.

For help with entry/exit signals, see Creating and Analyzing Entry/Exit Signals.

Error

The difference between the desired output and the value produced by the neural network.

For help analyzing predictions, see Analyzing Predictions.

eSignal

A data service from which data can be imported directly into TradingSolutions.

For help using eSignal, see Importing Data from eSignal.

Exemplar

A grouping of data that is presented to a neural network for training. For static neural networks, each exemplar contains one sample. For dynamic neural networks, each exemplar may contain one or more samples.

Exit Efficiency

This value is the percentage of the maximum gain for each trade that was achieved at the exit of each trade. This is useful for determining if trades are being held past their maximum value. Values close to 100% indicate that the trades are typically being exited when the maximum profit is available. Lower values indicate that higher profits may be possible if the strategy for generating exit signals were more aggressive.

Exit Long Signal

An entry/exit signal that indicates the best time to sell currently owned shares of a stock prior to an upcoming price decrease. Typically, the anticipated price decrease is not large enough to warrant entering short.

For help with entry/exit signals, see Creating and Analyzing Entry/Exit Signals.

Exit Short Signal

An entry/exit signal that indicates the best time to buy out of a short sale prior to an upcoming price increase. Typically, the anticipated price increase is not large enough to warrant entering long. This is also referred to as covering a short.

For help with entry/exit signals, see Creating and Analyzing Entry/Exit Signals.

Exit Signal

An entry/exit signal that indicates the best time to exit the market. An exit long signal indicates when to sell currently owned shares of the stock prior to an upcoming price decrease. An exit short signal indicates when to

buy out of a short sale prior to an upcoming price increase. Typically, the anticipated price change is not large enough to warrant entry in the opposite direction.

For help with entry/exit signals, see Creating and Analyzing Entry/Exit Signals.

Exiting the Market

The act of ending a trading position in the market. This can involve selling stock that was purchased (exiting long) or buying stock to cover a short position (exiting short).

Expectancy Score

This value indicates the amount expected to be returned by each trade. It equals the percent wins times the average win, minus the percent losses times the average loss. It can be risk-adjusted by dividing by the largest loss.

Exporting

An action that makes data or functionality in a program available to other programs or users of that program.

For help with exporting, see Exporting Data for Use in Other Programs.

TradingSolutions Glossary

Glossary_TA B C D E FGlossary_F G H I J K L M N O P Q R S T U V W X Y Z

FAQ

See Frequently Asked Questions.

Feedforward

An attribute of a neural network topology in which the values can bypass the processing in one or more hidden layers. Values that go through feedforward processing are combined with values that go through the hidden layers to produce a single value.

Field

One column of data in a data series. For example, the closing price of a stock is one field in the data series for that stock. Fields are used to hold data and calculate new values based on this data.

Field Delimiter

The character used to separate columns in a text file. Most text files are either comma-delimited or tab-delimited.

For help with text files, see Importing Data into TradingSolutions.

Field Format

A set of formatting characteristics to use when displaying a field in the Spreadsheet View or the Portfolio View. Field formats are referred to by name and can be applied to one or more fields. For example, the Price format is used by default for High, Low, Open, and Close fields.

For help with field formats, see Using Custom Field Formats.

Financial Indicator

A calculation based on the price and/or volume of a stock to determine a trend in those values.

Fitness *(Genetic Algorithms Usage)*

The evaluation of a potential set of values or settings during genetic optimization. Sets of values that produce better results than other sets of values are said to have a better fitness.

For help with optimization, see Optimizing Signals and Predictions.

Fixed Width

A file format in which columns are assigned a fixed number of characters rather than being delimited by a character.

For help with text files, see Importing Data into TradingSolutions.

Float

The number of shares outstanding for a common stock. Also, an abbreviation of floating point, which refers to a representation of numbers that allows for fractional amounts.

Focused Network

A type of time-lag recurrent network that has memory only in the input axon. An unfocused network also has memory in each hidden layer.

For help with neural network topologies, see the Modify Field Dialog: Prediction Model page help.

Format

See Field Format.

Formula

The portion of a function definition that indicates how to process the inputs in order to produce an output. Formulas are also used when defining entry/exit system rules.

For help with function definitions, see Calculating Values and Financial Indicators.

Four Digit Years

A specification that the year component of a date should include all four digits of the year, rather than just the last two digits.

Fractional Shares

Trading the ownership of incomplete shares, for example half and quarter shares. This is typically done to facilitate investing specific amounts of money. In actual trading, it is typically only available when trading mutual funds.

Frequently Asked Questions (FAQ)

A collection of common questions that arise about a given topic.

For answers to frequently asked questions about TradingSolutions, see Answers to Common Questions.

Fully Recurrent Network

A recurrent neural network that does not include a non-recurrent feedforward processing path. Because of this, all data must flow through the recurrent processing.

For help with neural network topologies, see the Modify Field Dialog: Prediction Model page help.

Function Definition

A series of mathematical calculations that take a set of inputs and produces a single output. A function definition is used when creating a calculated field. One function definition can be used in any number of fields and can also be used when creating new function definitions and entry/exit systems.

For help with function definitions, see Calculating Values and Financial Indicators.

Function Group

A collection of function definitions. Groups are used to separate definitions during selection. Typically, the definitions in a group share common characteristics.

Fundamental Analysis

Analyzing securities by examining the earnings and assets of the underlying companies. This differs from Technical Analysis, which examines the trading of those securities.

For an overview of technical analysis, see What is Technical Analysis?

TradingSolutions Glossary

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Gain

The percentage that the equity has increased.

Gamma *(Options Trading Usage)*

The amount that the delta of an option will change for a one point move of the price of the underlying security.

Gamma Memory

A type of memory used in dynamic neural networks. Gamma memory is similar to an exponential moving average in that a percentage of each new value is combined with an opposing percentage of the previous value. Each additional memory tap does this with the value of the previous memory tap. This allows fewer memory values to be used to store more historical information, but may significantly water down the information in those values.

For help with neural network components, see the Advanced Topology Settings Dialog help.

For help with neural network topologies, see the Modify Field Dialog: Prediction Model page help.

Gaussian Mutation *(Genetic Algorithms Usage)*

A type of mutation used during genetic optimization. Gaussian mutation uses a bell-curve around the current value to determine a random new value. Under this bell-shaped area, values that are closer to the current value are more likely to be selected than values that are farther away.

For help with optimization, see Optimizing Signals and Predictions.

Gene *(Genetic Algorithms Usage)*

A single value or setting that is being optimized during genetic optimization. A collection of genes is called a chromosome.

For help with optimization, see Optimizing Signals and Predictions.

Generation *(Genetic Algorithms Usage)*

A set of chromosomes during genetic optimization. Each new generation is produced by modifying the previous generation in an attempt to highlight the characteristics that produced the best results.

For help with optimization, see Optimizing Signals and Predictions.

Genetic Algorithm

A method typically used for trying multiple solutions from a large set of potential solutions. A subset of the solutions are evaluated, then modified (evolved) in an attempt to find a best solution by highlighting the characteristics that produced the best results.

For an overview of how genetic algorithms work, see What are Genetic Algorithms?

Genetic Optimization

Using a genetic algorithm to find an optimal solution. See Genetic Algorithm above.

For help with optimization, see Optimizing Signals and Predictions.

Global Defaults

Settings that are used by the entire program unless another value is selected.

Group

In TradingSolutions, this term has multiple uses. Data can be placed in groups (also called subgroups) for organization and processing. Because of this, the portfolio as a whole is sometimes included when referring to

possible groups of data. Function Definitions, Entry/Exit Systems, and TradingSolutions can also be placed in groups to make them easier to find.

TradingSolutions Glossary

Glossary_TA B C D E F G HGlossary_H I J K L M N O P Q R S T U V W X Y Z

Hidden Layer

A layer of processing between the input and the output of a neural network. Each additional hidden layer in a neural network theoretically allows it to learn more complex patterns, but also makes it harder to train well.

For help with neural network topologies, see the Modify Field Dialog: Prediction Model page help.

High

The highest price at which a security traded during a given day.

HLOC Chart

A charting method that displays the high, low, open, and closing prices of a security.

For help creating HLOC charts, see Displaying Data in a Chart.

Hold Signal

An entry/exit signal that indicates the current position should not be changed. This is typically generated during a time of uncertainty when the price may increase slightly, decrease slightly, or stay level.

For help with entry/exit signals, see Creating and Analyzing Entry/Exit Signals.

TradingSolutions Glossary

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Importing

An action that brings data or functionality into a program.

For help importing data, see Importing Data into TradingSolutions.

In the money *(Options Trading Usage)*

An option with a strike price better than the current price of the underlying security. For example, a call option with a strike price below the price of the security.

Index Option *(Options Trading Usage)*

An option in which the underlying security is an index, such as the S&P 500. This can be viewed as a bet on the direction of a broad section of the market.

Information View

A window in TradingSolutions that displays information about the group or data series that is currently selected in the Portfolio View.

For help with the Information View, see Tracking Data with the Information View.

Input

Data that is put into a calculation or prediction to produce a new value.

Input Axon

A component in a neural network that allows data to be brought into the neural network for processing.

For help with neural network components, see the Advanced Topology Settings Dialog help.

Integral Axon

A component used in Jordan/Elman networks to apply processing to previous information.

For help with neural network components, see the Advanced Topology Settings Dialog help.

Intraday

An indication of the periodicity of the data. Intraday data has a new High / Low / Open / Close bar every given number of minutes.

Investment

The amount of money that is invested during simulated trading of an entry/exit signal.

For help setting the investment size, see Using Trading Styles.

TradingSolutions Glossary

Glossary_TA B C D E F G H I JGlossary_J K L M N O P Q R S T U V W X Y Z

Jordan/Elman Networks

A group of neural network topologies that include those produced by the research of Michael I. Jordan and Jeffrey Elman.

For help with neural network topologies, see the Modify Field Dialog: Prediction Model page help.

TradingSolutions Glossary

Glossary_TA B C D E F G H I J KGlossary_K L M N O P Q R S T U V W X Y Z

There are no glossary entries beginning with the letter K.

TradingSolutions Glossary

Glossary_TA B C D E F G H I J K LGlossary_L M N O P Q R S T U V W X Y Z

L2 Temporal Criterion

A specific type of criterion that includes the ability to adjust the error based to better model time-related data.

For help with neural network components, see the Advanced Topology Settings Dialog help.

Laguarre Memory

A type of memory used in dynamic neural networks. Laguarre memory is similar to gamma memory in that a percentage of each new value is combined with an opposing percentage of the previous value. However, Laguarre memory includes improvements that make the values of later memory taps include more specific information.

For help with neural network components, see the Advanced Topology Settings Dialog help.

For help with neural network topologies, see the Modify Field Dialog: Prediction Model page help.

Learning Curve

A graph of the difference between the desired output and the output produced by the neural network for each epoch of training.

For help analyzing predictions, see Analyzing Predictions.

Learning Rate

A group of values that control the amount by which the training weights in a neural network component will be adjusted based on the backpropagated error. In TradingSolutions, the learning rate is made up of the step size and the momentum.

For help with neural network settings, see the Advanced Topology Settings Dialog help.

Limit Order

An order to buy or sell a security at a given price or better. Limit orders have the advantage of naming an advantageous price, but run the risk of not being executed in a timely manner, if at all. Limit orders have lower precedence than market orders.
For example, if the current price of a security is 50 and you would like to enter long, you may place a limit order at 49 in hopes of buying at that price before it goes up.
Limit orders can be simulated during signal analysis during trade entry to help increase profitability.

For help using limit orders, see Using Trading Styles.

Local Minima

A reference to one or more local minimums.

Local Minimum

In the performance surface of a neural network, a combination of training weights that produces low errors that are not the lowest possible error, but are surrounded in the graph only by solutions with higher errors. A local minimum causes problems when training a neural network since the training does not know if it is the lowest possible error or which direction to adjust the weights in order to find a lower error.
TradingSolutions uses momentum as part of its learning in order to continue in a positive direction past smaller local minima.

Long Trade

Buying a security at the current price with the intent of selling that security after the price has gone up. In effect, betting that the price will increase.

Losers

Trades that produced no profit or lost money.

Loss

The percentage that the equity has decreased.

Low

The lowest price at which a security traded during a given day.

TradingSolutions Glossary

Glossary_TA B C D E F G H I J K L MGlossary_M N O P Q R S T U V W X Y Z

Margin

The minimum amount of money required to buy or sell a security. This is typically a percentage of the overall value of the trade, with the remainder being borrowed.

Margin Call

An action by the broker indicating that the investor must cover all or part of the debt incurred by trading on margin as a result of the underlying trade declining in value.

Market Order

An order to buy or sell a security at the current price. Market orders have precedence over all other types of orders and will be filled as long as there is a corresponding seller or buyer.

Maximum Profit Signal *(Optimal Signals Usage)*

A type of optimal signal. Maximum profit signals delay entry signals until the point of maximum profit.

For help with optimal signals, see Generating an Optimal Signal.

Memory Depth

The number of previous samples of data that are included in the values of a memory component. For TDNN memory, this is the same as the number of memory taps. For exponential memories like gamma and Laguarre memories, the memory depth is larger than the memory taps since previous values are combined with newer values.

For help with neural network topologies, see the Modify Field Dialog: Prediction Model page help.

Memory Taps

The number of values that are stored in a memory axon for each input into that axon. The more memory taps that are in a memory axon, the more previous values it will be able to remember. However, each new memory tap also creates a new output from that memory axon, requiring additional processing.

Menu

A set of options that can be performed in the program. The main menu typically appears at the top of the program window. Context menus can be displayed by right-clicking on various parts of the interface.

For help with the items in the main menu, see The TradingSolutions Main Menu.

Messages and Alerts Window

A window in TradingSolutions that displays messages and alerts in a to-do list format.

For help with the Messages and Alerts Window, see The Messages and Alerts Window.

MLP

See Mutlilayer Perceptron.

Model

A general term for a neural network topology, its settings, and its training weights. This grouping can be used as a representation, or model, of the interactions between the inputs and the outputs.

For help with neural network topologies, see the help for the Modify Field Dialog: Prediction Model page.

Modular Network

A type of neural network that contains multiple processing paths. Each processing path has the potential of specializing on a different aspect of the incoming data, allowing it to specialize on multiple conditions.

For help with neural network topologies, see the help for the Modify Field Dialog: Prediction Model page.

Momentum *(Financial Usage)*

A calculation of the strength" behind the current trend in price movement.

Momentum *(Neural Usage)*

The amount of the previous weight adjustment that is added to the current weight adjustment. Momentum is used to speed up learning and to avoid local minima.

For help with neural network settings, see the help for the Advanced Topology Settings Dialog.

Momentum Rate

See Momentum (Neural Usage).

Moving Average (MA)

An average of the current value and a given number of the previous values, for each given day.

Multilayer Perceptron (MLP)

The most basic neural network topology. The data in a multilayer perceptron follows a single path with no recursion or memory elements. Despite its simplicity, the multilayer perceptron can be used to solve the vast majority of problems solvable by supervised neural networks.

For help with neural network topologies, see the help for the Modify Field Dialog: Prediction Model page.

Mutation *(Genetic Algorithms Usage)*

An activity during genetic optimization during which a gene in a good chromosome is modified to try a random new value. TradingSolutions uses Gaussian mutation to produce better results than would be achieved if purely random numbers were used.

For help with optimization, see Optimizing Signals and Predictions.

TradingSolutions Glossary

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Naked Option *(Options Trading Usage)*

See Uncovered Option.

Neural Model

See Model.

Neural Network

A method of computing values built from a large number of very simple processing elements that individually deal with pieces of a big problem. These processing elements are adjusted (trained) to work with the data of a particular problem by being given examples of inputs and desired solutions.

For an overview of how neural networks work, see What is a Neural Network?

Neural Wizard

A tool in NeuroSolutions that enables you to create a neural network using one of a selection of common neural network topologies.

For help using NeuroSolutions with TradingSolutions, see Developing Models with NeuroSolutions.

NeuroSolutions

A product from NeuroDimension, Inc. that enables you to design and use neural networks. The neural networks available in TradingSolutions were created using NeuroSolutions.

For help using NeuroSolutions with TradingSolutions, see Developing Models with NeuroSolutions.

Noise

Fluctuations in price that are not part of a larger trend.

Non-null Value

A value that is not a null value.

Normalized Error

The difference between the desired output and the value produced by the neural network, normalized to a common level. In TradingSolutions, a normalized error of 1 indicates that the output of the neural network was equal to the previous value.

For help analyzing predictions, see Analyzing Predictions.

Notes

Notes are text you can use to keep more information about something. Alerts, entry/exit systems, functions, and trading solutions all have notes that appear on the Information Dialog when you press the **More** button next to the description. Data series and groups have notes that appear in the Information View when they are selected in the Portfolio View.

Null Value

A value for which there is no data. Null values include raw data that is missing during import, as well as calculations or predictions that require more data than is available.

TradingSolutions Glossary

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Odd Lot

A trade consisting of less than 100 shares. Odd lots often incur additional expenses, receive a less favorable price, and are traded after other orders.

Offer Price

See Ask Price.

Online Weight Update

An update of the training weights once for every exemplar in the entire training set. Online weight updates are less stable than batch weight updates, but may be better able to model discrete situations.

For help with neural network settings, see the help for the Advanced Topology Settings Dialog.

Open

The price that a security began trading at when the market opened on a given trading day. This is typically not equal to the closing price of the previous day due to after hours trading.

Open Interest *(Options and Futures Trading Usage)*

The total amount of outstanding contracts for a future or option.

Optimal Signal

An entry/exit signal that uses future information to determine the best trading action. Since the optimal signal looks ahead into the future, it is not useful for trading or as an input to a prediction. However, it can be used effectively as the desired output of a prediction to model good trading activity.

For help with optimal signals, see Generating an Optimal Signal.

Optimization

See Genetic Optimization.

Options Clearing Corporation (OCC)

The issuer of all listed options on all exchanges.

Out of the money *(Options Trading Usage)*

An option with a strike price worse than the current price of the underlying security. For example, a call option with a strike price above the price of the security.

Output

Data that is returned from a calculation or prediction based on a set of inputs.

Output Axon

A component in a neural network where the results of the processing are made available outside of the network.

For help with neural network components, see the help for the Advanced Topology Settings Dialog.

Overbought

A situation in which an upward trend in the market has pushed the price above its actual worth. A stock that is currently overbought will often be sold off, causing the price to decrease to normal levels.

Oversold

A situation in which a downward trend in the market has pushed the price below its actual worth. A stock that is currently oversold will often begin to be bought, causing the price to increase to normal levels.

Overwrite

A setting that allows you to replace data in your portfolio during import.

TradingSolutions Glossary

Glossary_TA B C D E F G H I J K L M N O PGlossary_P Q R S T U V W X Y Z

Parameters

Data that is put into a function definition or entry/exit system to produce a new value. Also referred to as inputs.

Partially Recurrent Network

A recurrent neural network that also includes a non-recurrent feedforward processing path.

For help with neural network topologies, see the help for the Modify Field Dialog: Prediction Model page.

Pass

When training a prediction in TradingSolutions, this refers to the number of unique attempts a model will be trained. Each pass begins with a random set of training weights, allowing the network to train for an optimal solution from different starting conditions each time. After all of the passes have been trained, only the set of training weights that produced the best results is kept.

PE

See Processing Element or Price/Earnings Ratio.

PE Ratio

See Price/Earnings Ratio.

Performance Surface

A graph of all of the training weights of a neural network against the average error those weights would produce. A neural network with two training weights would create a three dimensional graph with one axis for each training weight and one axis for the average error.

Pending Fields

Fields that still need processing. Processing is required after fields are created or modified. It is also required after new data is imported.

Periodicity

The number of minutes or days to include in each High / Low / Open / Close bar. Periodicities can be intraday", meaning new bars are produced every given number of minutes, or end-of-day", meaning new bars are produced at the end of a day or set of days.

Population Size *(Genetic Algorithms Usage)*

The number of chromosomes in each generation during genetic optimization.

For help with optimization, see Optimizing Signals and Predictions.

Portfolio

In TradingSolutions, the collection of all of the data you have available for processing and analysis.

For help with the Portfolio View, see Managing Data with the Portfolio View.

Portfolio View

A window in TradingSolutions that displays all of the data series that are currently in your portfolio. The Portfolio View can also have display fields to display and sort current evaluations of those data series.

For help with the Portfolio View, see Managing Data with the Portfolio View.

Postprocessing

Processing that takes place after a main processing action. When defining a prediction of an entry/exit signal, postprocessing can be used to convert the raw output of the neural network into a usable signal.

For help with predictions, see Predicting and Modeling Financial Data.

Postprocessing Optimization

The genetic optimization of the settings for postprocessing predicted signals.

For help with optimization, see Optimizing Signals and Predictions.

Predicted Field

A field that uses a neural network on a set of inputs to produce a result.

Prediction

A set of one or more fields that are produced by a single neural network model. Typically, one prediction will produce only one predicted field. However, predictions can be created that produce multiple outputs.

For help with predictions, see Predicting and Modeling Financial Data.

Premium

The price an investor pays the writer of an option above the intrinsic value of the option.

Preprocessing

Processing that takes place before a main processing action. When defining a prediction, preprocessing can be used to make data more usable by the neural network. This term also appears in the Status Dialog to indicate that the raw output of a neural network is being analyzed before postprocessing occurs.

For help with predictions, see Predicting and Modeling Financial Data.

Price/Earnings Ratio (PE Ratio)

The ratio of the price of a stock to the earnings per share for the underlying company.

Primary Signal

A signal designation typically used to indicate the signal you are currently trading for a data series.

For help with special signals, see Primary, Secondary, and Service Signals.

Processing Complete

See Task Completion Sound.

Processing Element (PE)

The processing of an input to an axon in a neural network. In hidden layers, these processing elements typically include nonlinear processing that transforms the value to fit a wider array of solutions than it would as a straight line. The number of processing elements that a hidden layer axon has in neural network indicates the number of different combinations of inputs to the preceding synapse that the axon has available. In TradingSolutions, the input axon is considered to have a number of processing elements equal to the number of inputs. The output axon is considered to have a number equal to the number of outputs.

For help with neural network settings, see the help for the Advanced Topology Settings Dialog.

Production Set

A set of data sometimes used during the analysis of a neural network. A production set is a secondary set of out-of-sample data and acts like a second testing test. The theory is that if you manually adjust or select your neural network models based on their performance in the testing set, then that data is no longer truly out-of-sample.

TradingSolutions does not provide an automated way to produce and analyze a production set. However, the date range of any prediction can be adjusted to allow for extra out-of-sample data after the testing set. The signal analysis range of predicted signals can then be adjusted to view the desired range of data.

Profit

The amount by which the equity has increased.

Profit Factor

The profit generated by profitable trades divided by the losses generated by losing trades. A value of 2 would indicate that twice as much money was made from winning trades than was lost from losing trades. Higher values indicate less risk.

Property Page

A sub-page inside of a dialog. Individual property pages are typically selected using tab controls at the top of a dialog.

For help with property pages, see the help for Property Pages.

Prophet or ProphetFinance.com

A data service from which data can be imported directly into TradingSolutions.

For help using ProphetFinance.com, see Importing Data from ProphetFinance.com.

Protected

A designation on functions and entry/exit systems that indicates that the definition is marked as protected from changes. For function definitions, this setting can be changed on the Modify Function Definition Dialog. For entry/exit systems, this setting can be changed on the Modify Entry/Exit System Dialog .

Protective Stop

See Stop Order.

Put Option *(Options Trading Usage)*

An option contract that gives the purchaser the right, but not the obligation, to sell the underlying security at a specific price on or before a specific date. In the case or European options, the purchase must occur on a specific date.

TradingSolutions Glossary

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Quick Actions

A collection of buttons that make available actions that are commonly performed on an object.

TradingSolutions Glossary

Glossary_TA B C D E F G H I J K L M N O P Q RGlossary_R S T U V W X Y Z

Random Number Seed

The number used to determine the starting point for a series of random numbers. Random numbers generated by computers are typically not truly random. Computer-generated random numbers are produced by algorithms that simulate randomly generated series. The starting point of these series is determined using a seed.

Raw Data

Data that is not calculated or predicted. Raw data is typically put into TradingSolutions by importing it from an external file or the Internet. However, it can also be entered manually from the Spreadsheet View.

Recurrent Network

A neural network topology that delays one or more of the processing values in the network so that they will be used in the calculation of the next output, rather than the current output.

For help with neural network topologies, see the help for the Modify Field Dialog: Prediction Model page.

Resistance

The resistance to the price of a stock increasing. The higher that the price of a stock increases, the more resistance it encounters to increasing higher. This is the opposite of Support.

Rules

See Entry/Exit Rules.

TradingSolutions Glossary

Glossary_TA B C D E F G H I J K L M N O P Q R SGlossary_S T U V W X Y Z

Sample

The data in one record. For daily data in TradingSolutions, a sample represents the data for one day. This is also referred to as one bar of data.

Samples Per Exemplar

The number of samples that should be examined each time the neural network updates its weights during the training phase of a dynamic network.

For help with neural network settings, see the help for the Advanced Topology Settings Dialog.

Secondary Signal

A signal designation typically used to indicate an alternate signal you would like to watch for a data series.

For help with special signals, see Primary, Secondary, and Service Signals.

Selection Tree

A list of possible values, arranged into groups or categories.

For help with selection trees, see the help for Selection Trees.

Service Signal

A signal designation used to indicate the signal that is currently being generated by the Solution Service for a data series.

For help with special signals, see Primary, Secondary, and Service Signals.

Sharpe Ratio

The average change in the equity divided by the standard deviation of the equity. This is useful as a basic reward-to-risk ratio. Higher Sharpe Ratios indicate that a greater amount of average profit could be made with less day-to-day volatility.

Short Trade

Borrowing a security and selling it at the current price with the intent of replacing that security after the price has gone down. In effect, betting that the price will decrease.

Signal

See Entry/Exit Signal.

Signal Type *(Optimal Signals Usage)*

The type of optimal signal to produce. Analog value signals adjust the strength of the signal based on the potential profitability of the signal. Thresholded analog signals remove the strength information from analog signals. Maximum profit signals delay entry signals until the point of maximum profit.

For help with optimal signals, see Generating an Optimal Signal.

Simple Predictor

A basic prediction of a value, often used as a baseline for evaluating the effectiveness of a prediction. In TradingSolutions, the last known value is used as a simple predictor of the next value. Another possible simple predictor is the mean of all known values.

Slippage

The difference between the estimated trading price during simulated trading and the actual trading price that would be achieved. TradingSolutions can simulate the effects of negative slippage by applying a percentage change to the trading prices used during simulated trading.

For help using stop orders, see Using Trading Styles.

Smoothing

The application of a moving average to a chart line in order to reduce the amount of variability (noise) that appears in the line.

Solution

See Trading Solution.

Solution Service

A service that provides you with sample models, data, and commentary for a select group of stocks so that you can see the software in action.

For help with the Solution Service, see The TradingSolutions Solution Service.

Sortino Ratio

This value is the average change in the equity over the downside deviation of those changes. It is similar to the Sharpe Ratio, but instead of penalizing for general volatility including upward changes, it only penalizes for downward volatility.

Source Field

A field that is used to define a trading solution. The trading solution that uses that source field is able to recreate the source field and all of the fields that were used to create that source field, excluding any raw data.

For help with trading solutions, see Working with Complete Trading Solutions.

Special Signal

A signal designation that allows you to easily track and analyze your favorite entry/exit signals for each data series.

For help with special signals, see Primary, Secondary, and Service Signals.

Split

See Stock Split.

Split-Adjusted Data

Historical price data that has been adjusted to match the price levels after a stock split. For example, after a 2-for-1 stock split, the price of a stock is cut in half. Therefore, all of the price data before that stock split needs to be cut in half to maintain a continuous price value.

For help with split-adjusted data, see Handling Data Adjusted for Stock Splits.

Spreadsheet

A method of displaying numbers in a two-dimensional grid. In the TradingSolutions Spreadsheet View, the horizontal rows of the spreadsheet represent information for individual dates, while the vertical columns of the spreadsheet represent individual fields.

For help with the Spreadsheet View, see Displaying Data in a Spreadsheet.

Spreadsheet View

A TradingSolutions window that can display a spreadsheet of the values of one or more data fields in a portfolio.

For help with the Spreadsheet View, see Displaying Data in a Spreadsheet.

Start Date

The first date in a range of data used for a particular operation, delineated by the dates associated with that data. Date ranges typically have a start and end date. If a start date is not specified, the first available date is used.

Startup Behavior

The types of information and menus that should be displayed when TradingSolutions is started.

For help changing the startup behavior, see Changing Global Defaults.

Static Neural Network

A type of neural network that examines only the patterns between each set of inputs. This is different from a dynamic neural network, which also has memory to allow it to learn patterns over time. Multilayer perceptrons, modular networks, and Jordan/Elman networks are examples of static neural networks.

For help with neural network topologies, see the help for the Modify Field Dialog: Prediction Model page.

Status Dialog

A dialog that appears while TradingSolutions is performing processing to indicate what is happening and how long it should take to complete. When processing has completed, the Status Dialog disappears automatically.

For help with the Status Dialog, see the help for the Status Dialog.

Step Size

The amount of the backpropagated error that is applied to each training weight during the training of a neural network.

For help with neural network settings, see the help for the Advanced Topology Settings Dialog.

Stock Split

An action taken by a company in which it splits their outstanding shares into a larger number of shares. A 2-for-1 split would result in the company having twice the number of shares, investors having twice as many shares, and each share being worth half as much. Therefore, each investor has the same percentage of equity in the company, but the individual shares would cost half as much to purchase.

For help with historical data after stock splits, see Handling Data Adjusted for Stock Splits.

Stop Order

An order to buy or sell a security once that security reaches a given price. Once the price is reached, the order is filled at the best available price, like a market order. Stop orders are typically used as protective stops" which cause an open trade to exit if an unfavorable price is reached.
For example, if a long trade is entered at 30, a stop may be placed at 25 to protect against large losses. This stop will only be executed if the low price reaches 25 while the trade is open.
Stop orders can be simulated during signal analysis to help decrease losses.

For help using stop orders, see Using Trading Styles.

Stop Limit Order

This is the same as a Stop Order, except that once the price is reached, the order becomes a limit order, causing it to only be filled at the specified price or better.
TradingSolutions does not currently simulate stop limit orders.

Stop Market Order

This is the same as a Stop Order. The name Stop Market Order" is sometimes used to differentiate it from a Stop Limit Order".

Streaming Intraday Data

Data that is imported continuously throughout the day while the underlying trades are occurring.

For help with streaming data, see Streaming Intraday Data.

Strike Price *(Options Trading Usage)*

The price associated with an options contract. Specifically, it is the price per share for which the underlying stock can be purchased if a call option is exercised or sold if a put option is exercised.

Sub-chart

One of multiple charts in a single Chart View window. Each Chart View window can display multiple charts at one time. Each sub-chart has its own value axis (y-axis), but all sub-charts share the same date axis (x-axis).

Subgroup

A way of subdividing data in a TradingSolutions portfolio. Subgroups can be used to organize data in the Portfolio View. They can also be used to establish different generalized processing for groups of data.

For more help with subgroups, see Grouping Data in your Portfolio.

Support

The support for the price of a stock increasing. The lower that the price of a stock decreases, the more support it receives for increasing back to previous levels. This is the opposite of Resistance.

Synapse

A type of component of a neural network breadboard. Synapses represent the place where the information from axons is combined and weighted. This is different from axons, which process information from inputs and synapses.

For help with neural network components, see the help for the Advanced Topology Settings Dialog.

System

See Entry/Exit System.

System Group

See Entry/Exit System Group.

TradingSolutions Glossary

Glossary_TA B C D E F G H I J K L M N O P Q R S TGlossary_T U V W X Y Z

Tab-Delimited File

A text file in which the columns are separated by tabs. In other words, a file that uses the tab character as the field delimiter.

For help with text files, see Importing Data into TradingSolutions.

TanH Axon

A component in a neural network that adjusts all of the values that pass through it with a nonlinear function that produces values between -1 and 1.

For help with neural network components, see the help for the Advanced Topology Settings Dialog.

TDNN Memory

A type of memory used in dynamic neural networks. Short for time-delay neural network memory, the first memory taps contain the current value of each input to the memory. Each memory tap after that contains the last value of each previous memory tap for each input, effectively creating a buffer of the last several input values. Since the actual values of the inputs are stored, the memory depth of a TDNN memory is the same as the number of memory taps.

For help with neural network components, see the help for the Advanced Topology Settings Dialog.

For help with neural network topologies, see the help for the Modify Field Dialog: Prediction Model page.

Technical Analysis

Analyzing securities by examining the trading of those securities. This differs from Fundamental Analysis, which examines the strength of the companies underlying the securities.

For an overview of technical analysis, see What is Technical Analysis?

Testing Set

A set of data used during the analysis of the training of a neural network. The testing set is used after training has completed to determine how well the network works on out-of-sample data. The better a neural network has modeled the data, the more the analysis of the testing set will match the results of the training and cross validation sets. It is important to note that the training is not modified based on the values testing set, it is only used for analysis.

For help with predictions, see Predicting and Modeling Financial Data.

Text File

A file that contains only textual information, allowing it to be read by most programs. Files that are not text files typically contain additional information in a format that is only readable by programs that know how to read that specific format.

For help with text files, see Importing Data into TradingSolutions.

Theta *(Options Trading Usage)*

The amount that the price of an option will decay for every one day that passes.

Thresholded Analog Signal *(Optimal Signals Usage)*

A type of optimal signal. Thresholded analog signals are analog signals without the strength information.

For help with optimal signals, see Generating an Optimal Signal.

Ticker

The trading symbol used for a security. For example, the ticker for Microsoft is MSFT.

Time-Delay Neural Network (TDNN)

See TDNN Memory.

Time-Lag Recurrent Network (TLRN)

A neural network topology that includes memory elements which allow it to identify patterns that occur over multiple samples.

For help with neural network topologies, see the help for the Modify Field Dialog: Prediction Model page.

Time Series

A set of values in which the values occur over time with each successive value being associated with a new period in time.

TLRN

See Time-Lag Recurrent Network.

Toolbar

A set of icons, typically at the top of the program window. Clicking on an icon in the toolbar performs a function in the program.

For help with the toolbars, see Customizing the Toolbars.

Topology

The layout and types of the components of a neural network. Using different components in different orders provides different functionality within the network.

For help with neural network topologies, see the help for the Modify Field Dialog: Prediction Model page.

Trade

The term trade has two meanings. In the case of commissions, a trade indicates a transaction to enter or exit the market. In the case of signal analysis, a trade indicates the entire entry/exit process associated with that transaction.

Trade Length

The number of bars that the trade was in the market, not including the bar it was exited on.

Trading Market

A market in which the prices are primarily level, indicating that equivalent numbers of shares are being bought and sold.

Trading Range

The range or prices during a particular period of time, typically represented by the high and low prices for that period.

Trading Signal

See Entry/Exit Signal.

Trading Solution

A set of definitions of one or more fields that can be applied to a data series to recreate those fields on new data. Trading Solutions can also be exported for other users to recreate your work.

For help with trading solutions, see Working with Complete Trading Solutions.

Trading Solution Group

A collection of trading solutions. Groups are used to separate definitions during selection. Typically, the definitions in a group share common characteristics.

Trading Style

A group of settings used for entry/exit signal analysis and optimization. A trading style specifies such things as the amount to invest and the amount of commission to pay on each trade.

For help with trading styles, see Using Trading Styles.

Trading System

See Entry/Exit System.

Trading Value

The price used for the market entry price and the exit price of each trade during the simulated trading of an entry/exit signal. Typical values are tomorrow's opening price or today's closing price.

For help with trading styles, see Using Trading Styles.

Trailing Stop

A stop order that is updated on a bar-by-bar basis to cover any increased profits that are gained by a trade. For example, if a long trade is entered at 30, a stop may be placed at 25 to protect against large losses. If the price increases to 35 on the next day, the stop may be updated to 30 to protect against losing the gains that have been made. In other words, the stop trails the price as it increases. It is left unchanged if the price decreases.

For help using stop orders, see Using Trading Styles.

Training Data

A general term for all of the data used in the training (and the analysis of the training) of a prediction. This includes the training set, the cross validation set, and the testing set.

For help with predictions, see Predicting and Modeling Financial Data.

Training Optimization

The genetic optimization of the settings for the topology of the neural network.

For help with optimization, see Optimizing Signals and Predictions.

Training Set

A set of data used during the training of a neural network to adjust the training weights. Each piece of data in the training set is presented to the neural network as an example of the desired output for a given set of inputs. The entire training set is presented once per training epoch.

For help with predictions, see Predicting and Modeling Financial Data.

Training Weights

The internal values of a neural network that the inputs to each processing layer are multiplied by. These weights are adjusted during training so that the inputs are transformed to be as close as possible to the desired output values. This term may also be used to refer to all of the values that are adjusted during training, including the exponents used by gamma and Laguarre memory.

For help with predictions, see Predicting and Modeling Financial Data.

Trending Market

A market in which the prices are moving primarily up or down. Prices during a trending market typically close near the extreme in the direction they are trending.

Two Digit Years

A specification that the year component of a date should include only the last two digits of the year, rather than all four digits.

TradingSolutions Glossary

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Uncovered Option *(Options Trading Usage)*

An option that is traded without the trader owning the underlying security.

Glossary

Glossary_TA B C D E F G H I J K L M N O P Q R S T U VGlossary_V W X Y Z

Vega *(Options Trading Usage)*

The amount that the price of an option will change for each 1% change in volatility.

Volatility

The amount that the price of a security fluctuates over a period of time.

Volume

The number of shares of a security that were traded while the market was open during a given trading day.

Votes

The number of times a field is included in the final result of a committee. Technically, this is the number that a field is multiplied by. The final result of a committee is the average of all of the copies of the fields in the committee.

TradingSolutions Glossary

Glossary_TA B C D E F G H I J K L M N O P Q R S T U V WGlossary_W X Y Z

Weight Updates

An update of the training weights based on information of the entire training set.

For help with neural network settings, see the help for the Advanced Topology Settings Dialog.

Weights

See Training Weights.

Winners

Trades that produced a profit.

Wizard

A dialog-based interface that allows you to move through a process one step at a time.

Work Directory

The directory (folder) on a computer or computer network where your data, function definitions, systems, and other work are stored. By default, the work directory is a subdirectory named Work" in the location where TradingSolutions is installed.

TradingSolutions Glossary

Glossary_TA B C D E F G H I J K L M N O P Q R S T U V W XGlossary_X Y Z

There are no glossary entries beginning with the letter X.

TradingSolutions Glossary

Glossary_TA B C D E F G H I J K L M N O P Q R S T U V W X YGlossary_Y Z

There are no glossary entries beginning with the letter Y.

TradingSolutions Glossary

Glossary_TA B C D E F G H I J K L M N O P Q R S T U V W X Y ZGlossary_Z

There are no glossary entries beginning with the letter Z.

Video Help Menu Dialog

The Video Help Menu Dialog displays a list of short videos which can help you get started with TradingSolutions.

Selecting A Topic To View

The Video Help Menu will display different topics depending on where it was accessed from.

When accessing video help from the TradingSolutions toolbar or Help menu, a list of all available topics is displayed. These topics are divided into the following groups:

- **Tour The Interface**
  These topics describe the basic controls that are available in different sections of TradingSolutions.
- **Common Questions**
  These topics answer common questions that new users of TradingSolutions often have. They provide a good foundation of knowledge for using the software.
- **How-To Guides**
  These topics provide quick demonstrations of how to perform basic tasks in TradingSolutions.
- **Approaches To Using TradingSolutions**
  These topics go into detail about various approaches to using TradingSolutions. Since TradingSolutions is designed as an open toolbox for you to develop and test your trading signals, these are not the only approaches available. However, these topics can help you get started by describing techniques that work for others.

When accessing video help from a dialog or context menu, topics related to the current activity are displayed. These topics are a subset of all of the topics available in the software. To see a complete list of topics, select **Select from All Available Topics**.

To play a video, double-click on its listing or press the **Play** button. This will display the Video Help Dialog.

What Do I Do Next?

To play a video, double-click on its listing or press the **Play** button. This will display the Video Help Dialog.

When you are finished viewing video helps, press the **Close** button.

How Did I Get Here?

The Video Help Menu Dialog is displayed when you select **Video Help Topics…** from the **Help** menu or press the **Video Help** button on the toolbar.

Video Help Dialog

The Video Help Dialog displays brief videos covering various topics related to using TradingSolutions.

Note: The videos include audio narration. If you cannot hear the audio narration, please make sure there are speakers connected to you computer. Also, make sure that sound on your computer is not currently muted.

Controlling the Video Playback

The following controls are available for controlling video playback.

- **Play / Resume**
  This button allows you to Pause and Resume the playback of the video.

- **Restart**
  This button allows you to restart the video from the beginning.

- **(Slider)**
  This control allows you to jump to any position in the current video by dragging the slider button.

☑ **Auto-Close at End**
This box indicates that this dialog should close automatically when the video has completed. This is checked by default. If you would like to see all or part of the current video again after it ends, uncheck this box before the end of the video. Then, use the Restart button or slider to view the video again.

What Do I Do Next?

The currently selected video will display automatically. When the video has completed, this dialog will close automatically.

How Did I Get Here?

The Video Help Dialog is primarily displayed from the Video Help Menu Dialog.

Save View Dialog

Rename View Dialog

This dialog appears in two different situations. The Save View Dialog allows you to specify a name to use for saving a chart or spreadsheet. The Rename View Dialog allows you to modify the name of a previously saved chart or spreadsheet.

Specifying a Name for a Chart or Spreadsheet

Type the name that you would like to use for this view into the name box.

Note: You can easily replace another saved view by selecting the name of the previous view from the drop-down list.

What Do I Do Next?

When you are finished entering or modifying the name, press the **OK** button. If would like to exit this dialog without saving the view, or modifying the name, press the **Cancel** button.

How Did I Get Here?

The Save View Dialog is displayed when you select **Save This Chart…** from the context menu for a chart, or **Save This Spreadsheet…** from the context menu for a spreadsheet.

The Rename View Dialog is displayed when you press the **Rename…** button from the Modify Data Series Dialog: Data Views page.

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