WHS FutureStation

User's Manual

http://www.whexpert.com

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Contents

1 Introduction

Welcome to the world of *WHS FutureStation!*
This document guides you through the installation process and explains how to work with *WHS FutureStation.* If you want to learn more about the technology and ideas underlying *WHS FutureStation*, please visit our homepage at www.fipertec.com.

The documentation of the modules *DySen-Express* and *DySen-DirectTrade* are available online through the Help-menu of *WHS FutureStation.* Moreover, they can be downloaded as separate files from the download section of www.fipertec.com.

The whole functionality of *WHS FutureStation* can be applied to both end-of-day prices and streaming realtime prices. Some specifics when working with realtime data are explained in a special section.

This documentation describes the complete functionality of *WHS FutureStation*. A couple of functions are only fully available in case *WHS FutureStation* is used in conjunction with the data feed from FIDES. This specific product is called *DySen FIDES-Trader*. The respective sections will be marked with *DySen FIDES-Trader Extension*.

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2 Installation

For installing *WHS FutureStation* doubleclick the file `DySen_install_all.exe` that can be downloaded from www.fipertec.com and follow the instructions of the setup procedure. Usually the default settings can be used without any changes. After finishing the setup procedure *WHS FutureStation* can be started from the windows task bar using `Start|Programs|WHS FutureStation`.

By default *WHS FutureStation* is installed in the directory `c:\Programs\Fipertec\WHS FutureStation`. This directory, or the one you have chosen in the setup, will be denoted the *installation directory.*

Detailed information about connecting to your data provider or local data base can be found in the chapter Accessing Price Data.

DySen FIDES-Trader Extension :

The *DySen FIDES-Trader* will directly be connected to the licensed exchanges on startup.

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3 A Brief Overview of *WHS FutureStation*

WHS FutureStation consists of a large number of individual modules ranging from pure charting and financial information tools over trading system generation and optimization to visual and fully automized trading. This modularization allows the user to expand its usage of the modules as his needs grow. The full power of *WHS FutureStation* will enfold as soon as the user delegates specific tasks that can be automized to *WHS FutureStation*, e.g.:

- realtime data screening
- automatic position exiting through *TradeGuards*
- full fledged trading systems with automatic order execution.

All this functionality is provided in a way that does not require any programming knowledge by the user.

What is a Sentimentor?

WHS FutureStation provides a general and open framework for deploying the most varied technical analysis procedures in conjunction with each other, i.e. indicators, formation analyses, cyclic techniques, Fibonacci retracements, candlestick formations, etc. In addition, fuzzy information and intuitions can also be combined and analyzed in a standardized form. This creates the basis for enabling the user to express, explore and enhance his trading ideas.

The basis for *WHS FutureStation* is the examination of so-called *sentiment series*. Every building block used in the analysis of a security produces such a sentiment series. For this reason such a building block is called a *sentimentor* – an artificial name derived from “sentiment” and “indicator”. (You will see below that also the word *Dynamite* is an acronym.)

A *sentiment* is a value on a scale of 0 to 100. On this scale 0 stands for the worst sentiment and 100 for the best. A sentimentor computes a sentiment value for each bar of an analyzed security.

What is a *WHS FutureStation* study?

Within *WHS FutureStation*, as many sentimentors as you require can be employed in order to discover the *total sentiment*, also called the *meta sentiment*. This meta sentiment is calculated by the so-called *Meta Sentimentor*. It represents the comprised evaluation of the security as represented by the underlying trading idea and may lead to buy, sell, or exiting signals in case it exceeds certain thresholds. Thus, a study usually consists of a number of sentimentors, the Meta Sentimentor, and optionally Stop techniques and filters.

In case your current license does not cover the creation of trading systems all sentimentors will behave as plain classical indicators, i.e., they simply visualize a certain mathematical conversion of the given price data. It remains up to you to derive trading decisions from visual observations of these indicators. Under this circumstance it is convenient to use the word *sentimentor* as a synonym of *indicator* and to view a study as a selection of indicators associated with a security.

Additional information

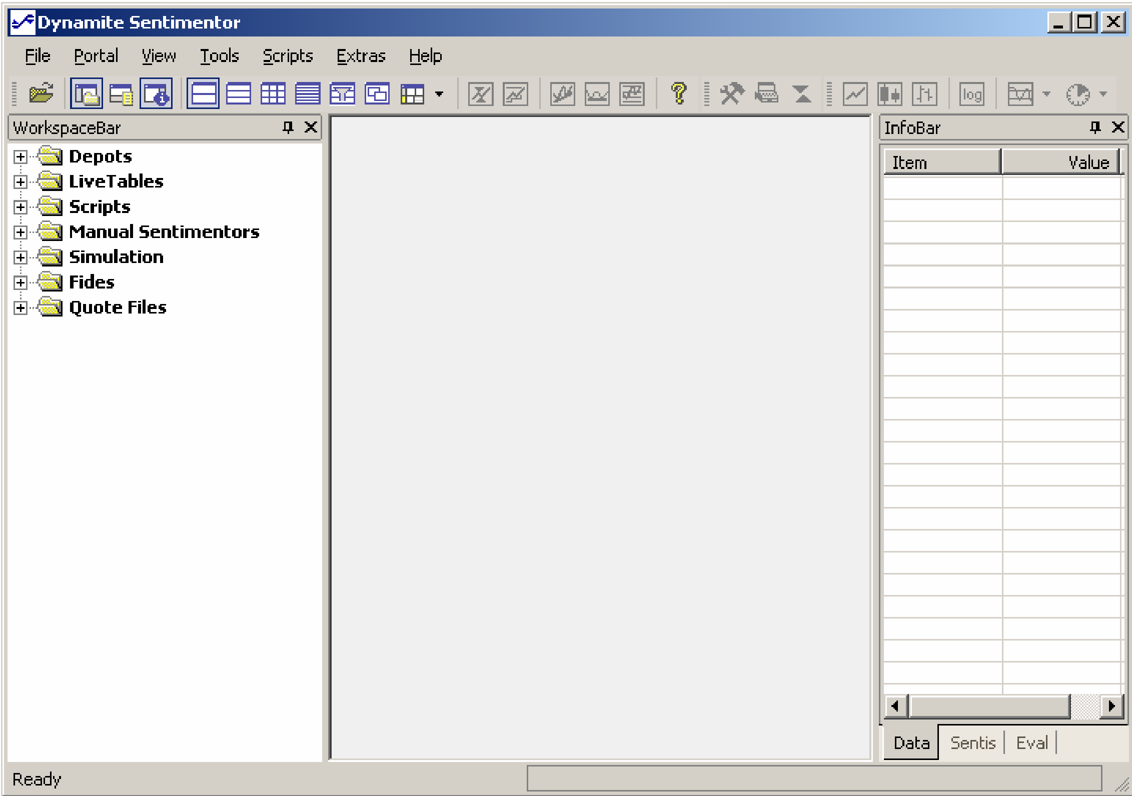
The scope of this document is to give a pure description of the functionality of *WHS FutureStation*. For getting more information about creating and verifying trading systems please see the list of Fipertec seminars on this topic as well as online lectures given at www.fipertec.com and www.fipertec.de.

4 Working with Windows

This section gives a general overview of the window types used by *WHS FutureStation.* The functionality associated with these windows is discussed in separate sections.

4.1 Structure of the Main Window

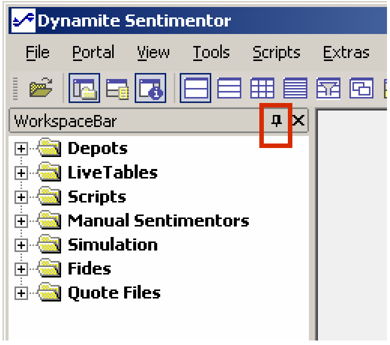
When starting *WHS FutureStation* for the first time, the main window will look like this:



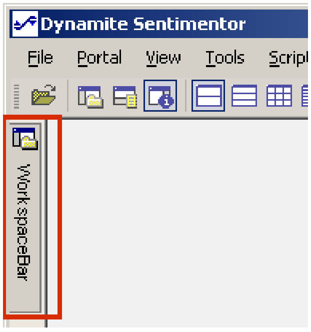
At the left side of the main window you can see the WorkspaceBar. The WorkspaceBar gives access to all objects required for your trading activities, e.g., securities and associated studies, depots, LiveTables, and much more.

At the right side of the main window we have the InfoBar used to display different kinds of information with respect to the currently active study.

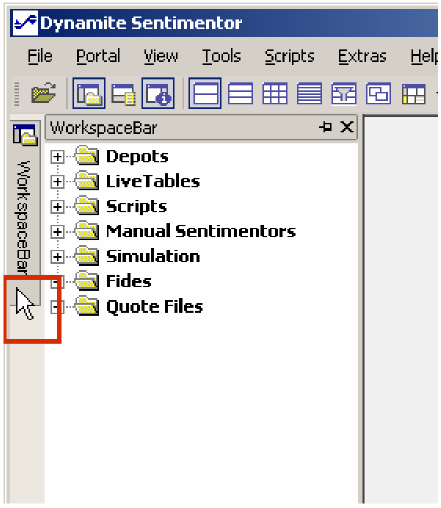
Every Bar used in *WHS FutureStation* contains a pin:



When clicking this pin the Bar will fold in and the main window will display a tab representing the Bar:



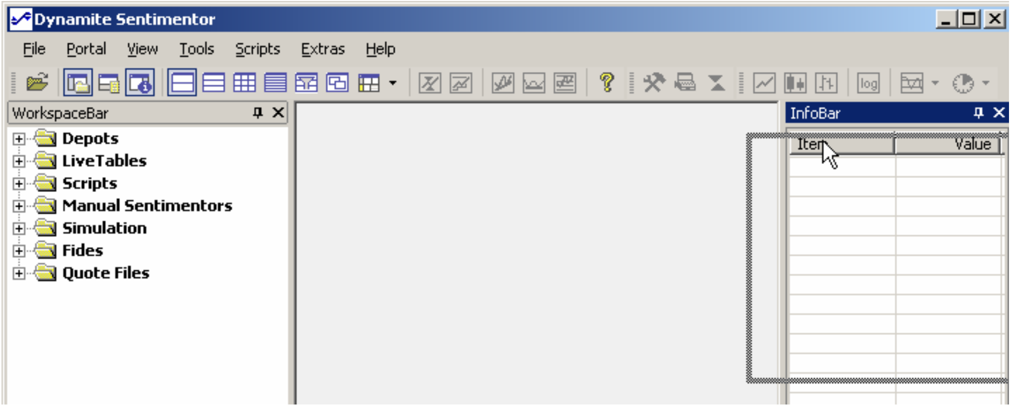
When pointing with the mouse on the Bar, it will fold out:



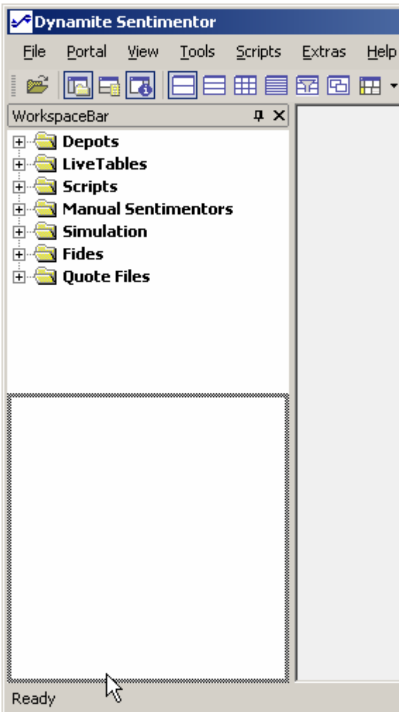
To make the Bar permanently visible click again on the pin.

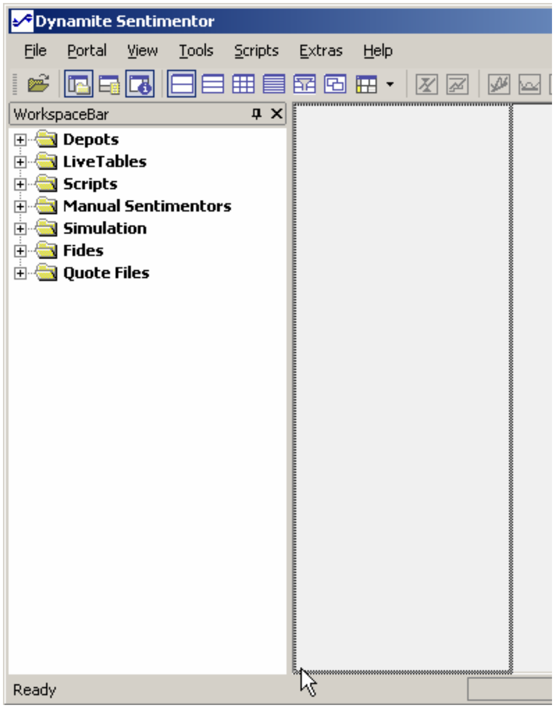
This technique is used for one main reason: saving screen space. No matter how many monitors you have, screen space still remains a very rare resource. *WHS FutureStation* provides some more techniques to save space.

Every Bar can be positioned freely by dragging its blue title bar:

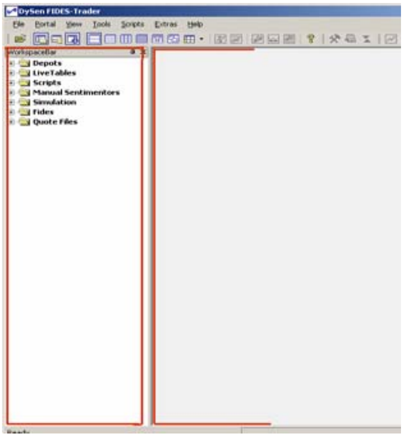


The grey rectangle signifies where the Bar will be placed when the dragging operation ends. A Bar may either be docked to the main window or be placed freely somewhere on the desktop. When dragging a Bar you will notice the rectangle “snapping” if the mouse is near the border of the main window or of another bar. This indicates the docking position associated with the current mouse position:

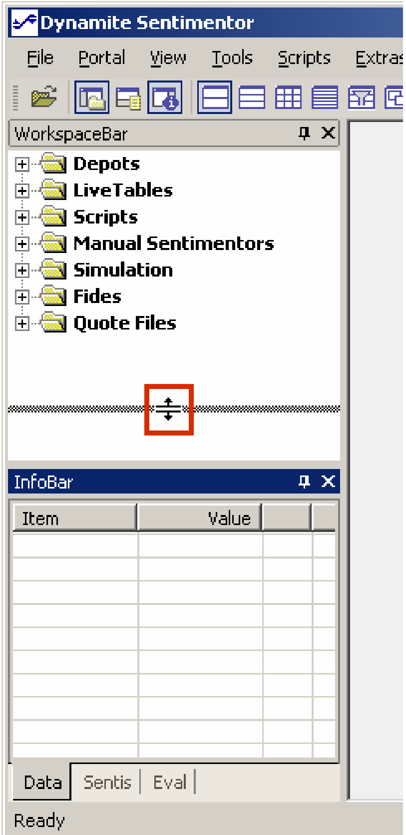




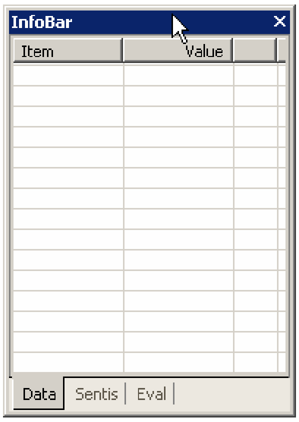
To explore all suggested docking positions move with the mouse along the edges of the main window or a Bar. The red lines show the areas of special interest:



If two bars are positioned over or next to each other their respective size can be changed by moving their common border:

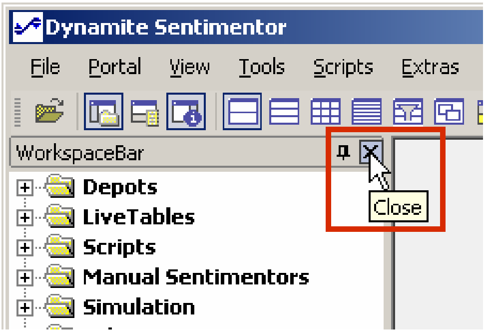


The bars can also be dragged out of the main window. This is specifically useful when working with multiple monitors.

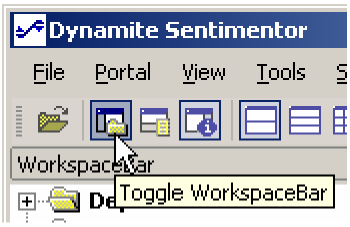


Use a doubleclick on the title bar of Bar to integrate it back into the main window.
When quitting *WHS FutureStation* the positions of the Bars are saved and restored when starting the program the next time.

In case a Bar is not required it can be hidden by clicking the „Hide"-button in its title bar.



This can also be achieved by using the corresponding toolbar buttons.



To show a hidden bar use the View-menu or the respective toolbar button.

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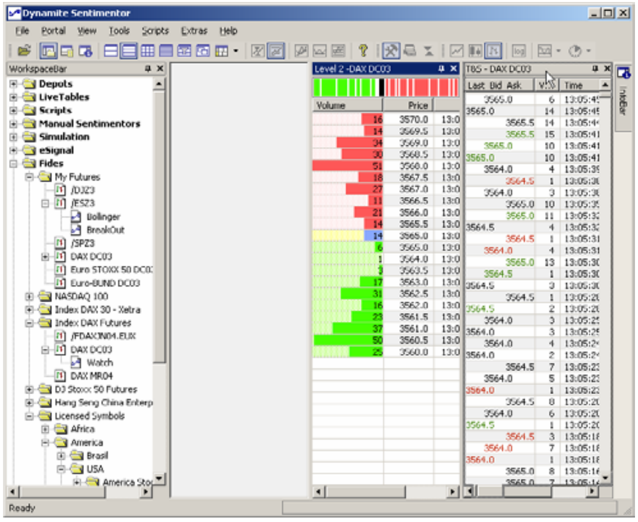
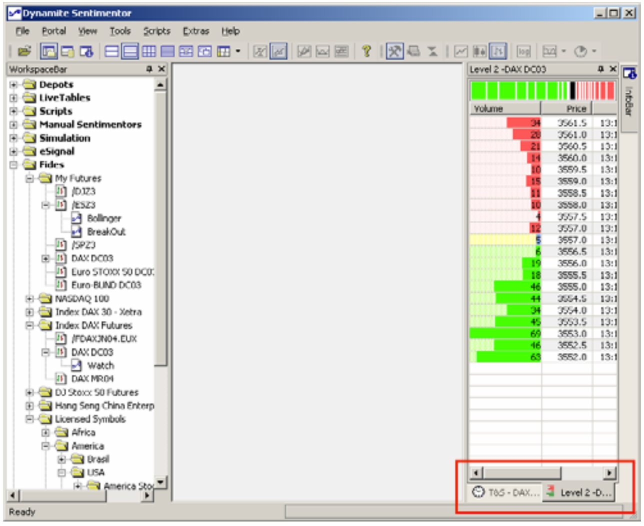
4.2 Overlaying Bars

WHS FutureStation allows to overlay Bars by dragging the title bar onto another title bar:





Overlayed Bars can be detached from the main window by dragging their common title bar. To detach an individual Bar, drag at its tab.

Any kind of Bars can be overlayed – only the WorkspaceBar and the InfoBar do not accept overlaying because they are used so frequently that they need a special handling.

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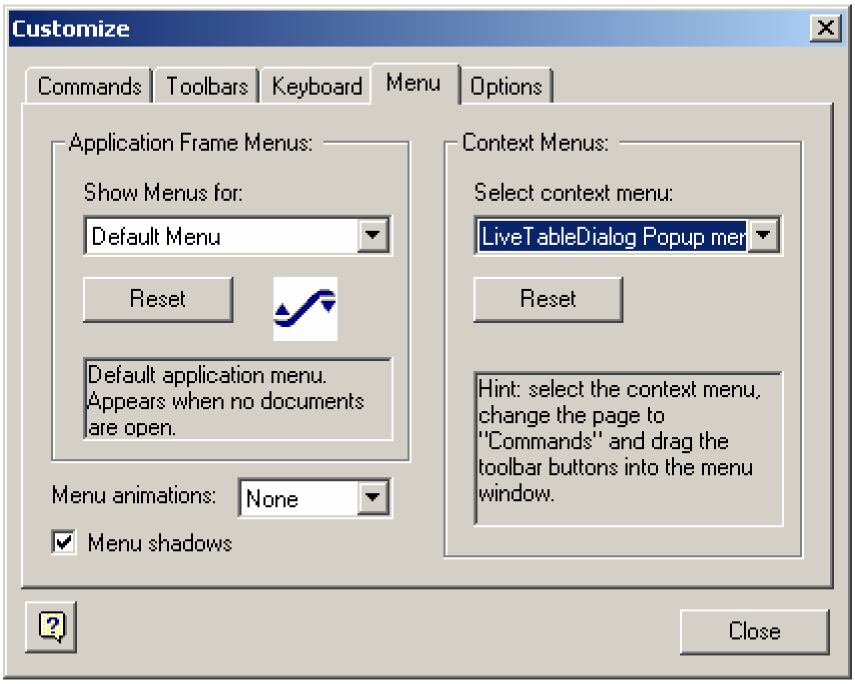
4.3 Configuration of Menus and Toolbars

WHS FutureStation supports the free configuration of menus and toolbars using the same mechanisms as the Microsoft Office tools. Using these configuration capabilities it is extremely easy to define a personal toolbar providing fast access to the most frequently used features.
The configuration dialog can be started through View|Customize Menus & Toolbars.



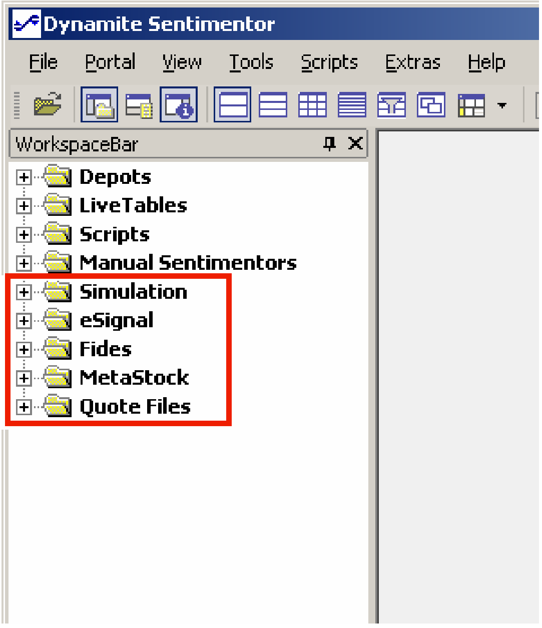
5 MasterChart

5.1 The MasterChart

The so-called *MasterChart* displays the chart of the security being analyzed. For analyzing a MasterChart you can attach as many sentimentors as you like. These sentimentors may be overlayed in the same window, may be shown in a *sub window* of the MasterChart, or they may even reside in an individual window.

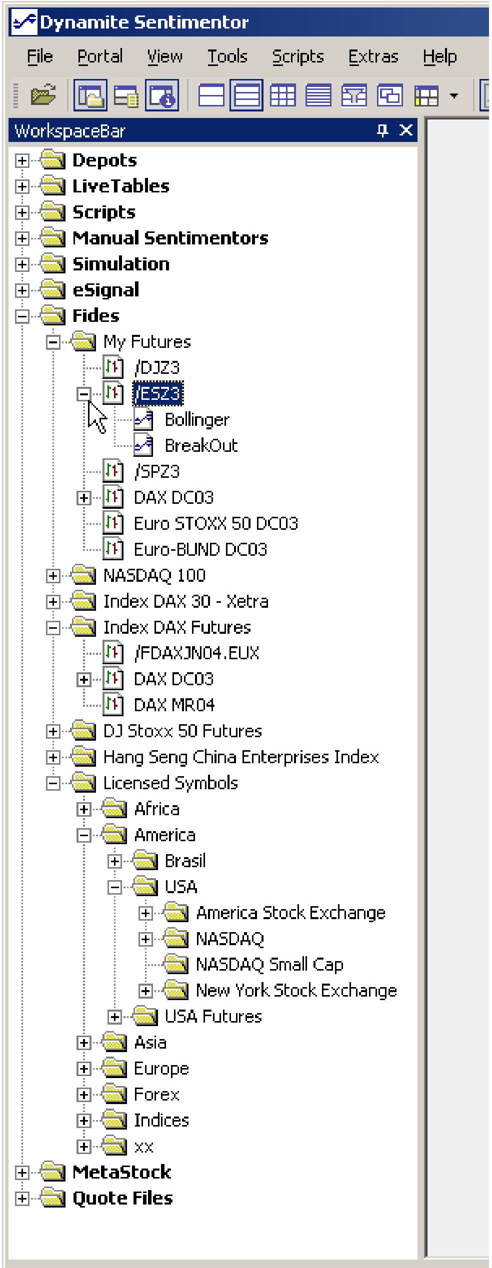
5.2 Loading a MasterChart

The data of a MasterChart will be read from a data source that has been activated. All activated data sources are shown in the WorkspaceBar.



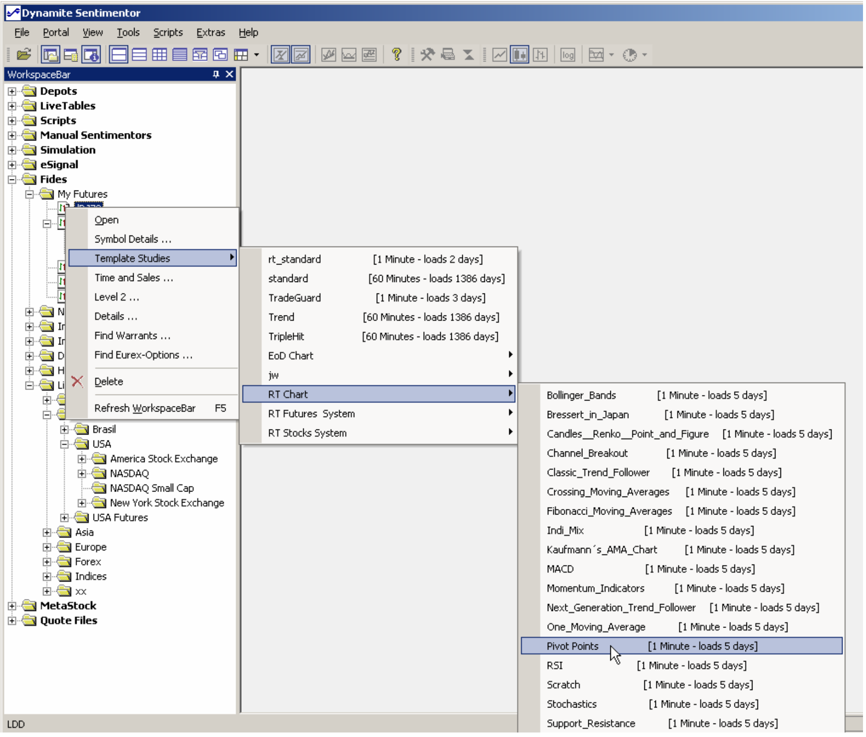
In the example shown above, access to the simulation price ticker, eSignal, Fides, MetaStock, and ASCII price data files have been activated.

Traverse the hierarchy of the WorkspaceBar until you come to the security to be loaded. All studies that have already been created for a security are displayed just below the security.



It make sense to create or configure studies individually on a per security basis to reflect characteristics specific to the individual securities.

Initially there are no studies assigned to the securities, so you will start with a *template study*. By rightclicking on a security a context menu pops up that gives access to the available template studies.



You may create as many template studies as you like. There are two prominent template studies that are named `standard` and `rt_standard`. In case you doubleclick a security that has not yet any associated studies, *WHS FutureStation* automatically loads the template study `standard` or `rt_standard` – the first one is taken for end-of-day securities, the second one for realtime securities. You may change these template studies at your wish.

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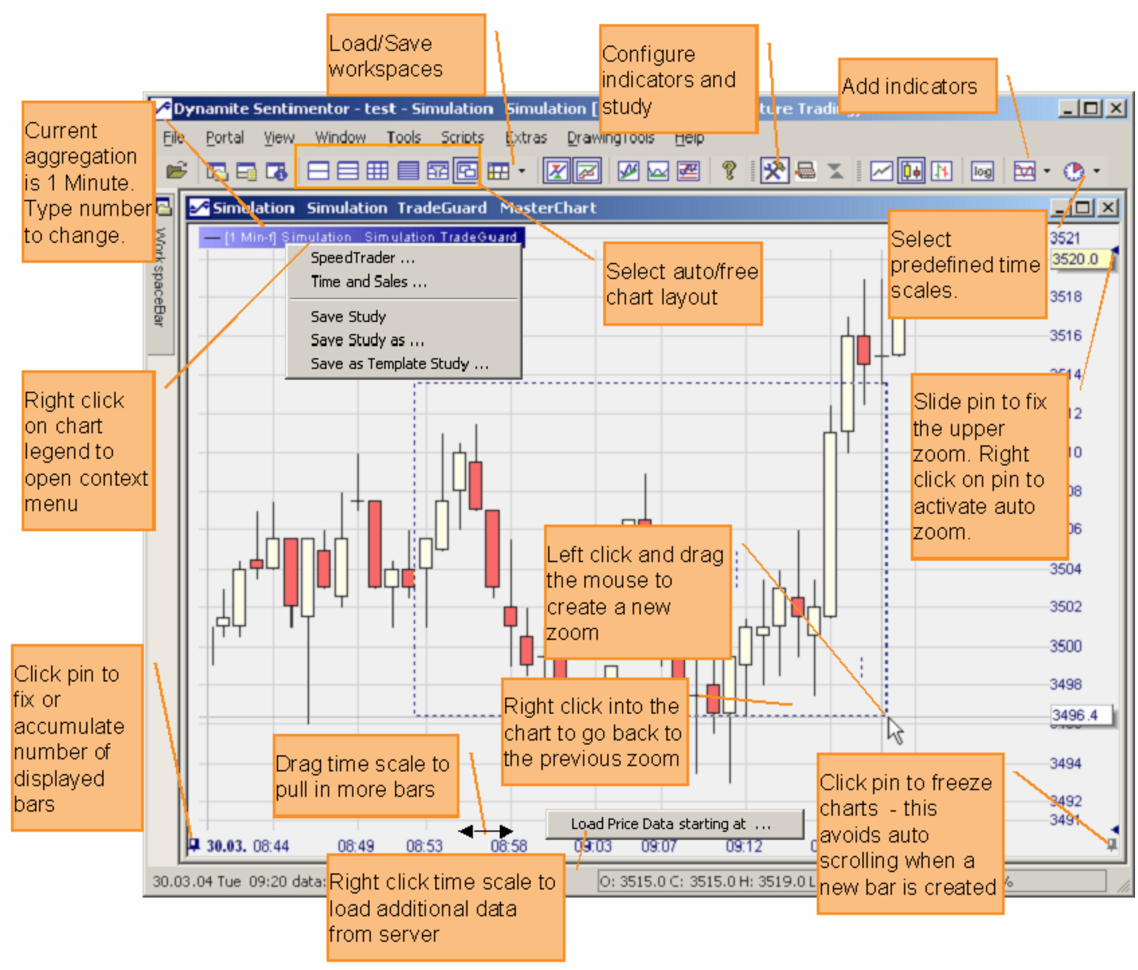
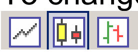
5.3 Some Charting Functionality at a Glance

The following screenshot visualizes some of the most important charting functionality. Details are explained in the following sections.



5.4 Line-Chart, Candle Sticks, Bar-Chart

To change the charting style just press the corresponding tool bar button: . The charting style is saved with the study.

5.5 Zooming

To zoom inside a window press the left mouse button and drag the mouse. This will create a rubberband that marks the region to be zoomed to. When releasing the mouse button the zoom will be executed.

Using a right-click on the chart background you can go back to the previous zoom range.

To fix the lower or price to be displayed slide the small triangle in the price scale. To go back to auto zoom mode right click on the triangle.

For fixing the start of the time scale activate the pin at the lower left side of the chart. New bars through incoming ticks will be added to the current zoom and hence the number of displayed bars in the zoom will increase. In order to display always the same number of bars, deactivate the pin by rightclicking on it. Each newly created bar will then automatically push the oldest currently displayed bar out of the zoom.

By dragging the scroll bar you can move the data window. All associated sentimentors will reflect the scrolling.

To ensure that you are informed whenever a new period starts because of incoming ticks, *WHS FutureStation* automatically scrolls the window to show the final period. Sometimes, though, it is convenient to suppress this behavior. This can be achieved by activating the *Freeze* mode through the pin at the lower right corner of the MasterChart of through the Designer dialog. In this case, the charts show a hint to indicate that the live tick processing is blocked:

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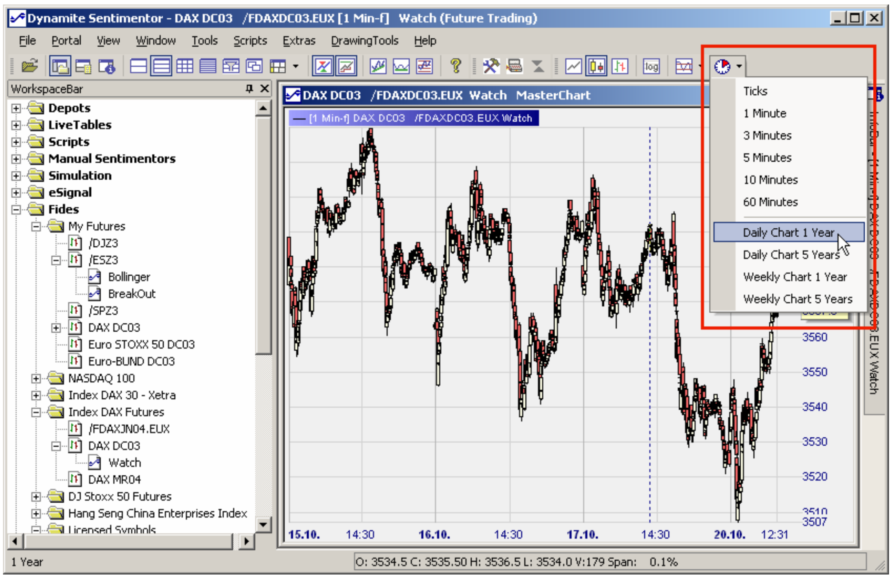
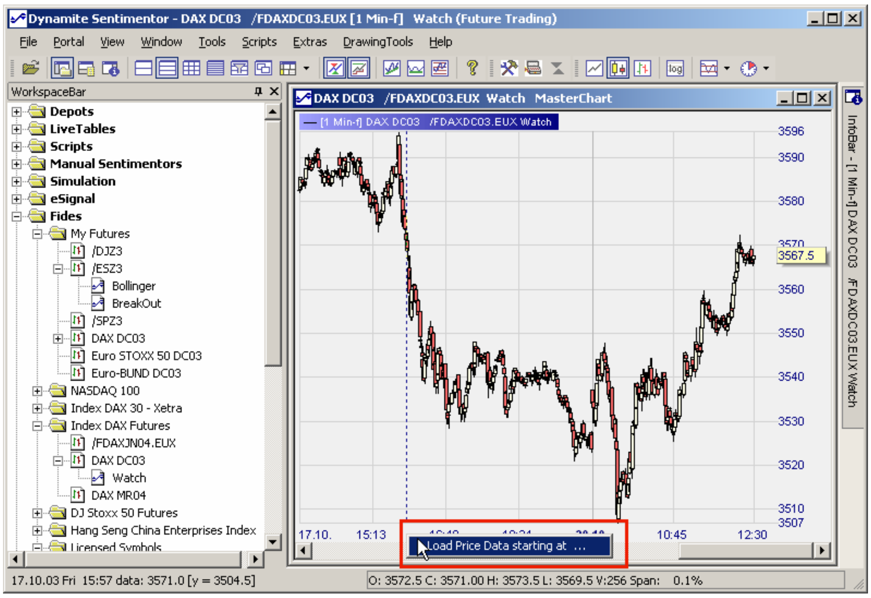
5.6 Loading Additional Price Data

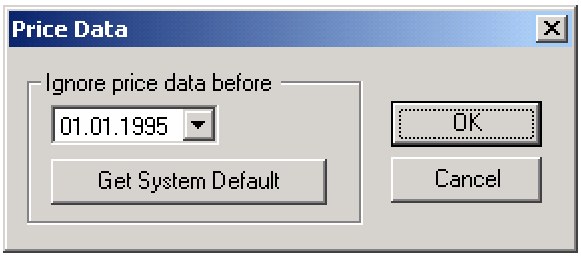
Each study holds the date from which on *WHS FutureStation* retrieves and displays price data. There are several ways to change this date. The most easy one is to use the predefined settings accessible from the tool bar:



In order to specify a specific date right click on the time axis of a chart:



In case the examined security is an end-of-day security, the following dialog will pop up:

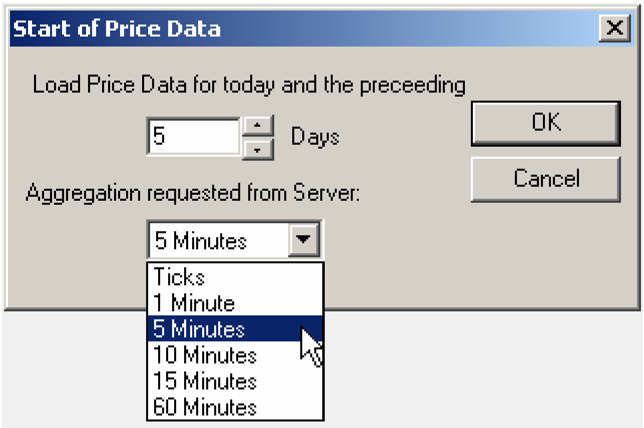


Besides the plain convenience for the visualization, this setting is also extremely important to reduce the computation time for evaluating and optimizing studies, as *WHS FutureStation* has to compute the sentimentors on the whole available data.

E.g., to optimize a study for a one year period, it usually suffices to load a "prefix" of another year – for calculating a 200 day Moving Average, the data of the 200 days preceding the evaluation period is required.

By clicking on the Get System Default-button the date specified in the systemwide Options-dialog can be used.

When working on a realtime security, *WHS FutureStation* automatically changes to this following variant of the dialog:



For realtime securities, *WHS FutureStation* loads the data from now and the specified number of preceding days. The number of available days depends on your data provider.

WHS FutureStation loads the data from the data providers server in the specified aggregation. When using realtime securities make sure to use an appropriate aggregation, otherwise you may end up with megabytes of data to be downloaded, e.g., if you work with an hourly chart, there is no need to load tick data.

WHS FutureStation applies a second aggregation on the loaded data. The resulting price data series is used for charting and computation of the signals. Hence, if you plan to work with a 3-minute chart, make sure to request a 1-minute server aggregation or ticks.

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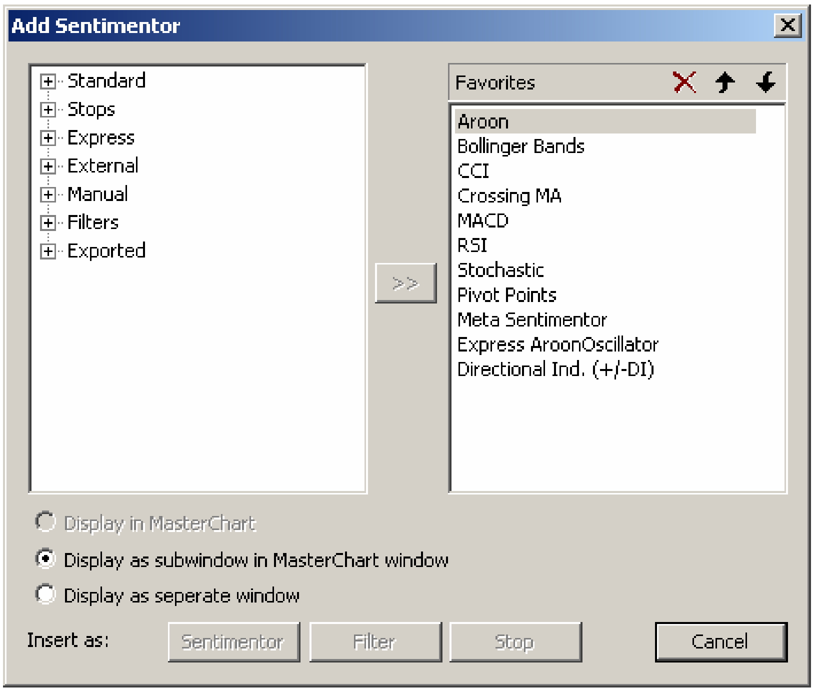
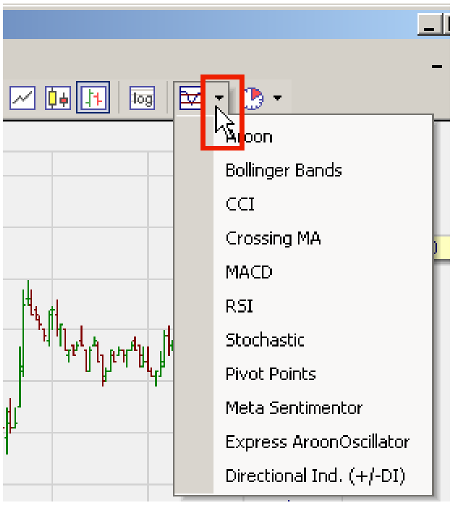
5.7 Adding Sentimentors

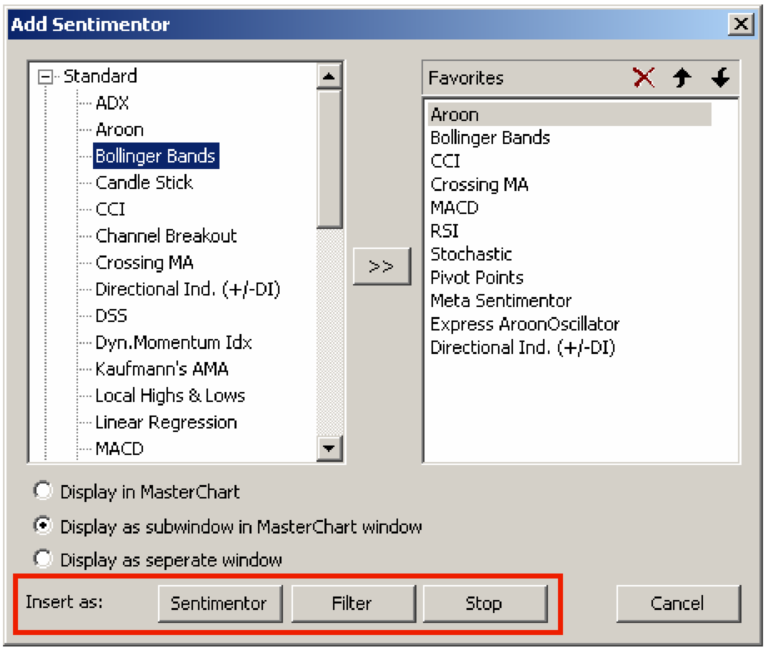
To add a sentimentor to a study, select the button from the toolbar. The following dialog will pop up:



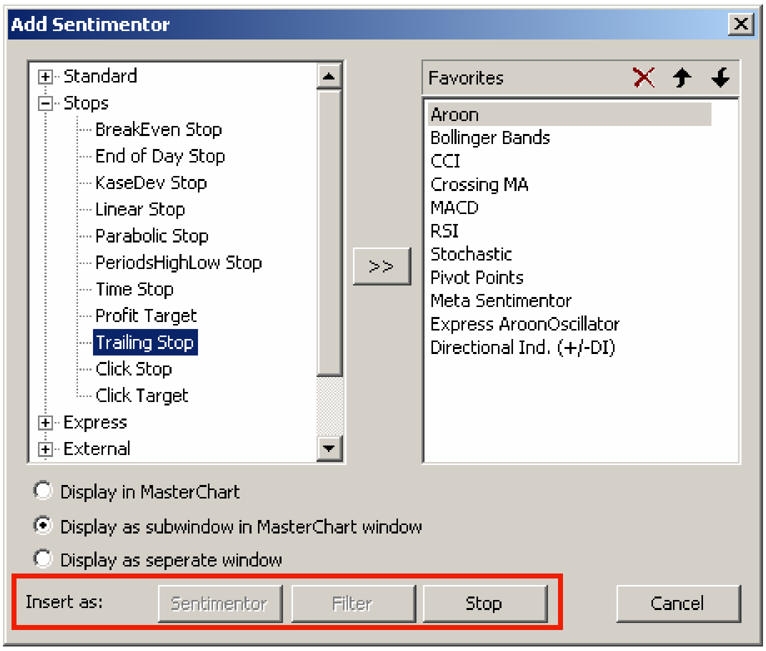
The left part of the dialog shows a structured view of all sentimentors available at your system. The right part shows your *favorite* sentimentors – e.g., those sentimentors that you access most frequently. This list can directly be accessed by clicking the small down arrow to the right of the sentimentors tool bar button:



When a sentimentor is selected, *WHS FutureStation* enables or disables the modes how the sentimentor can be added to the study, .e.g, a normal sentimentor can added as a *sentimentor,* a *filter*, or as a *stop*:



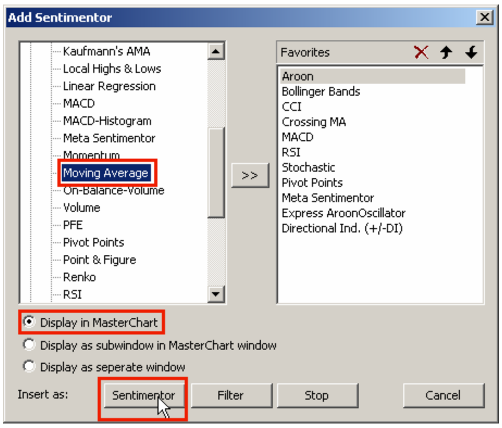
whereas a price based stop for usage in trading systems can only be added as a *stop*:



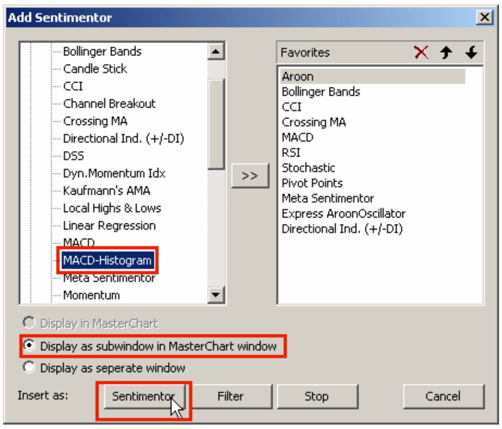
More details on adding sentimentors as a filter or a stop can be found in sections Adding a Sentimentor as a Filter and Adding Stops to a Study.

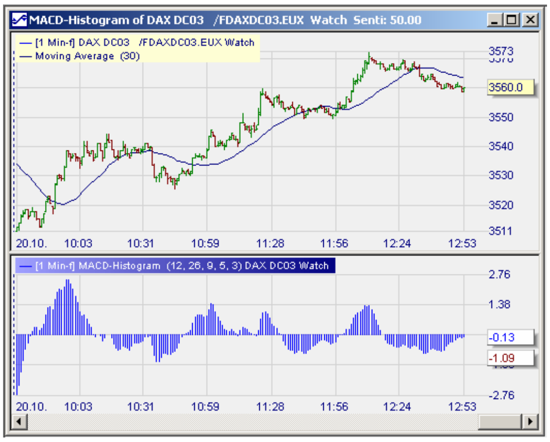
5.8 Displaying a Sentimentor

A sentimentor can be displayed in various ways. If the sentimenrtor's Y-axis is the price, it can be displayed directly in the MasterChart:

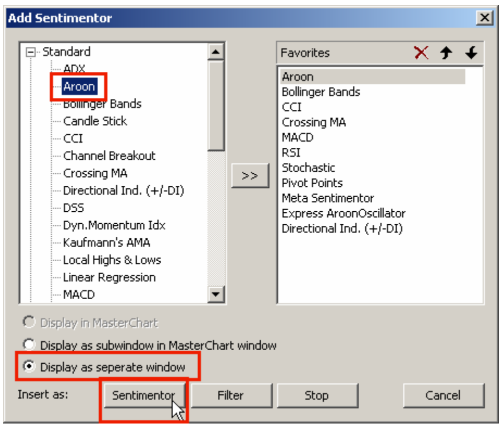


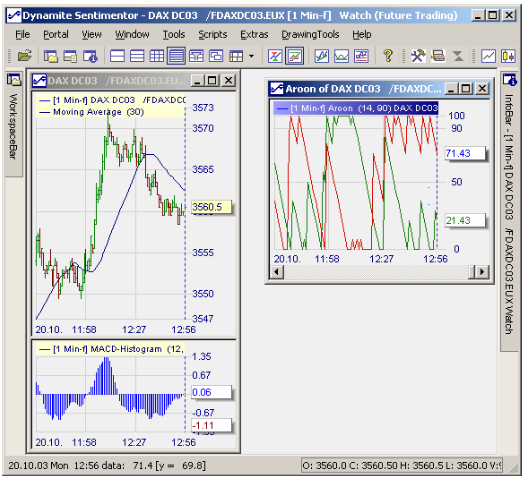
Every sentimentor can be displayed as a sub window of the MasterChart:





In case many sentimentors are used it is convenient to place some of them as separate windows, independently of the MasterChart:





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5.9 Auto Layout of Chart Windows

Using the toolbar buttons you may switch between predefined automatic window layouts:

These are specifically useful when working simultaneously with multiple trading systems. Whenever a new chart is loaded, a sentimentor is added or the main window is resized, the auto layout will be applied.

Tile Equity: Layouts all MasterCharts and Equity windows; hides all other windows

Tile Master: Layouts all MasterCharts, MetaSentimentors, and Equity windows; hides all other windows.

Tile: Layouts all sentimentors in rows and columns.

Tile Horizontal: Layouts all sentimentors horizontally.

Tile Filter: Layouts all MasterCharts and associated filters.

Free Placement: All windows need to be positioned manually. When resizing the main window, all windows will be resized proportionally.

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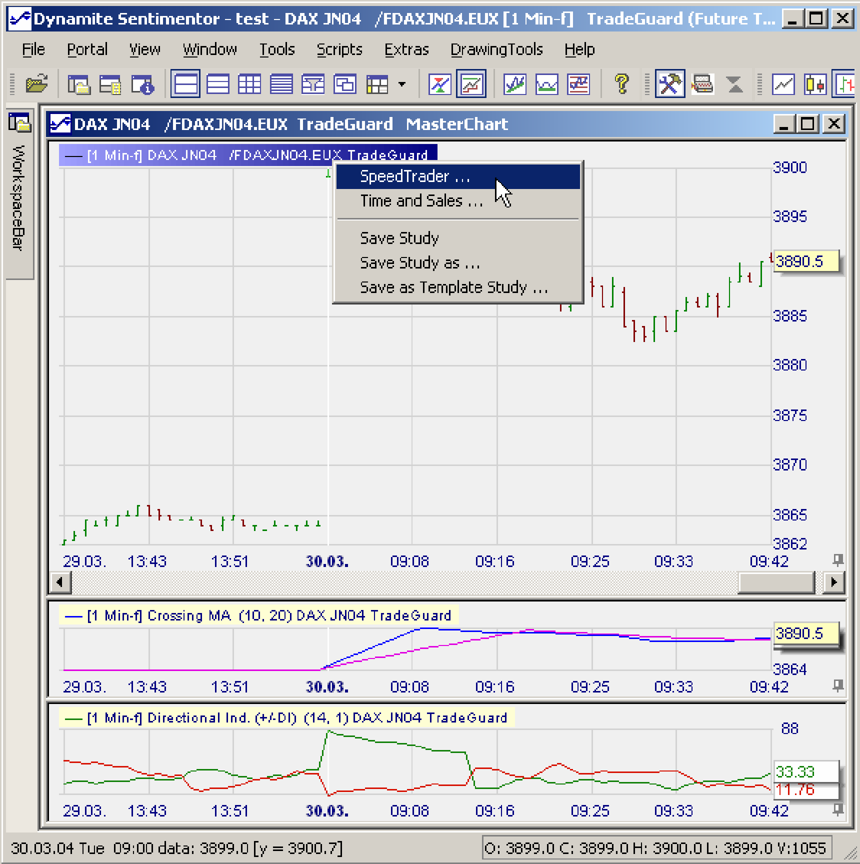
5.10 Displaying MarketDepth and Time & SalesBars in the MasterChart

Rightclick on the MasterChart legend to open the associated context menu. It shows entries for SpeedTrader and Time & Sales display in case the underlying data source provides this information:



The market depth is visualized as a histogram in the MasterChart. This shows short term support/resistance levels and can be of great importance for scalpers.

The SpeedTrader and Time & Sales views can be folded in just like normal Bars.

In case your license covers the *DySen-DirectTrade* module, the SpeedTrader allows to create various orders by simply clicking on a price level. For details please see the *DySen DirectTrade* documentation.a

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5.11 Sentimentor Context Menu

Right clicking on the sentimentor’s legend will pop up an associated context menu:

5.12 Drag & Drop

Drag & Drop is supported throughout *WHS FutureStation*. A security drag operation can be *started* from:

- any security of the WorkspaceBar
- any entry of a RatingBar, LiveTable or Depot
- the list of a Time & SalesBar
- the list of a DetailsBar
- the SymbolSearch dialog (*DySen FIDES-Trader Extension*)

A dragged security can be *dropped* on:

- a chart window – this will result in displaying the corresponding study for the dropped security
- a Time & SalesBar, SpeedTraderBar, or DetailsBar – the Bar will then display the information for the dropped security
- an Account – this will add the security to the depot with a position size of 0.

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5.13 Range Window

To explore specific ranges of the MasterChart or a sentimentor a *range window* can be created. A range window can be zoomed and scrolled independently of all other windows. This condition is indicated in the title bar of a range window by displaying „[Standalone View]“.

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5.14 Creating a Range Window

To create a range window, mark the range with the rubberband while pressing the Shift-key. When releasing the mouse button, a new range window will be created displaying the selected range.

Note: Change to the window arrangement Tile for displaying all windows and range windows.

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5.15 Closing a MasterChart

To close a MasterChart and all associated sentimentor and range windows choose File|Close or close the MasterChart directly using MS Windows standard functionality.

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5.16 Logarithmic Scaling

With View|Log Scale or  the price axis can be switched to a logarithmic scale. This mode is especially useful for securities with an extreme volatility, as a price change of one percent always requires the same place on the price axis, i.e. an increase from 10$ to 10.1$ gets visually the same importance as an increase from 100$ to 101$.

Here is an example: JDS Uniphase with linear scaling:

JDS Uniphase with Log Scale:

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5.17 Display Signals

With View|Display Signals or with the toolbar button the visualization of the signals in the charts can be turned on or off.

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5.18 X-Ray/Y-Ray

With the menu entry View|X-Ray you can toggle the X-Ray on and off. The X-Ray is a vertical bar displayed in all windows at the position corresponding to the date the mouse is actually indicating. The X-Ray simplifies the analysis of charts and signals of different sentimentors.

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5.19 Visualizing Stops and Profit Targets in the MasterChart

With View|Display Stops/Profittargets or with the toolbar button the visualization of the stop levels and profit targets can be turned on or off.

Note: *WHS FutureStation* selects the vertical zoom such that all profit targets and Stops are visualized. Within an optimization it might happen that the chosen stop values are so wide (which effectively deactivates them) that the vertical span to be displayed becomes very large, and hence the chart mutates into a horizontal line. To avoid this, select the accepted parameter ranges for the stops sufficiently tight or deactivate the display of the stops by pressing the –button from the toolbar.

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5.20 Copying a Chart as a Bitmap to the Clipboard

With Extras|Copy active Window to Clipboard the current active chart can be copied as a bitmap into the clipboard. From there the bitmap can be inserted and processed by a variety of programs such as Word, Excel, Outlook, etc.

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6 Drawing Into a Chart

6.1 General Notes

To start drawing into a chart click on one of the drawing tool buttons  to activate the drawing mode. Moreover, make sure the logarithmic scaling is disabled, otherwise the drawing is disabled. The drawing can now be attached to a MasterChart or to the chart of a sentimentor:

In case a line is drawn into the MasterChart you may press the Shift-key while drawing to let *WHS FutureStation* snap the trendline to the nearest high or low.

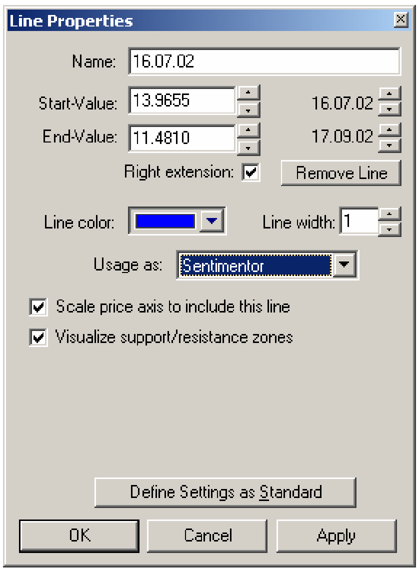
To cancel the drawing mode before drawing has begun, click again on the drawing tool button or right click into a chart.

When clicking on a drawing tool the tool is activated and will display resize corners:

Drag a resize corner to reposition or manipulate the drawing tool.

Right clicking on a drawing tool opens the context menu:

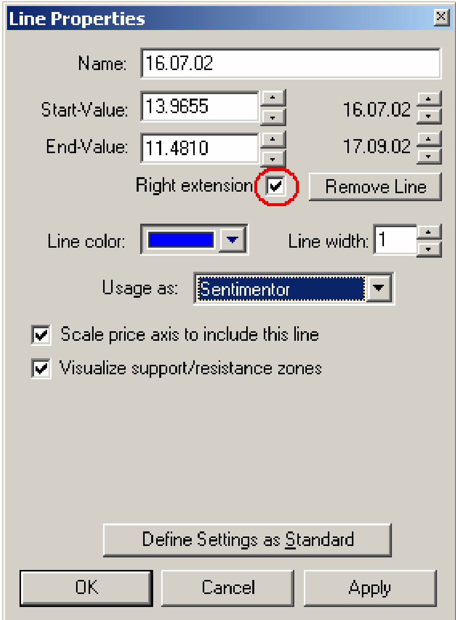
When choosing the Settings entry a corresponding dialog for this drawing tool is opened. This dialog is also automatically opened when the drawing of a tool is finished.

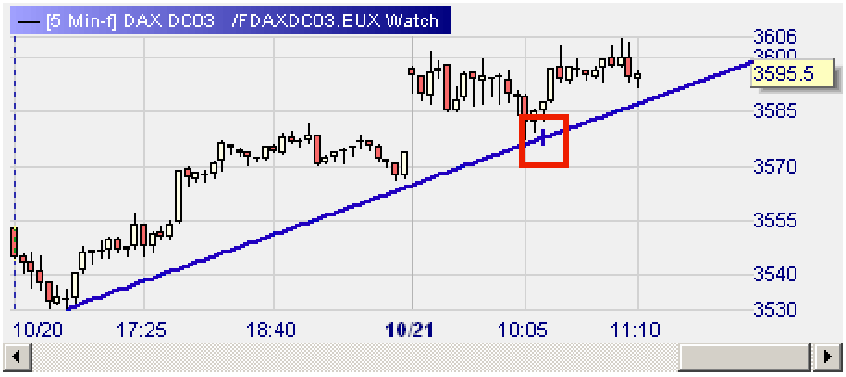


The Name of the line is automatically set to the starting date of the line. Wherever WHS FutureStation displays information concerning a line, its name is used. You may change the name as you like.

The Start-Value and End-Value define the prices and the corresponding dates. By using the arrow keys, these values can be changed. The dates displayed are always the beginning of a bar. When changing a date, the gradient of the line is maintained.

When activating the Right extension option, the line is automatically extended into the future:





The original end point of the trendline is depicted by a small vertical line.

To remove the line click on the Remove Line button.

To ensure that a line is always visible, activate the Scale price axis to include this line-option.

By clicking the Define Settings as Standard-button the current settings are saved as standard and are automatically set when drawing a new line.

When drawing trendline, the shift-key may be pressed in order to automatically snap to the nearest high or low of the bar the mouse is pointing to.

6.2 Usage Modes of a Trendline and Horizontal Line

A line drawn into the MasterChart can be used in different modes and, depending on the mode, influence the sentiments and signal generation:

- **Drawing only**
  The line is used for visualization purposes only and does *not* influence the signal generation in any way.

- **Long Stop**
  The line is used as a price based stop that is triggered when the price crosses the line from above (this usage is especially interesting in conjunction with the TradeGuard functionality)
- **Short Stop**
  Analogical to the Long Stop. A position is closed when the line is crossed from below.
- **Sentimentor Stop**
  The line is created as a Sentimentor Stop with. The interpretation of a trendline for generating the corresponding sentiment uses so called *support/resistance zones*, where the line has a high significance. The visualization of this zones can be toggled with the Visualize support/resistance zones-option. A specific TrendlineSentimentor explains the Trendline-Sentimentor in detail.
- **Sentimentor**
  Analogical to *Sentimentor Stop*. The trendline is created as a sentimentor and influences the overall sentiment.
- **Filter**
  The trendline is used as a normal Sentimentor applied as a filter.

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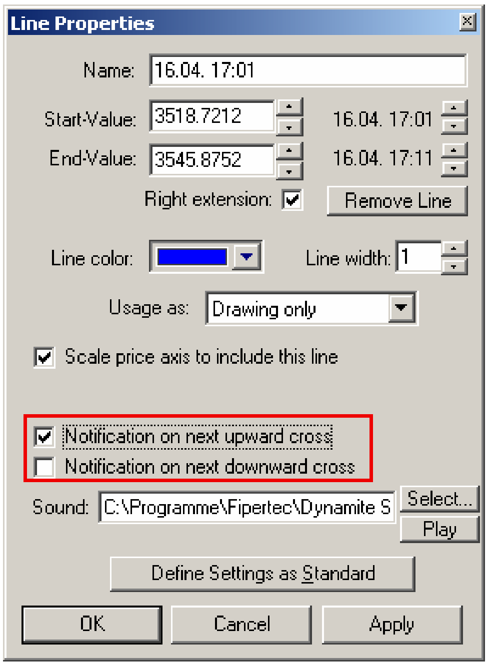
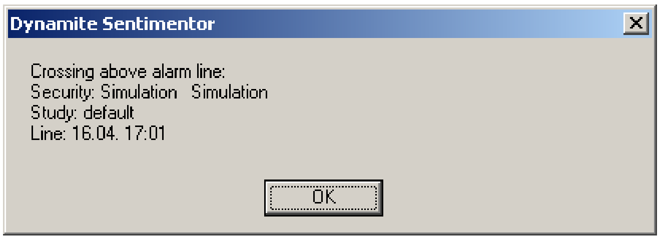
6.3 Defining an Alarm

If a line is attached to a realtime study, *WHS FutureStation* can emit an alarm and a corresponding dialog when the line is crossed:





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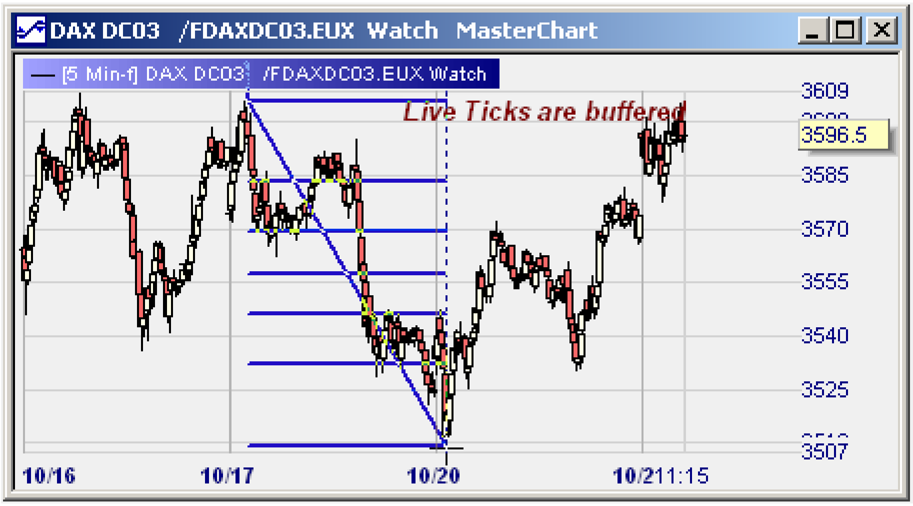
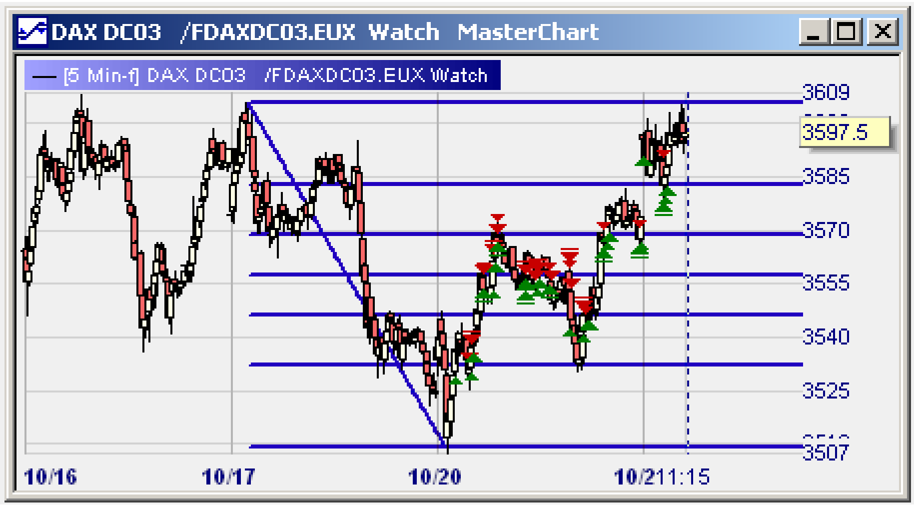
6.4 Drawing Fibonacci Levels into a Chart

The drawing of Fibonacci levels into a chart is analogous to drawing a line. By clicking the button, the Fibonacci draw mode is entered. Now the Fibonacci *construction* line can be drawn into the MasterChart or into the chart window of a sentimentor.





When drawing the construction line, the shift-key can be pressed in order to automatically snap to the nearest high or low of the bar the mouse is pointing to.

If pressing the Ctrl-key while drawing, the weight of the automatically generated Fibonacci sentimentor is automatically fixed to zero, i.e., the Fibonacci line will not influence the signals of the study.

When pointing to a Fibonacci level, a popup window displays associated information. When clicking on a Fibonacci level, the Properties dialog is started that works exactly as described for trendlines.

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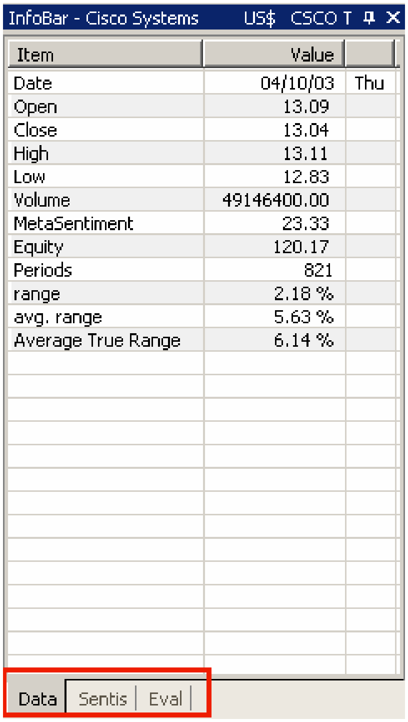
7 InfoBar

The InfoBar consists of three pages that can be selected by the tabs at its bottom.



7.1 The Data Page

The Data-Page displays information corresponding to the date the mouse is indicating.

The Average Range and Average True Range are computed for the currently selected evaluation period as selected in the Designer-dialog.

The Range as used for the computation of the Average Range is the quotient of the high and low of the period expressed in percent. The True Range enlarges the trading range by taking the close price of the previous period into account. It is defined as the maximum value of the subtraction

- current period's high minus current period's low (the Range)
- current period's high minus previous period's close
- previous period's close minus current period's low

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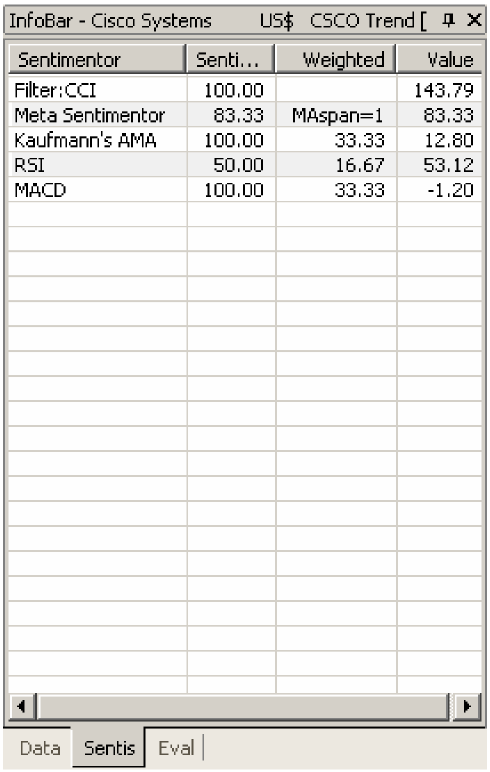
7.2 The Sentis Page

A major characteristic of *WHS FutureStation* is the fact that the reason why a signal has been generated can be verified by the user. This results from the fact that a signal is generated exclusively because of the sentiment values generated by the applied sentimentors. In order to make the signal generation as transparent as possible the Sentis-Page displays the respective sentiment values of the sentimentors applied in the current study for the date the mouse is indicating.


InfoBar - Cisco Systems US$ CSCO Trend [

Sentimentor	Senti...	Weighted	Value
Filter:CCI	100.00		143.79
Meta Sentimentor	83.33	MAspan=1	83.33
Kaufmann's AMA	100.00	33.33	12.80
RSI	50.00	16.67	53.12
MACD	100.00	33.33	-1.20

Data Sentis Eval

The Meta Sentimentor is built by computing the weighted sum of the sentimentors. Therefore, the column Weighted shows the weighted contribution of each sentimentor to the Meta Sentimentor for the date the mouse is indicating. This gives an immediate understanding of the generated signals.

In case the Meta Sentimentor is computed without applying a moving average, the sum of the Weighted column is exactly the Meta Sentiment value at the given date. In the example given above „MAspan = 1“ denotes the span of the Moving Average is 1, i.e., no moving average is computed.

The last column Value displays the “most important” value of each sentimentor at the given point in time, e.g., the RSI has a value of 53.12.

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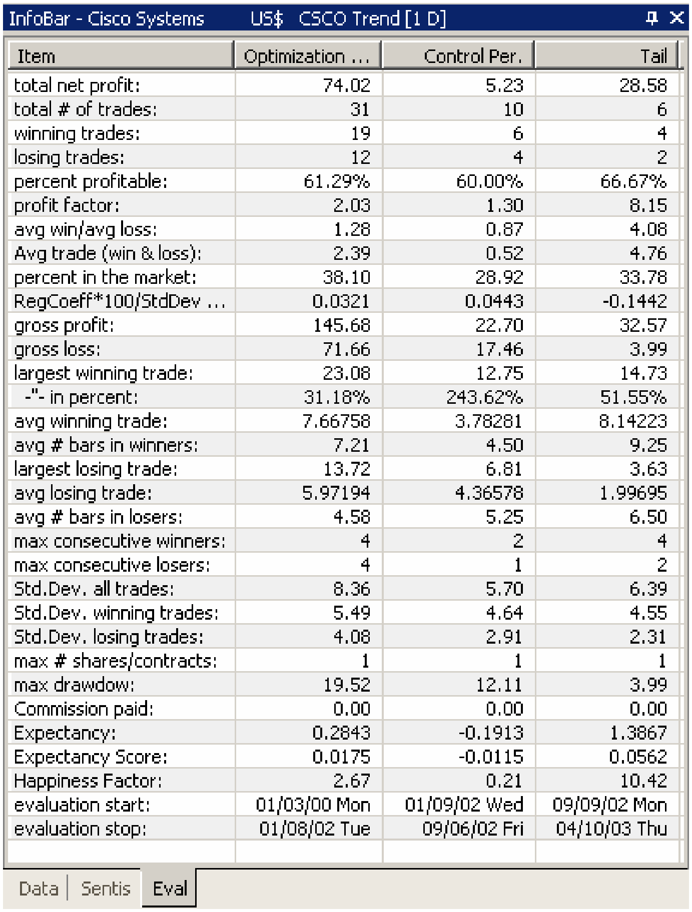
7.3 The Eval-Page

The Eval-Page displays the current evaluation of the trading approach. The shown information varies with the different approaches.



InfoBar - Cisco Systems US$ CSCO Trend [1 D]

Item	Optimization ...	Control Per.	Tail
total net profit:	74.02	5.23	28.58
total # of trades:	31	10	6
winning trades:	19	6	4
losing trades:	12	4	2
percent profitable:	61.29%	60.00%	66.67%
profit factor:	2.03	1.30	8.15
avg win/avg loss:	1.28	0.87	4.08
Avg trade (win & loss):	2.39	0.52	4.76
percent in the market:	38.10	28.92	33.78
RegCoeff*100/StdDev ...	0.0321	0.0443	-0.1442
gross profit:	145.68	22.70	32.57
gross loss:	71.66	17.46	3.99
largest winning trade:	23.08	12.75	14.73
-"- in percent:	31.18%	243.62%	51.55%
avg winning trade:	7.66758	3.78281	8.14223
avg # bars in winners:	7.21	4.50	9.25
largest losing trade:	13.72	6.81	3.63
avg losing trade:	5.97194	4.36578	1.99695
avg # bars in losers:	4.58	5.25	6.50
max consecutive winners:	4	2	4
max consecutive losers:	4	1	2
Std.Dev. all trades:	8.36	5.70	6.39
Std.Dev. winning trades:	5.49	4.64	4.55
Std.Dev. losing trades:	4.08	2.91	2.31
max # shares/contracts:	1	1	1
max drawdown:	19.52	12.11	3.99
Commission paid:	0.00	0.00	0.00
Expectancy:	0.2843	-0.1913	1.3867
Expectancy Score:	0.0175	-0.0115	0.0562
Happiness Factor:	2.67	0.21	10.42
evaluation start:	01/03/00 Mon	01/09/02 Wed	09/09/02 Mon
evaluation stop:	01/08/02 Tue	09/06/02 Fri	04/10/03 Thu

Data | Sentis | Eval

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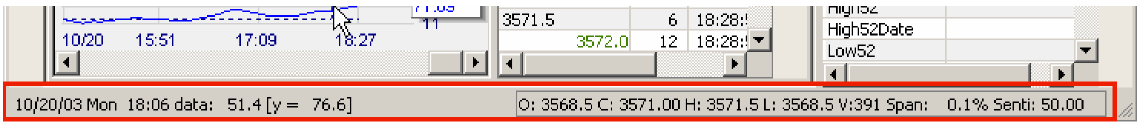
8 Status bar

The standard window status bar shown at the bottom of the main window is used to display information corresponding to the date the mouse is indicating. Reading from left to right the data are:



Date, day of week, time, value of the indicator at this date, value of the indicator corresponding to the vertical position of the mouse pointer, Open/Close/High/Low/Volume of the MasterChart, quote span, and the sentiment value computed by the sentimentor for that date.

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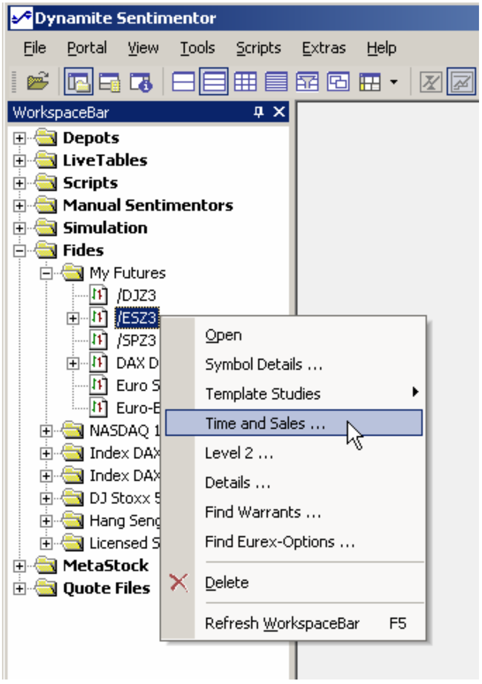
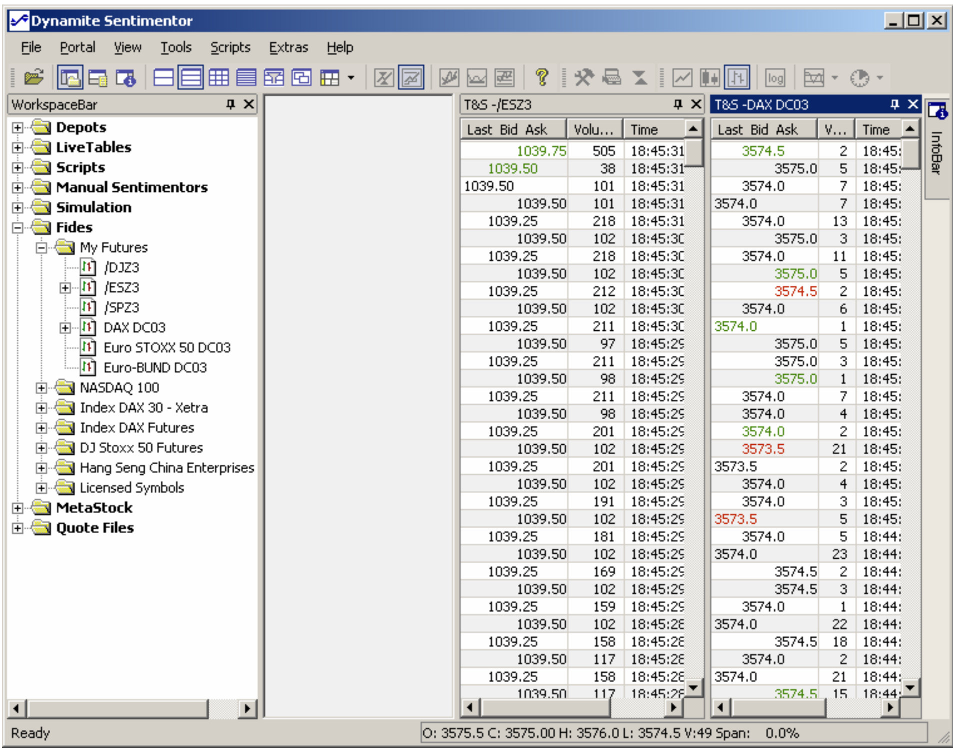
9 Time & SalesBar

Besides opening a Time & SalesBar directly in a MasterChart it can be opened as a stand alone Bar through the context menu of a security:





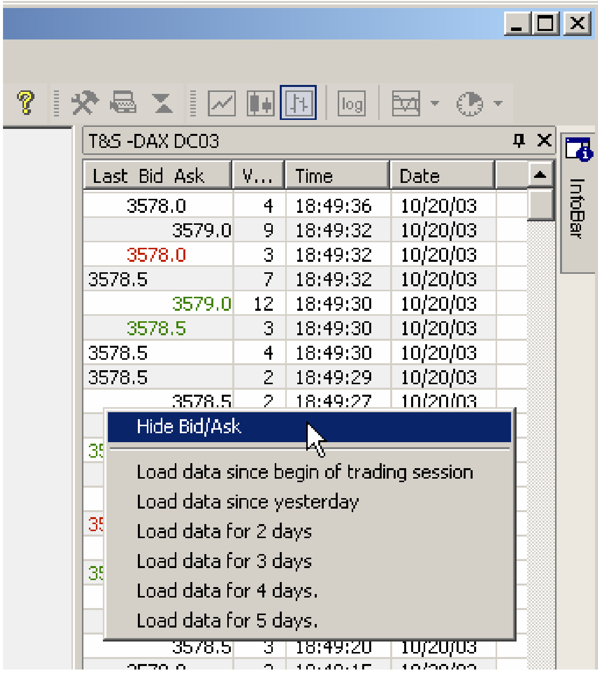
The Time & SalesBar color codes up and down movements of the prices:

- green indicates an up move

- red indicates a down move
- black indicates an update without a price change

Note: these colors, as all colors used by *WHS FutureStation*¸ can be configured through the ColorManager accessible through the main menu Extras|Colors.

Right clicking on a Time & SalesBar opens the context menu:



DySen FIDES-Trader Extension:

The *DySen FIDES-Trader* allows to load Time & Sales data for up to 5 trading sessions.

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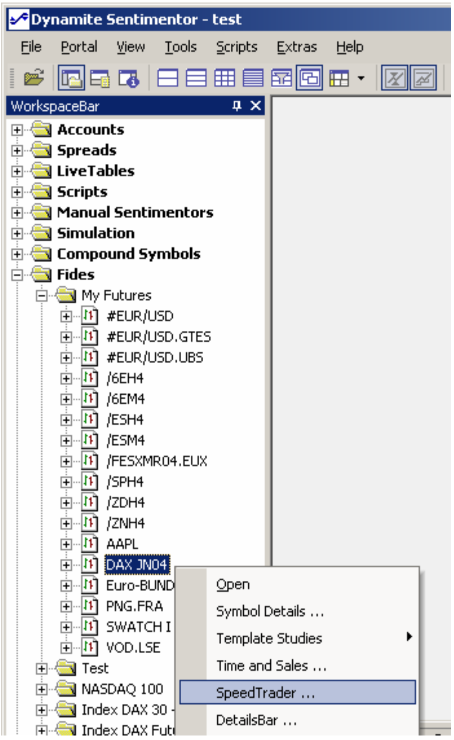
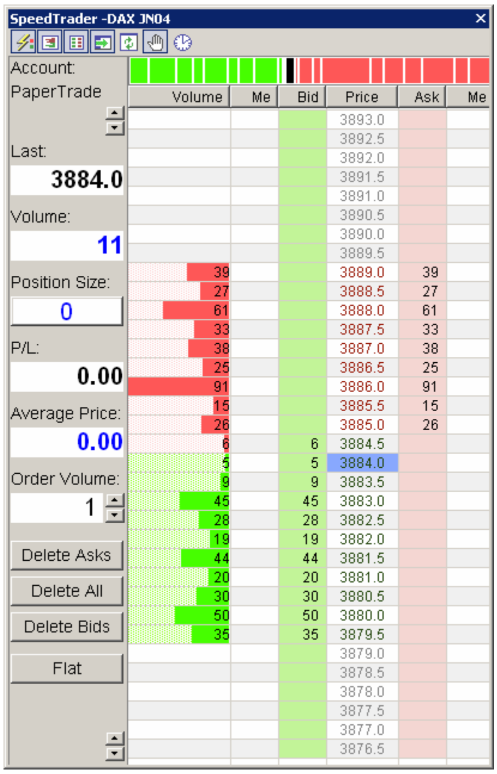
10 SpeedTrader Bar

Just as a Time & SalesBar, a SpeedTraderBar can be opened from the context menus of realtime securities:





The SpeedTraderBar can be used for both, just displaying the market depth for informational purposes and, if attached to an account, trading with the click of a button.

The toolbar buttons of a SpeedTraderBar allow to configure its appearance:

	Show/Hide the left pane of account information and trade buttons.(Please see the manual *DySen-DirectTrade* for details.)
	Show/Hide the column displaying the volume histogram
	Show/Hide Bid/Ask columns
	Show/Hide gaps in the market depth
	Automatically center the list to display the last trade price
	Ask for confirmation before issuing a trade
	Show/Hide time information

The upper part shows the sizes horizontally and indicates whether there is a bid or ask pressure.

The colors of each level can be customized in the ColorManager through the main window Extras|Colors.

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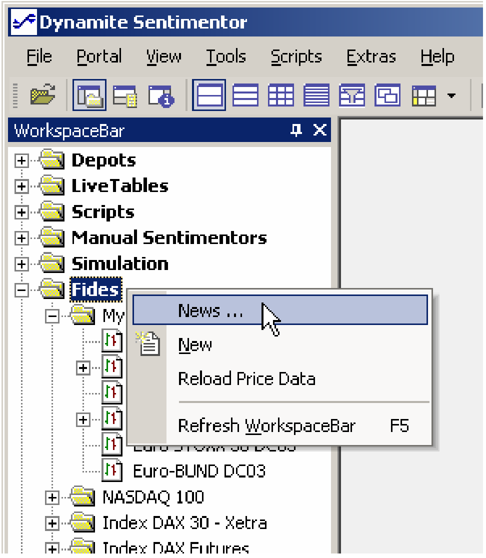
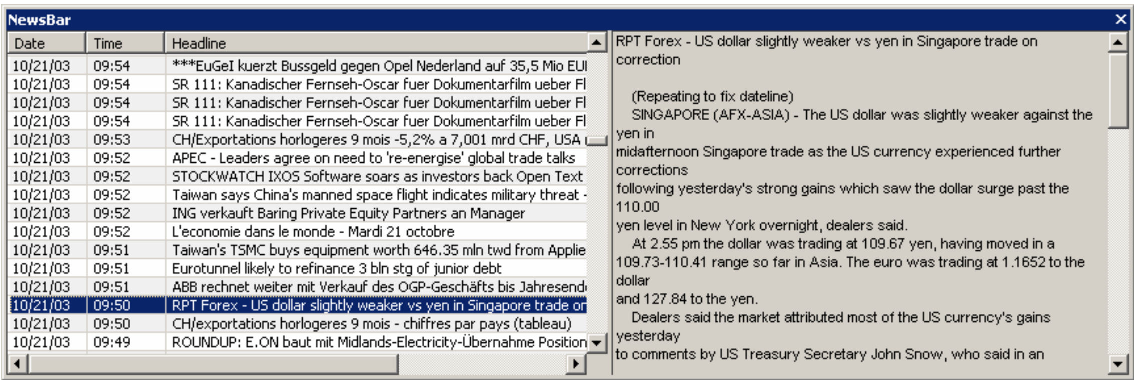
11 NewsBar

DySen FIDES-Trader Extension:

The *DySen FIDES-Trader* provides a NewsBar that can be opened through the context menu of the Fides-entry in the WorkspaceBar:



Depending on your licensed modules you may see the headlines and optionally the corresponding story:



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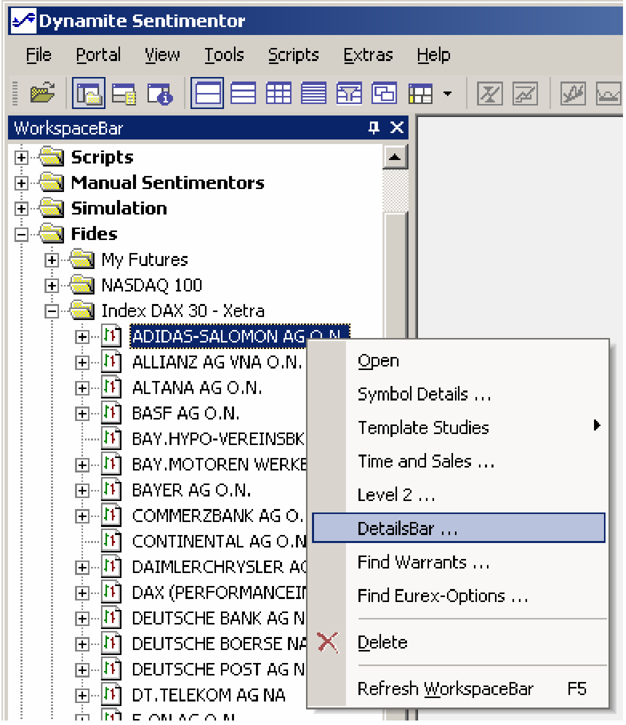
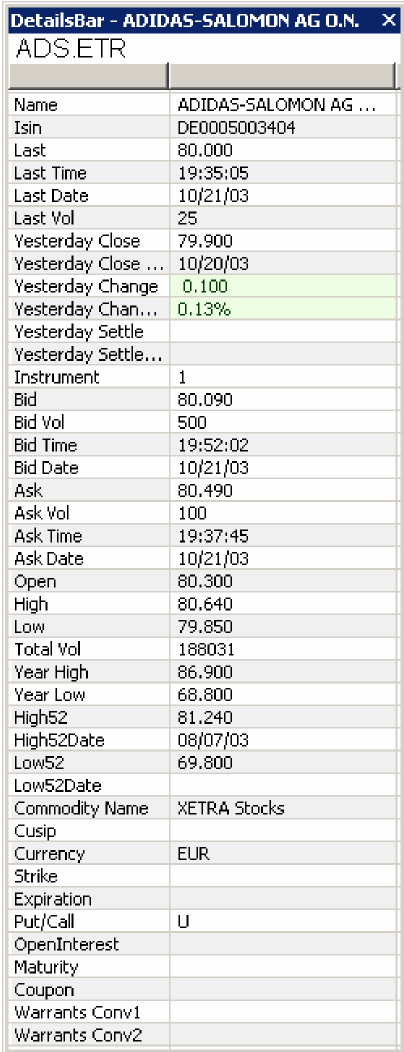
12 DetailsBar

DySen FIDES-Trader Extension:

Choose DetailsBar from the context menu of a Fides security to create a DetailsBar for that security:



The DetailsBar shows a predefined set of fundamental and live data:



DetailsBar - ADIDAS-SALOMON AG O.N.

ADS.ETR

Name	ADIDAS-SALOMON AG ...
Isin	DE0005003404
Last	80.000
Last Time	19:35:05
Last Date	10/21/03
Last Vol	25
Yesterday Close	79.900
Yesterday Close ...	10/20/03
Yesterday Change	0.100
Yesterday Chan...	0.13%
Yesterday Settle	
Yesterday Settle...	
Instrument	1
Bid	80.090
Bid Vol	500
Bid Time	19:52:02
Bid Date	10/21/03
Ask	80.490
Ask Vol	100
Ask Time	19:37:45
Ask Date	10/21/03
Open	80.300
High	80.640
Low	79.850
Total Vol	188031
Year High	86.900
Year Low	68.800
High52	81.240
High52Date	08/07/03
Low52	69.800
Low52Date	
Commodity Name	XETRA Stocks
Cusip	
Currency	EUR
Strike	
Expiration	
Put/Call	U
OpenInterest	
Maturity	
Coupon	
Warrants Conv1	
Warrants Conv2	

To change the monitored security, drag and drop another security onto a DetailsBar or type in the symbol directly into the text field at the top of the DetailsBar. By dragging the list of the DetailsBar the current symbol is taken and can be dropped onto a drop source, e.g., a SpeedTraderBar, a chart, a LiveTable, etc.

13 Trading Approaches

A trading approach defines how to convert a given sentiment series into signals. *WHS FutureStation* distinguishes between *trendsignals* and *trading strategies.*

Trendsignals are generated independently of each other, i.e. long and short signals are given without a reference to the preceding signals. Moreover, transaction costs and budgets are not taken into account.

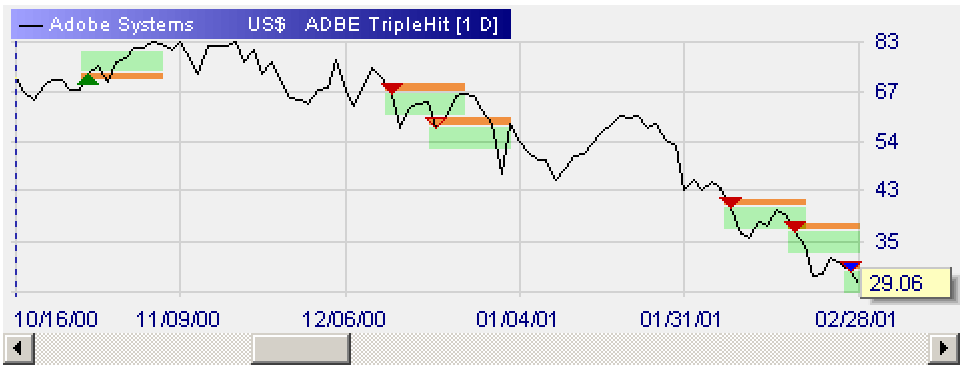
In contrast, a trading strategy is computed starting from an initial budget. The given signals rely on each other. Moreover, transaction costs and slippage influence the performance.

13.1 Visualization of Trendsignals

The following scheme is used to visualize trendsignals:

▲	solid green triangle	correct long signal
△	green triangle	wrong long signal
▼	solid red triangle	correct short signal
▽	red triangle	wrong short signal
▲	green triangle filled with blue	A buy signal that is so near to the present that its correctness cannot be evaluated yet (open buy signal).
▼	red triangle filled with blue	A sell signal that is so near to the present that its correctness cannot be evaluated yet (open sell signal).

The following screenshot shows trendsignals in a sentimentor window.



The green areas show the target zones that have to be exceeded, whereas the red areas show the stop zones that may not be exceeded.

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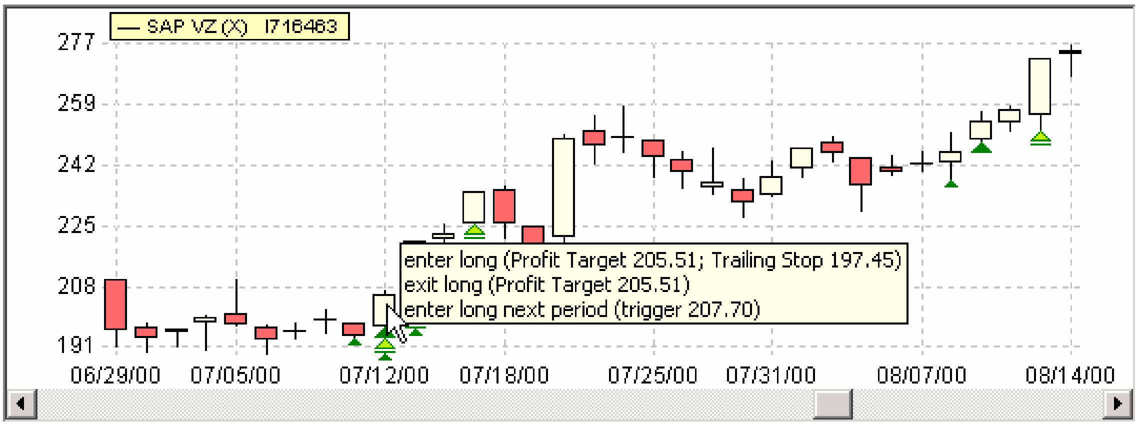
13.2 Visualization of Trading Signals

The interpretation of the trading signals depends on the current evaluator.

▲	solid green triangle	long (buy/buy calls/buy contracts)
▲	small solid green triangle	long-signal to be executed in the next period This signal type is displayed only if the Signal Execution for Sentiment Enter-signals is set to “Confirmation price next bar” or “Open next bar” in the Evaluator. Moreover, the field draw setup signals of the Options-dialog must be activated.
▲	solid green triangle with bar	close long triggered by a sentiment signal

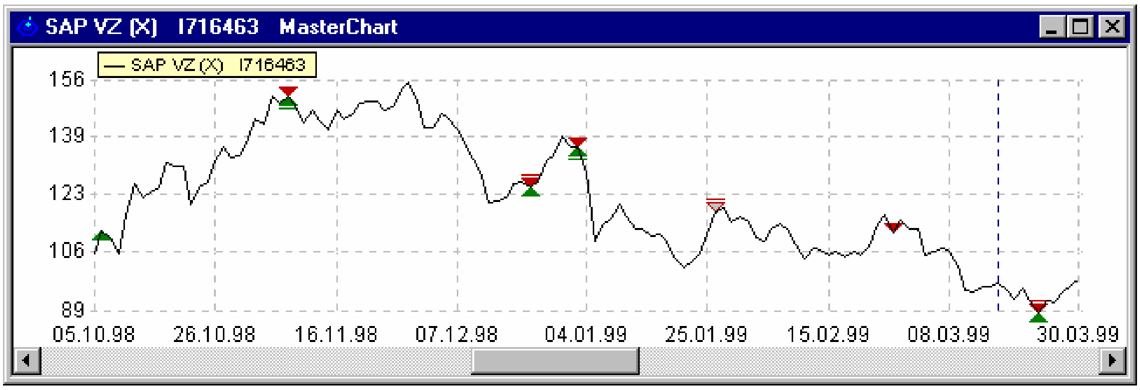
		In case the triangle is filled with gray, the signal was generated by a Stop. If it is filled with yellow, the profit target has been reached.
	solid red triangle	short (sell short/buy puts/sell contracts)
	small solid red triangle	short signal to be executed in the next period This signal type is displayed only if the Signal Execution for Sentiment Enter-signals is set to “Confirmation price next bar” or “Open next bar” in the Evaluator. Moreover, the field draw setup signals of the Options-dialog must be activated.
	solid red triangle with bar	close short triggered by a sentiment signal In case the triangle is filled with gray, the signal was generated by a Stop. If it is filled with yellow, the profit target has been reached

Depending on the chosen Signal Execution policies a bar may create several signals. If the mouse points to a bar, all signals generated within this bar are explained in a popup window.



The order in which the signals are explained corresponds to the order the signals have been executed by *WHS FutureStation*.

A red and a green triangle displayed at the same date (e.g., or), indicate a switch of the position.



An open position is handled as if it were closed at the last day of the evaluation period.

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13.3 Analyzing a Trading Approach

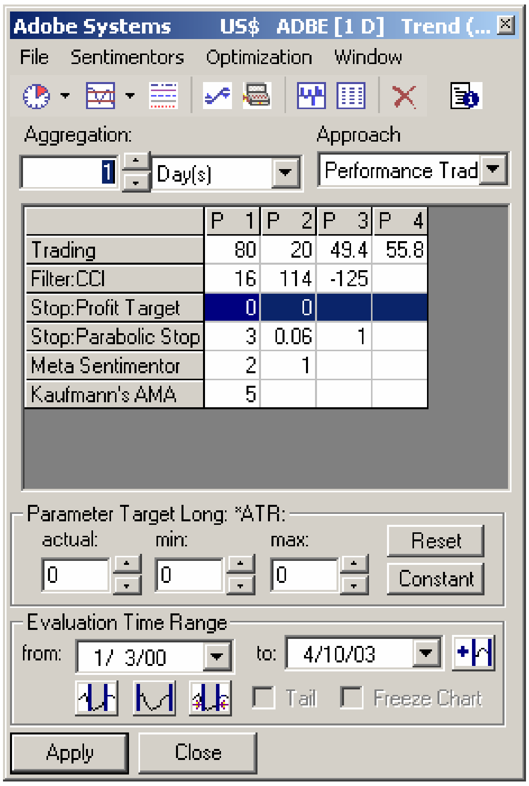
To analyze the quality of a given sentimentor parameter setting, *WHS FutureStation* produces a performance report with the following entries:

Name	**Definition**
total net profit	gross profit less the losses, commission, and slippage.
performance	performance with respect to the initial account size. (Displayed only if the strategy relies on an initial account size.)
total # of trades	total number of trades
winning trades	number of trades with a remaining profit after subtracting commission and slippage
losing trades	number of trades with ending in a loss (commission and slippage included)
percent profitable	the ratio of winning trades to losing trades
gross profit	sum of the profit of the winning trades (commission and slippage included)
gross loss	sum of the losses of the losing trades (commission and slippage included)
avg win/avg loss	ratio of the average winning trade to the average losing trade (gross profit / winning trades) / (gross loss / losing trades)
profit factor	gross profit / gross loss A „profit factor“ of 3 would indicate a profit of $3 per $1 loss.
Avg trade (win & loss)	(gross profit + gross loss) / total # of trades

Largest winning trade	the profit of the largest winning trade (displayed as an absolute value and in percent of the total net profit).“
avg winning trade	average winning trade gross profit / winning trades
avg # bars in winners	average duration of a winning trade (currently, a *bar* is always one day)
largest losing trade	the loss of the largest losing trade
avg losing trade	average losing trade gross loss / losing trades
avg # bars in losers	average duration of a losing trade (currently, a *bar* is always one day)
max consecutive winners	greatest number of consecutive winning trades
max consecutive losers	greatest number of consecutive losing trades
Std. Dev. all trades	standard deviation of the net profit of all trades
Std. Dev. winning trades	standard deviation of the net profit of the winning trades
Std. Dev. losing trades	standard deviation of the net profit of the losing trades
percent in the market	ratio between the time an open position was kept and the total evaluation time span.
max # shares/contracts	size of the largest position held
max drawdown	maximal loss with respect to the highest preceding account size Example: Suppose after five trades the account size reached a maximum value of $10.000, and the following trades result in an account size of $2.000. At this point the drawdown is 80%.
commission paid	sum total of paid commission
included slippage	sum total of included slippage
Expectancy Score	[(PW x AW- PL x AL) / AL] * Opportunity with: PW = probability of winning AW = average winning trade PL = probability of losing AL = average losing trade Opportunity = # Trades / # Periods in the evaluation period
Happiness Factor	[Performance * PW * (ProfitFactor + AW / AL)] / [max. drawdown + max. losing trade + max winning trade]

14 Designer-Dialog

The Designer dialog allows to select, evaluate, and optimize the sentimentors used to analyze the MasterChart. To open the Designer-dialog use Tools|Designer from the menu, or click the toolbar item, or simply press Ctrl-D.



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14.1 MasterChart Study File

A *study file*, also denoted a *study*, stores the sentimentors and their parameters as well as the settings for the evaluator and the trading approach.

When opening the Designer dialog, *WHS FutureStation* checks whether there exist studies for the corresponding MasterChart. By default, all studies must be stored in the folder `Dys` in the installation directory (DysDir). The name of a study -file is constructed from the name of the security, an `#`-character, optionally the the symbol and another `#`-character, an explanatory label, and the suffix `dys`, e.g.
`DaimlerChrysler#options.dys` or
`DaimlerChrysler#DCX#options.dys`

WHS FutureStation automatically loads the study corresponding to a MasterChart which has been saved most recently. The explanatory label, the so-called *study label*, as well as the name and symbol of the security are displayed in the title bar of the Designer dialog.

If no study corresponding to the actual MasterChart exists, then *WHS FutureStation* loads the predefined study `rt_standard.dys`, or `standard.dys` for end-of-day securities, from the directory `DefaultDys` which is located inside the installation directory. You can adapt `rt_standard.dys` and `standard.dys` to suit your particular needs.

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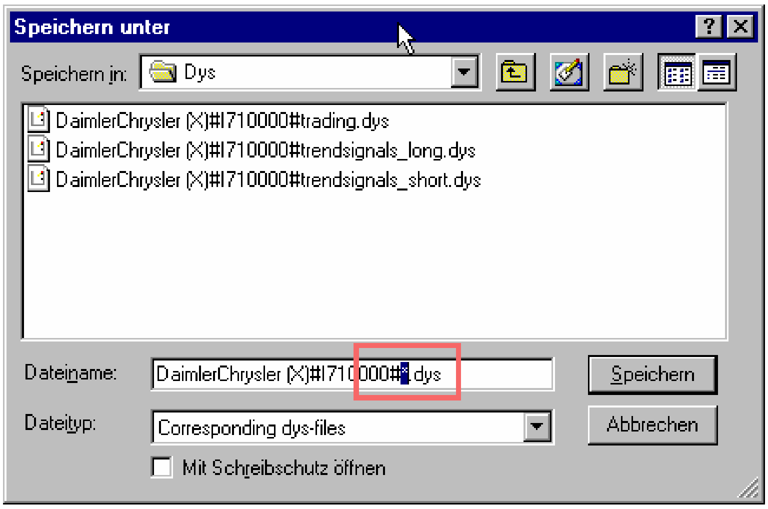
14.2 Saving a Study

A study can be saved using File|Save from the menu of the Designer-dialog. If the study has initially been loaded from `standard.dys`, then the filename of the stored configuration file will carry the explanatory label `default`, e.g. `DaimlerChrysler#DCX#default.dys`

An arbitrary label can be defined when using File|Save As.



Be careful to maintain the format of the filename, i.e., only change the label! Otherwise *WHS FutureStation* cannot match the configuration file with the MasterChart.

It is good style to create a number of configuration files per MasterChart which are individually targeted to a specific trading approach. You can do this manually or through scripts as described below.

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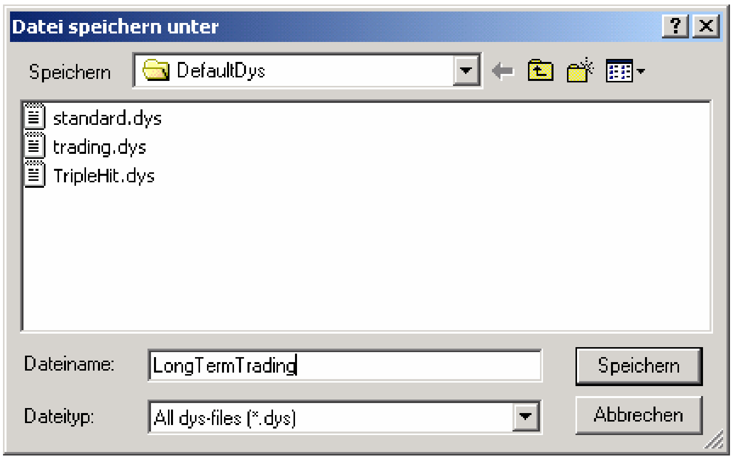
14.3 Save as Template Study

Frequently one likes to apply a study created for a security to other securities. Therefore, a given study can be saved as a so-called *Template Study*. These Template Studies are usually stored in a specific directory that is automatically chosen in the File Save-dialog.



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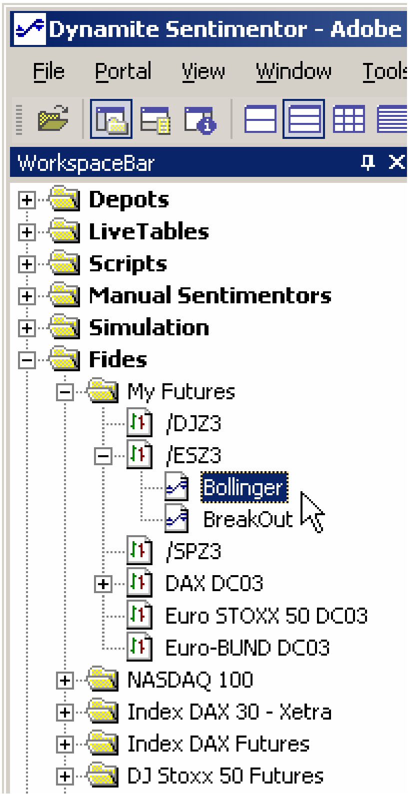
14.4 Loading a different Study

If you want to switch to another study use File|Open from the Designer dialog. A file selection box will pop up showing all the study files corresponding to the current MasterChart. However, you can also load an arbitrary configuration file by navigating to that file, e.g., you could navigate to `standard.dys` and adapt it.

Alternatively, a study can be loaded from the WorkspaceBar. Below each quote file the labels of all existing studies for that quote file are displayed.



By doubleclicking on a study this study and the corresponding MasterChart are loaded.

After loading a study, *WHS FutureStation* zooms automatically to the evaluation period specified in the study.

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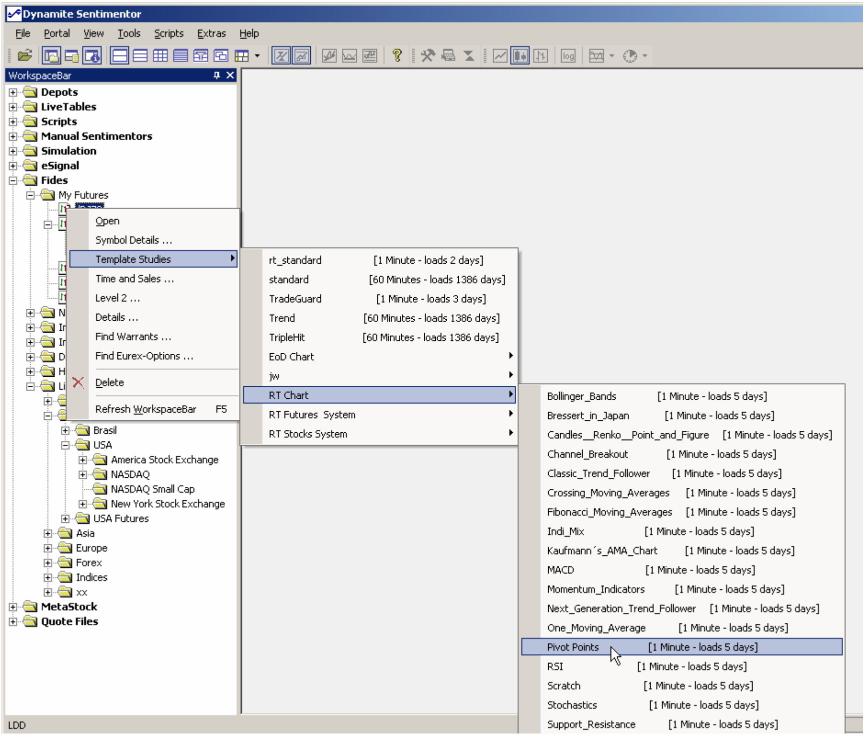
14.5 Open Template Study

With File|Open Template Study a template study can be selected and loaded. When using File|Save the study is automatically assigned to the current MasterChart using the name of the template study as the study label.

A security can be loaded directly with a specific template study by rightclicking on the security in the WorkspaceBar:



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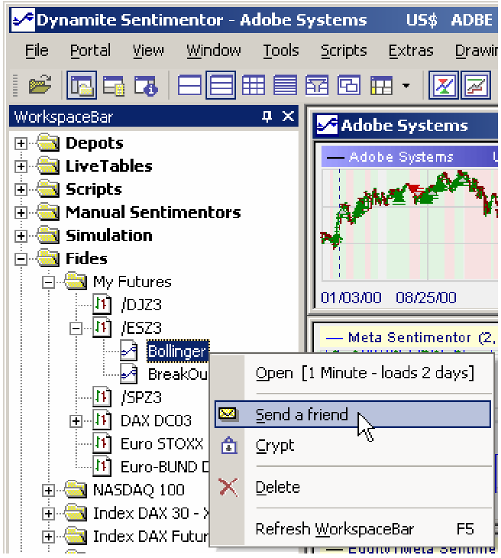
14.6 Emailing a Study

If you have installed a so-called MAPI email system, e.g., Microsoft Outlook, you can email a study directly from within *WHS FutureStation*. To do this, just open the context menu by right clicking on the study to be send and choose Send a friend.



The message editor of your mail program will come up having the selected study already attached to the message.

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14.7 Encrypted Studies

WHS FutureStation allows to encrypt a study, so studies may be exchanged with other users without providing the internal knowledge and research efforts.

An encrypted study is shows the following characteristics

- only the MasterChart, the MetaSentimentor, and the Equity are displayed
- the MasterChart displays the signals as usual
- In the Designer-dialog the applied sentimentors are hidden
- encrypted studies can be optimized
- a SystemTest can be applied
- encrypted studies may be used in scripts and LiveTables.

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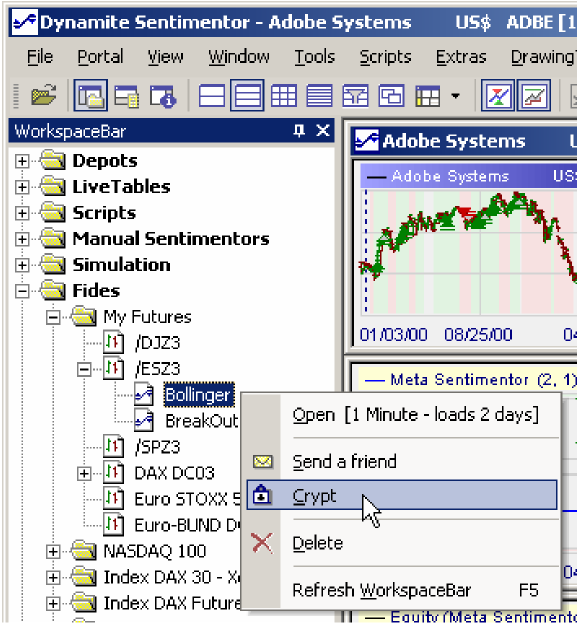
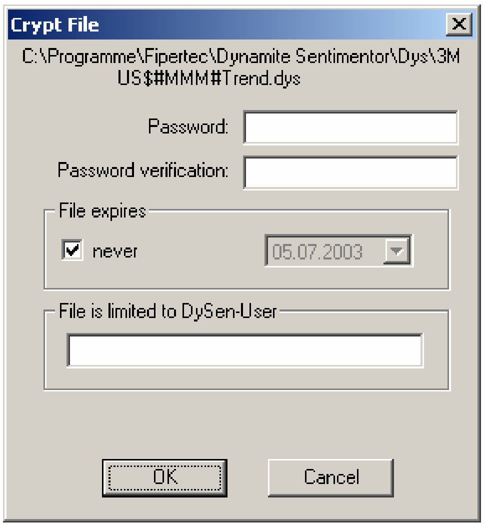
14.7.1 Encrypting a Study

To encrypt a study right click on it in the WorkspaceBar and choose Crypt from the menu:



The following dialog will pop up:



The Crypt File dialog is used to define the password for decrypting the study. Moreover, *WHS FutureStation* allows to specify an expiration date of an encrypted study, i.e., *WHS FutureStation* refuses to load encrypted studies that are expired. This enables interesting time based licensing models of studies.

In case an expired study is attempted to be loaded, *WHS FutureStation* automatically loads the `standard` study.

In addition to a time based validity a study can also be licensed to a specific DySen user. To bind a study to a user enter the user's user name. If no user is defined then anybody can work with the study. If the study should only be available during the trial period of *WHS FutureStation*, enter DEFAULT as user name.

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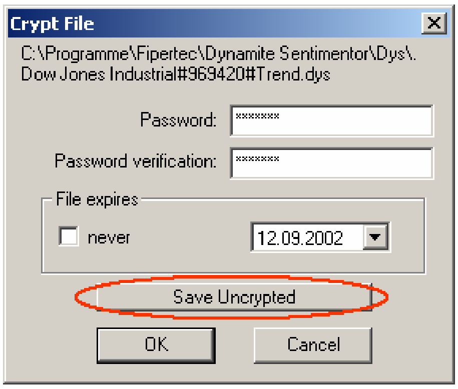
14.7.2 Decrypting a Study

If the Crypt File dialog is started for an already encrypted study, *WHS FutureStation* asks for the corresponding password:

After entering the correct password, the Crypt File dialog is started with an additional button:



By clicking Save Uncrypted the dialog is quitted and the study is saved uncrypted.

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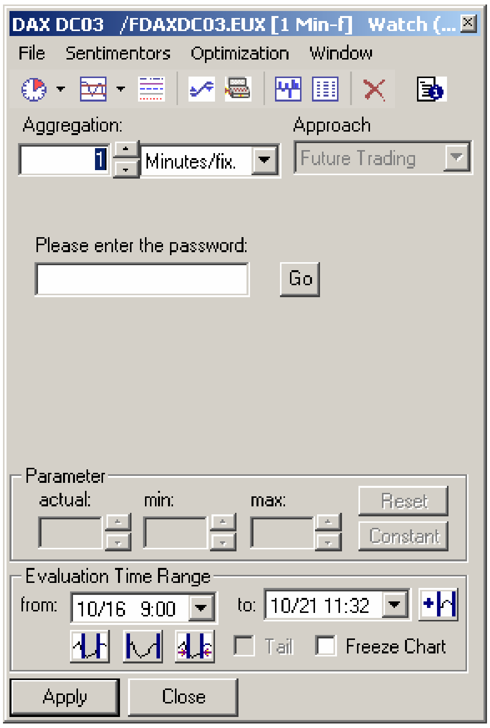
14.7.3 The Designer Dialog showing an Encrypted Study

When targeted to an encrypted study, the Designer dialog appears as follows:



The study may be optimized and the Evaluation Time Range may be varied as needed. After entering the correct password and clicking Go, the study will be encrypted.

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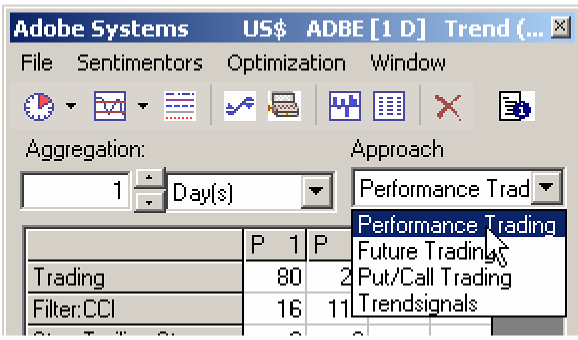
14.8 Selecting the Trading Approach and the Evaluator

WHS FutureStation supports a number of trading approaches. Generally, *WHS FutureStation* distinguishes between *Trendsignals* and *Trading Strategies.* Each Trendsignal is evaluated independently of all other signals, whereas a trading strategy consists of a number complete trades. The approach to be applied in the current study is selected in the Approach-combobox.



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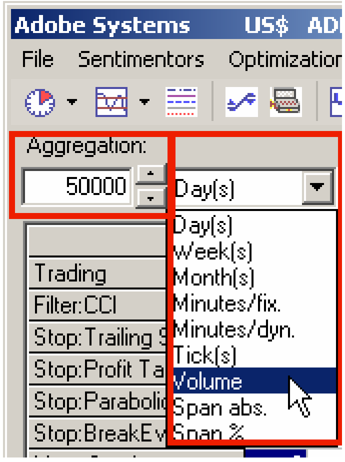
14.9 Specifying the Aggregation

WHS FutureStation allows the aggregation of price data to *periods* in a completely free manner: days, weeks, months, minutes, ticks, min volume, min trading range, and Renko.



The aggregation mode defines how ticks or daily data are summarized to make up a period. Very often a time based aggregation in the sense of daily, weekly or 3-minutes is used. The advantage of a time based aggregation is that the psychological important factor *time* is reflected directly on the X-axis. The disadvantage, though, is that periods with little movement or volume are visualized in the same way as periods with significant action – and this leads to "noise" in the indicators. *WHS FutureStation* allows to aggregate the data also on non-time based criteria in order to get equally "significant" periods instead of equally "long" periods. In the example given above, a period requires a traded volume of at least 50000 shares to be completed.

Each aggregation mode is completed by a number *n*, e.g., *10* ticks make up one period.

The following aggregation modes are supported:

- Day/Week/Month
  n days/weeks/month make up a period
- Minutes(fix)
  n minutes make up a period. The time scale is divided into slots of *n* minutes starting at midnight. All ticks falling into the same slot make up a period.
- Minutes(dyn)
  Like Minutes(fix), but the first tick of a day defines the first interval and thus the first period. When the interval is elapsed, the next arriving tick creates the next interval. (Useful for securities traded with a very low volume.)
- Volume
  A period is closed when the traded volume reaches or exceeds *n*.
- Span abs./Span %
  New ticks or daily bars are added to the current period until the *span*, i.e., the difference between high and low of the period, reaches or exceeds *n*. This aggregation mode implies a filter mechanism with some similarity to Point & Figure or Renko aggregations, but they maintain the familiar bar or candle charting styles.

- Renko
  The ancient Japanese Renko aggregation converts the price data to exclude noise automatically. To achieve this it packs the prices into so called *bricks*. New bricks are created only if the *brick size*, as defined by the numeric value *n* as an absolute value, is reached. Gaps, e.g., at the opening of a new trading session, are not converted into bricks.
  Note: This technique creates artificial periods where the open and close prices reflect the bricks edges and hence they will usually differ from the real prices. Therefore backtesting results will always differ from the results that would have been achieved in real trading. Hence, the Renko aggregation should mostly be used for discretionary trading!

All sentimentors are applied on the data resulting from the aggregation.

For realtime securities, each new trading day starts a new period.

Note: When receiving data from a realtime data provider, you may often define an aggregation of the data to be send by the server, e.g., 10-Minutes. You need to make sure that in this case the selected aggregation inside *WHS FutureStation* does not conflict with the pre-aggregated data by the server. As an example: If you load 1-minute pre-aggregated data and choose “5 Tick” aggregation in *WHS FutureStation*, the resulting charts are not consistent: The streaming realtime ticks arriving on your PC will be aggregated correctly, but the historical 1-minute periods will not.

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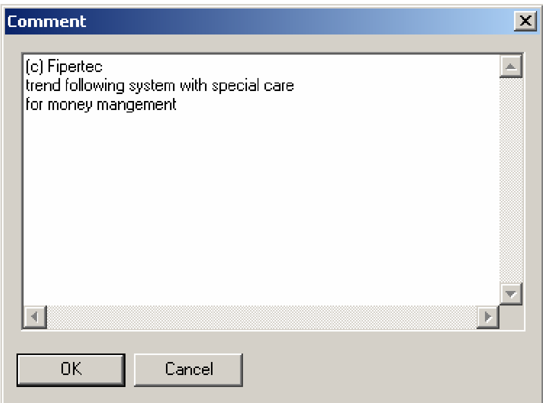
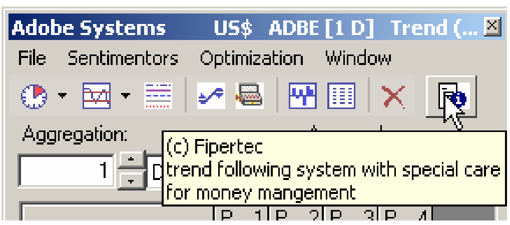
14.10 Notes

A study may be enriched with notes clicking the button of the DesignerDialog’s toolbar:



When pointing to the toolbar button without clicking, a popup window will display the notes:



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14.11 The Designer-Table

The upper part of the Designer-dialog consists of a table which could look like this:

	P 1	P 2	P 3	P 4
Trading	80	20	49.4	55.8
Filter:CCI	16	114	-125	
Stop:Trailing Stop	0	0		
Stop:Profit Target	0	0		
Stop:Parabolic Stop	3	0.06	1	
Stop:BreakEven Stop	1.22	0.5		
Meta Sentimentor	2	1		
Kaufmann's AMA	5			

The first row contains the parameters of the current trading approach, in this case the chosen approach is *Trendsignals*. The subsequent row contain sentimentors and their respective parameters. If the *Meta Sentimentor* is used it is always displayed in the second row for ergonomic reasons

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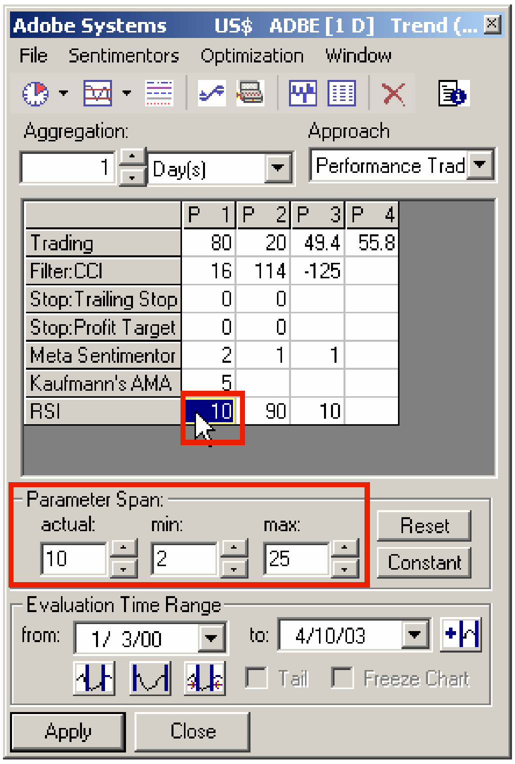
14.12 Changing Parameters of a Sentimentor

The way a sentimentor works is defined by its parameters. The Designer-table lists all selected sentimentors and their respective parameters.

All parameters are integers.

To change a particular parameter, it is necessary to click into the corresponding cell. This results in an adaptation of the fields inside the Parameters-groupbox.



Each parameter is described by three values which can be varied: the current value of the parameter, its lower bound, and its upper bound. The current value must be in the range specified by the lower and upper bound. The bounds are required for the optimization.

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14.13 Visual Feedback on Parameter Changes

When clicking a cell inside the Designer-table the corresponding sentimentor becomes the *active sentimentor*. This means that the evaluation for this sentimentor is displayed in the Approach/Evaluation-groupbox. Moreover, the signals generated by this sentimentor are displayed in the MasterChart and in the range windows of the MasterChart.

When changing the current value of the parameter, the active sentimentor is immediately evaluated and the sentimentor as well as its signals are redrawn. By keeping pressed the spin button to the right of the parameter field, a continuously change of the parameter and the visualization is achieved.

Clicking inside a sentimentor window also makes this sentimentor the *active* sentimentor.

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14.14 Reset of a Parameter

By clicking on the Reset-button, all three parameter values are reset to their default values.

14.15 Resetting all Parameters of the active Sentimentor

To reset all parameters of the active sentimentor to their default values use the menu entry Sentimentors|Reset Active Sentimentor.

You may access man

14.16 Resetting all Parameters

To reset all parameters of the sentimentors and the actual trading approach to their default values use the menu entry Sentimentors|Reset All Sentimentors.

14.17 Exporting the Active Sentimentor

With the menu function Sentimentors|Export Active Sentimentor the sentiment series of the currently activated sentimentor of the Designer-table can be exported into a file. This file can be included in other studies as an “Exported Sentimentor”, e.g., for expressing intermarket dependencies, and it can be used in other software.

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14.18 Fixing a Parameter

For the optimization it is sometime desirable to fix a parameter at a certain value. This can be done easily with the Const-button. When pressing this button, the upper and lower bounds of the parameter are set to the current value of the parameter. Thus the parameter can’t be varied by the optimization.

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14.19 The Meta Sentimentor

The Meta Sentimentor usually computes the weighted sum of the sentiment series of all the other sentimentors currently loaded. This weighted sum is used to compute a moving average. The parameters of the Meta Sentimentor define the weights to use for the respective sentimentors as well as the speed of the moving average.

The Designer-dialog automatically adapts the number of weight parameters whenever an additional sentimentor is loaded or a sentimentor is removed.

As an alternative to computing the Meta Sentimentor as *the weighted sum of the individual sentimentors, it can be defined by logical* conditions that are explained in a separate section.

Sometimes it is interesting to vary only the weight parameters in the optimization, but none of the other parameters. This can be achieved easily by checking the Weights only-checkbox.

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14.20 Displaying the Equity-window

The development of the equity when trading the generated signals can be visualized in the Equity-window. Using the menu entry Window|Equity Window the Equity-window can be shown or hidden.

The equity curve is very important for determining the quality of the generated signal series. The curve should be smooth and ascending without significant drawdowns.

In case the current trading approach is Trendsignals, the Equity-window displays the cumulated evaluation points.

14.21 Creating a Report for the Trading Approach

By clicking the Report-button of the Designer-dialog a report of the actions resulting from the signals can be created.

Evaluation Report
Date: 31.08.00 15:40:17
Dys-File: C: \WHS FutureStation\Dys\SAP VZ X)#I716463#default.dys
Sentimentor: Meta Sentimentor
Approach: Trading
Evaluation: Performance

Date	Action	Size	Quote	Comm.	Trade Profit	Account
07.05.99						10000.00
10.05.99	buy	86	115.63	18.89		
27.07.99	sell	86	126.71	20.70	912.87	10912.87
06.08.99	buy	95	113.61	20.51		
31.08.99	sell	95	123.40	22.27	887.14	11800.00
03.09.99	buy	91	128.77	22.27		
07.10.99	sell	91	149.91	25.92	1874.72	13674.72
22.10.99	buy	104	130.51	25.79		
02.11.99	sell	104	137.60	27.19	684.16	14358.89
10.11.99	buy	101	141.72	27.20		
18.11.99	sell	101	140.90	27.04	-137.70	14221.18
29.11.99	buy	103	136.50	26.71		
21.12.99	sell	103	207.46	40.60	7241.87	21463.05
06.01.00	buy	117	181.78	40.41		
08.03.00	sell	117	331.28	73.64	17377.90	38840.95
04.04.00	buy	168	229.58	73.28		
07.04.00	sell	168	245.50	78.36	2522.43	41363.38
17.04.00	buy	192	214.10	78.10		
08.05.00	sell	192	215.14	78.48	42.54	41405.91
10.07.00	buy	206	200.38	78.43		
26.07.00	Keep open	206	237.60	93.00	7495.07	48900.99

total net profit: 38900.99
performance: 389.01%
total # of trades: 10

winning trades: 9
losing trades: 1
percent profitable: 90.00%
gross profit: 39038.69
gross loss: 137.70
avg win/avg loss: 31.50
profit factor: 283.50
Avg trade (win & loss): 3917.64
largest winning trade: 17377.90 (44.67%)
avg winning trade: 4337.63
avg # bars in winners: 20.89
largest losing trade: 137.70
avg losing trade: 137.701
avg # bars in losers: 6.00
percent in the market: 62.58%
max # shares/contracts: 206
max drawdown: 137.70
Commission paid: 898.81

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14.22 Evaluation Time Periods

14.22.1 General Notes

WHS FutureStation allows to partition the loaded price data into three time ranges that are specifically interesting when developing automated trading strategies:

- *Optimization Time Range*
  The price data inside this range is the primary basis for an optimization. *WHS FutureStation* maximizes the chosen optimization goal, e.g. the net profit, on this data. Restrictions can be used in the optimization process to rule out systems that show unwanted characteristics like a too large drawdown.
- *Control Time Range*
  The control time range is used to check the results of a parameter setting found in the optimization range on “unknown” data. Restrictions can also be defined for the control period that have to be obeyed in the optimization process. As an example, the optimization time range could be optimized for a maximal net profit and a restriction could express that the profit factor in the control time range should be at least 1.5.
- *Tail Time Range (Out of Sample Data)*
  In contrast to the control time range that influences the optimization process indirectly through restrictions, the tail time range remains completely unknown for the optimization. Hence, the tail time range

allows to see immediately in terms of graphics and statistics the behavior of a system on completely unknown data.

The partitioning of the price data into the three distinct time ranges helps greatly in the development of stable, robust trading systems.

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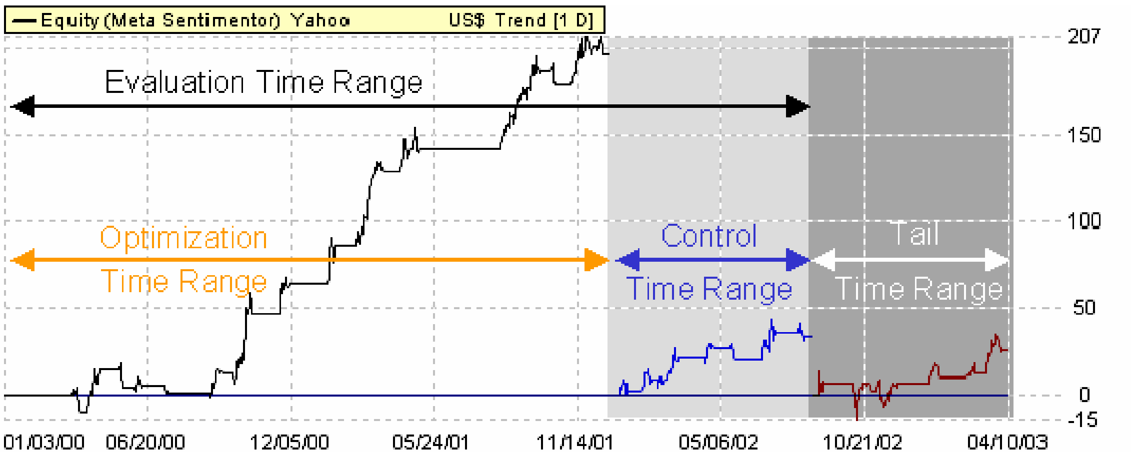
14.22.2 Visualization of the Time Ranges



The Equity chart visualizes the different time ranges.

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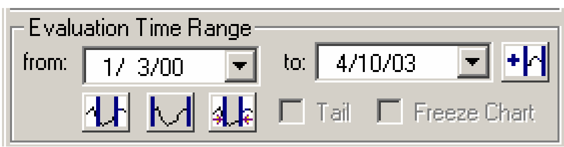
14.23 Specifying the Evaluation Time Range

By specifying the evaluation time range the optimization and control time range are automatically set, as the control time range is defined as a certain percentage of the evaluation time range. In the screenshot given above, the control period is defined as 25% of the evaluation time range. Through this coupling, the different ranges can be set and changed very conveniently.

To specify the time range for evaluation time range, use the controls of the Evaluation Time Range-groupbox:



The evaluation time range can be specified explicitly using the From/To-date pickers.

The Get-button allows to make the actual zoom range the evaluation time range.

Using the All-button, the evaluation time range is set to cover the complete loaded data.

After changing the time range explicitly, you can use the Zoom to Evaluation.-button, to zoom the windows to back to the evaluation time range.

When saving a study only the From-date is saved. The To-date is automatically set to the latest available date when loading the corresponding quote file. This enables an easy daily, say, evaluation of stocks using batch files without the necessity to adapt the time range manually.

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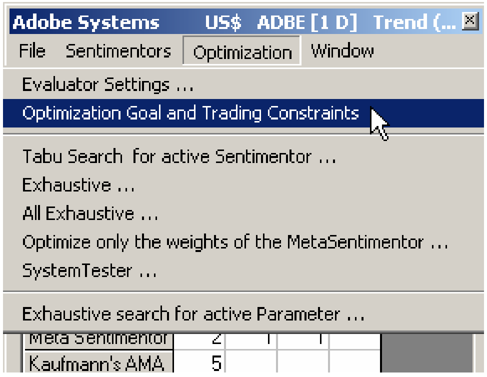
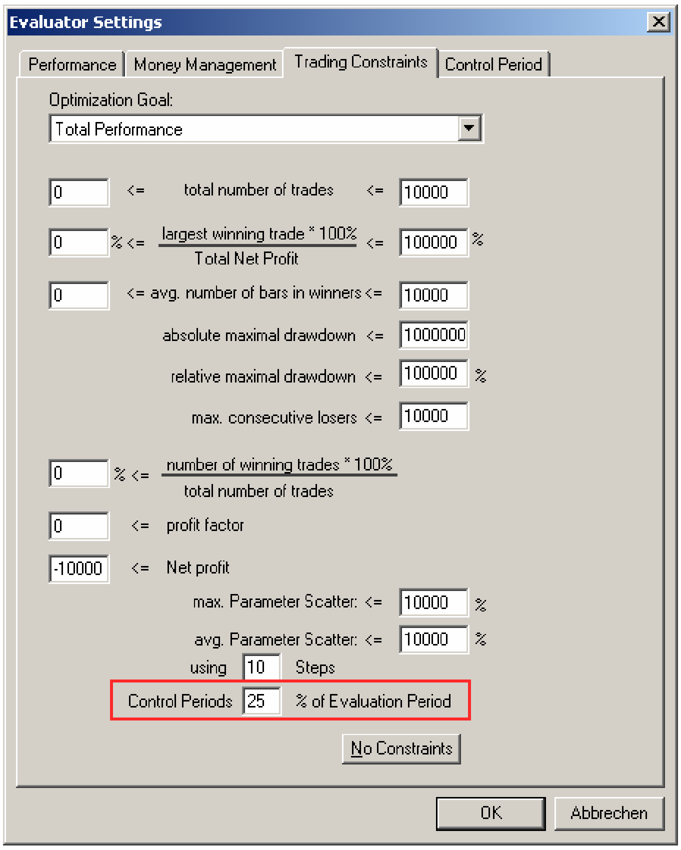
14.24 Specifying the Control Time Range

The control time range is defined as a percentage of the evaluation time range. The percentage is defined on the page Optimization Goal and Trading Constraints of the Evaluator that can be reached through the menu of the Designer dialog:





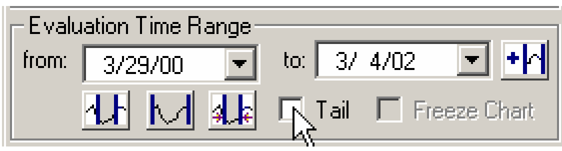
In case the control time range is not required specify 0.

14.25 Tail Time Range

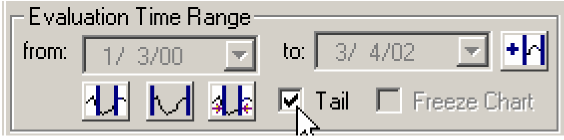
The tail time range is automatically set by *WHS FutureStation* to the time range following the evaluation time range. The tail time range may be empty.

14.26 Switching to the Tail Time Range

WHS FutureStation allows to switch between the evaluation time period and the tail time period by clicking the Tail-button. This button is clickable if the current evaluation time period does not consume the end of the available price data.



When clicking the Tail-button, *WHS FutureStation* switches the evaluation time range internally to the *tail,* i.e. from 3/4/02 to the end of the available data, and displays the trading results in terms of trading signals and performance report. To switch back to the original evaluation time range, just click again on the Tail-button:



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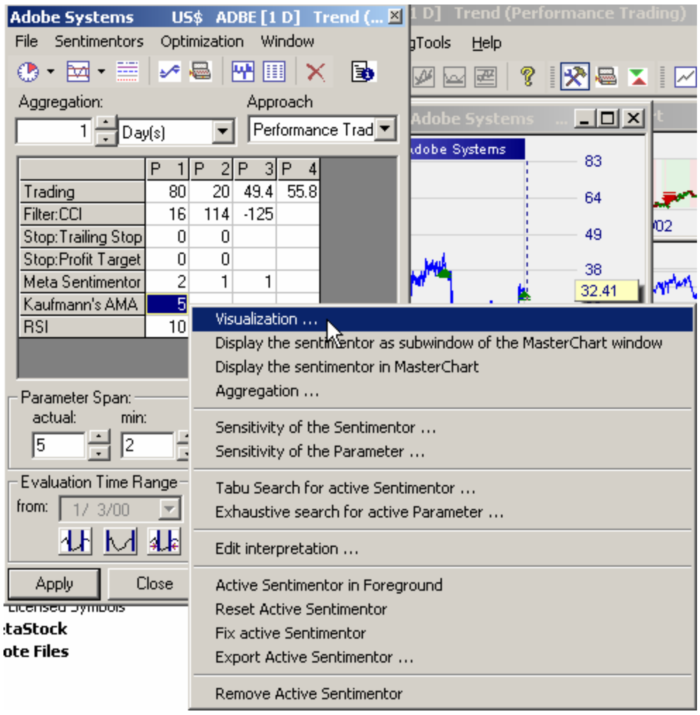
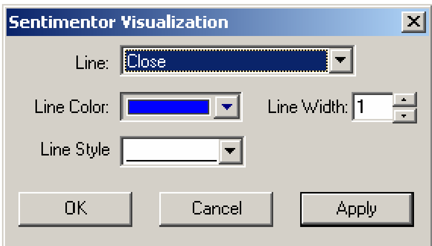
14.27 Visualization of a Sentimentor

By rightclicking on a sentimentor row in the Designer tableau the corresponding context menu pops up:



You may change the display style of a sentimentor by selecting Visualization:



When choosing 0 as the Line Width the corresponding line will not be displayed. Otherwise the Line Width is only taken into account when the Line Style is set to "solid".

Sentimentors that use the price scale as Y-axis can be overlayed in the MasterChart by selecting Display Sentimentor in MasterChart.

Each sentimentor with a graphical representation can be displayed as a sub window of the MasterChart by selecting Display sentimentor as a sub window of the MasterChart.

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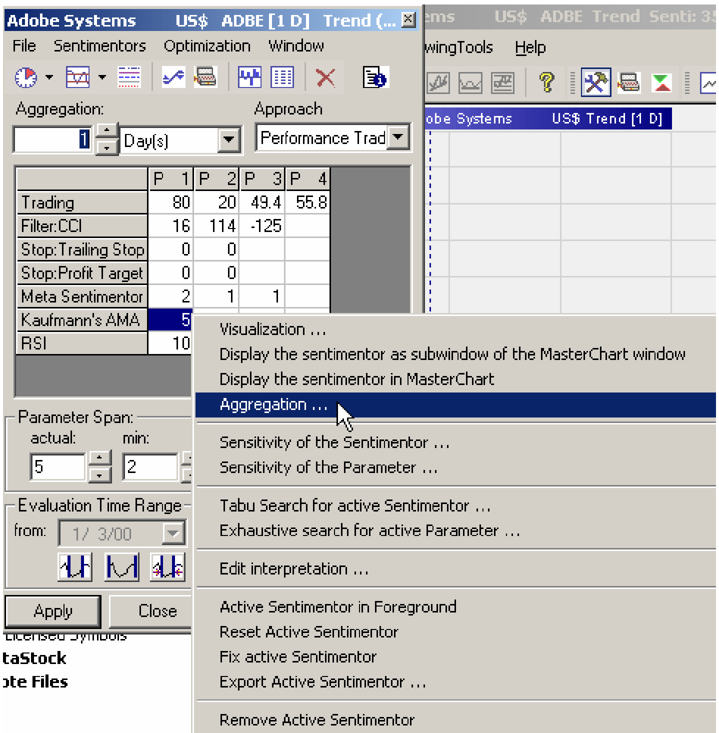
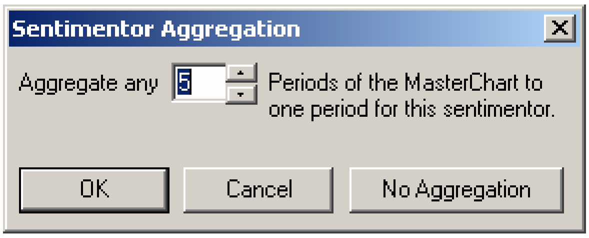
14.28 Aggregation of a Sentimentor (Multiple Time Frame)

When choosing Aggregation from the context menu of a sentimentor, a specific aggregation for this sentimentor can be defined:



The Sentimentor Aggregation dialog allows to define a number of periods of the MasterChart that are to be summarized to make up a period for this sentimentor:



By applying this technique, a study may rely on multiple time frames, e.g., 1 minute MACD, 3.minute RSI and a 60 Minute CCI. *WHS FutureStation* takes care for automatically mapping the sentiments and synchronizing the signals.

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14.29 Sensitivity Analysis

14.29.1 General Notes

For the evaluation of a given parameter setting (i.e., all the parameters visible in the Designer-tableau) it is quite interesting to get information about the *sensitivity* of these parameters. In other words, “How much does the objective function, e.g., the net performance, vary if a parameter is slightly changed?”

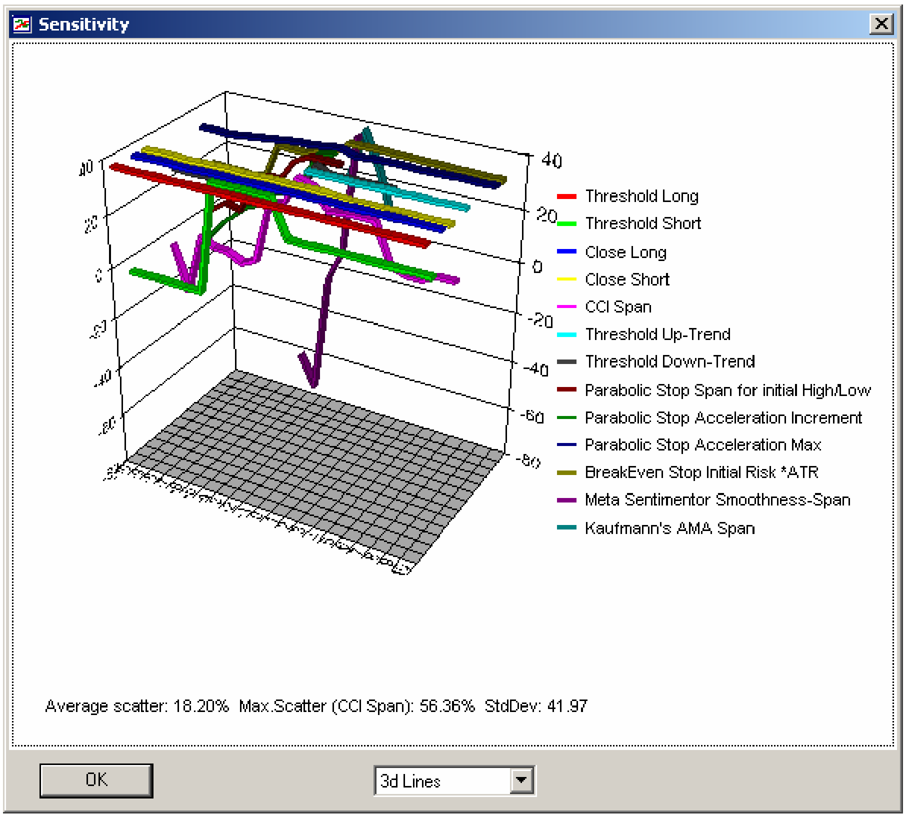
The rationale behind this question is the assumption that the higher the sensitivity of the parameters, the less likely it is that this setting will work on unknown data.

WHS FutureStation can compute and visualize the sensitivity automatically by using the following algorithm:

Starting from the initial parameter setting each parameter is changed subsequently in a range from
*-10 * step size + initial parameter value* up to *+10 * step size + initial parameter value*
and the new value of the objective function, e.g., the net performance, is computed. A *step size* equals the change in the parameter when using the up/down arrows in the Parameter group box for the given parameter. Instead of the default 10 any other number of steps can be chosen.

In case a parameter change leads to a value lying outside the feasible range or if the resulting setting violates a trading restriction then this parameter change is not conducted.

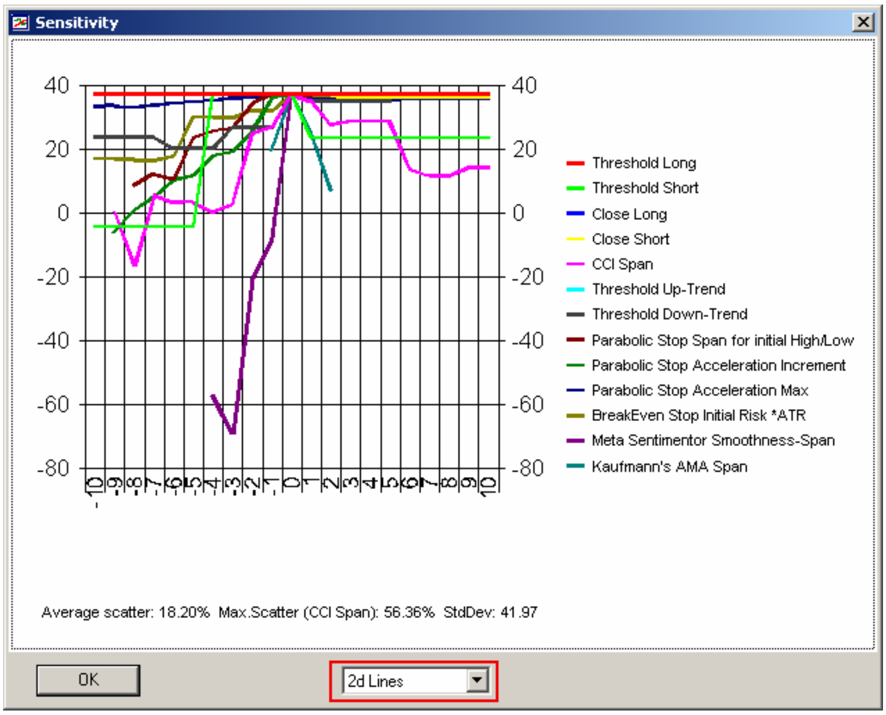
The result of the sensitivity analysis is visualized as follows:



By pressing the Ctrl-key and moving the mouse the perspective of the 3D-chart can be changed.

Clicking on a line in the legend will highlight the corresponding data. Vice versa, clicking on a data series will highlight the corresponding entry in the legend.

Using the selection box at the bottom of the dialog, you may select a different charting mode, e.g., 2D lines:



The X-axis shows the change in step sizes of the parameters. The 0 location corresponds to the initial parameter setting. The Y-axis shows the value of the chosen objective function, e.g., the net performance.

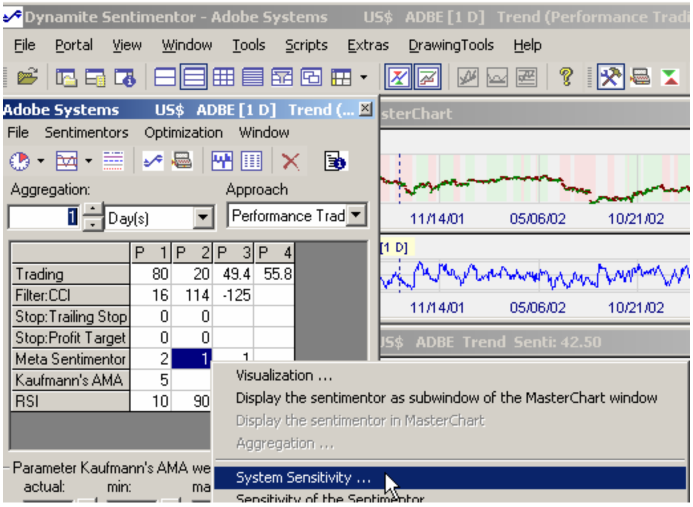
The footer of the graphic shows some statistics based on the average percentage change of the objective function with respect to the initial setting – this is called the *parameter scatter* .

- the “Average Scatter” is the average over all parameter scatters
- the “Max. Scatter” is the maximal measured parameter scatter
- the “StdDev” is the statistical standard deviation over all parameter changes.

WHS FutureStation allows to use the results of a sensitivity analysis within the optimization by using corresponding restrictions.

14.29.2 Sensitivity Analysis of a complete Study

Rightclicking on the MetaSentimentor in the Designer-Dialog opens the context menu:



Choose System Sensitivity to check the sensitivity of all parameters that

- are not fixed
- are not set to 0 (applying the assumption that a parameter set to zero means "disabled", e.g., TrailingStop)
- have a domain unequal {0, 1} (applying the assumption that such a parameter is a on/off switch, e.g., a certain pattern in the CandleStick sentimentor)

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14.29.3 Sensitivity Analysis of a Sentimentor

Equals the analysis of the complete system, but only the parameters of the selected sentimentor are examined.

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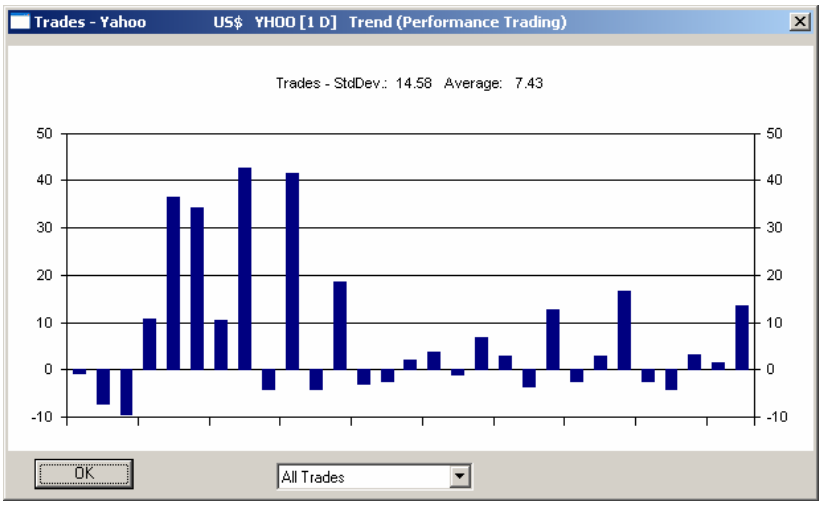
14.29.4 Sensitivity Analysis of a Parameter

Only the active parameter is examined using its complete value range.

top

14.30 Trade Histogram

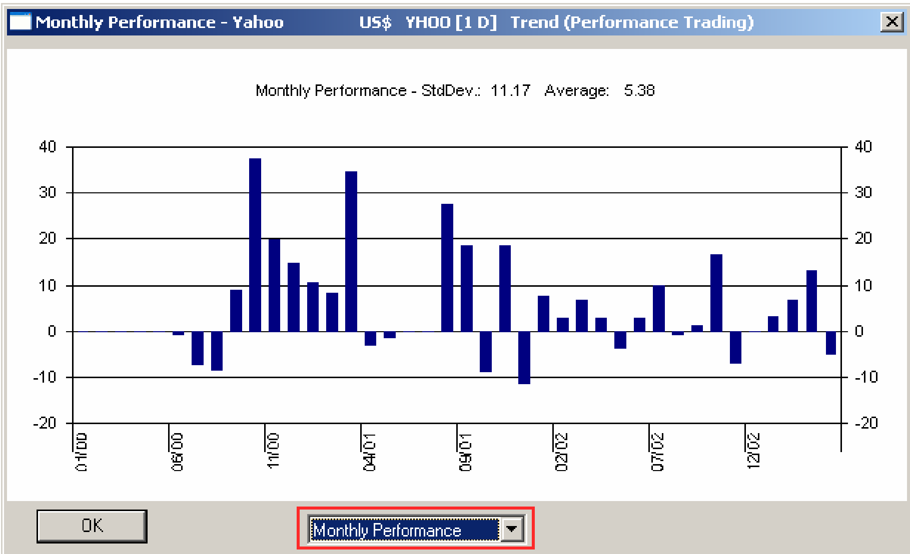
Using the menu entry Window|Performance Histograms or the toolbar button a dialog showing all trades as a histogram can be opened:



This is view is a very interesting supplement to the equity chart as it shows clearly the relations between winning and losing trades as well as series of winning and losing trades.

Whenever the underlying study is changed of new ticks arrive, the histogram is updated automatically.

The selection box allows to switch to a number of different histogram modes:



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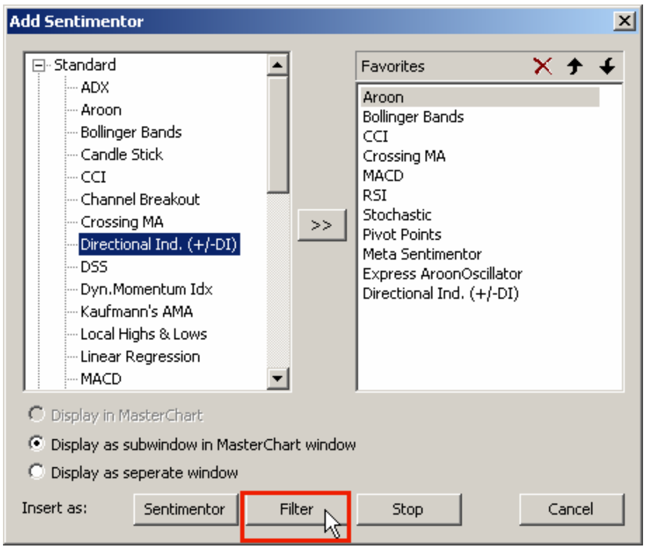
14.31 Adding a Sentimentor as a "Filter"

Quite often one wants to exclude certain trades if the overall market conditions do not meet certain requirements. E.g., many traders avoid long positions in long-term downtrend markets, even if there is a good chance for a small rally. *WHS FutureStation* supports filters within studies to express this kind of restrictions.
When using filters, an entry signal of the MetaSentimentor is executed only, if it passes all filters, i.e., for a long entry signal, all filters need to show a sentiment

of at least 65, and vice versa for short entry signals all filters must have a value of at most 35.

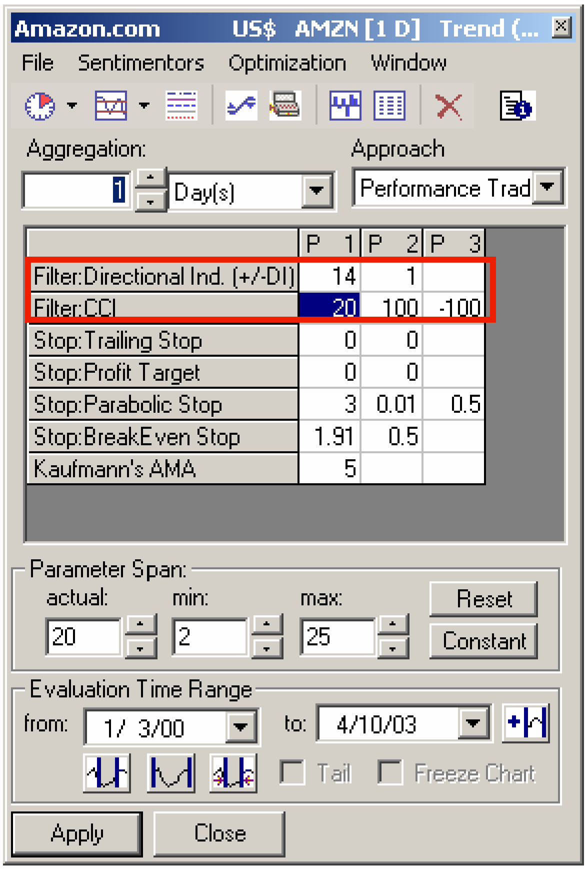
Click on the toolbar button of the DesignerDialog's toolbar to open the Add Sentimentor dialog, select a sentimentor, an click on the Filter button:



Filters based on "Manual Sentimentors" can also be used to rule out trades at certain points in time, e.g., before the expiration date of options or before quarterly reports.

The regions where all filters of a study show a long or short sentiment can be visualized in the chart. This visualization allows to check at a glance at what points in time positions could be entered at all.

WHS FutureStation allows to add as many filters to a study as you like. To find the filter sentimentors in the Designer-table easily, they are prefixed with "Filter:" and appear starting at the top of the Designer-table.



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14.32 Adding Stops to a study

Successful trading strategies require both excellent entry signals *and* excellent exit signals. Therefore, *WHS FutureStation* supports a variety of stop techniques in addition to exiting a position via the MetaSentimentor:

- **price based stops** (e.g. Parabolic stop) exit a position if a specifically computed price level is reached
- **time based stops** (e.g. End-of-Day stop) exit a position it the trading duration reaches a certain time limit
- **sentiment based stops** exit a position if the sentiment contradicts the current position. Each sentimentor can be used as such a "stop-sentimentor", even the manually defined sentimentors, e.g., "Option expiration date is near"-sentimentor. A stop-sentimentor is evaluated independently from the MetaSentimentor.

Additionally, a ProfitTarget can be installed that closes a position if a certain profit level has been reached.

The trading approach *Trendsignals* uses implicitly a time stop, stop loss and a profit target.

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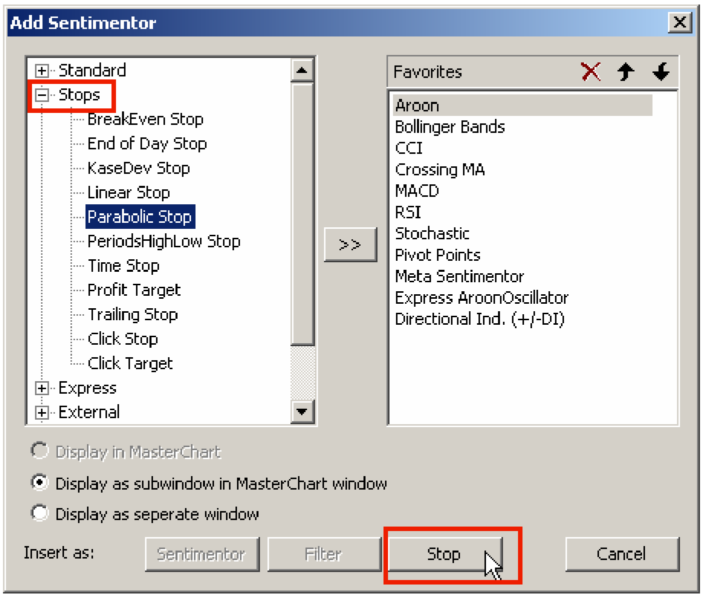
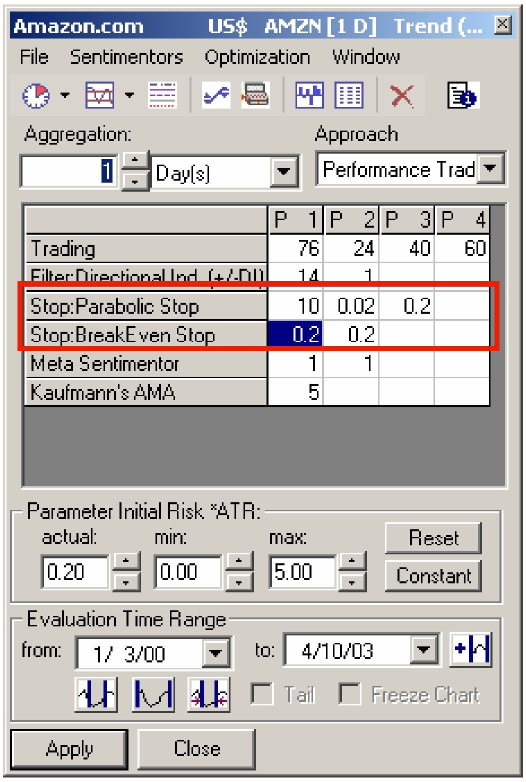
14.32.1 Adding a Time/Price-based Stop

Select the stop to be added and use the Stop -button to add the stop to the study.

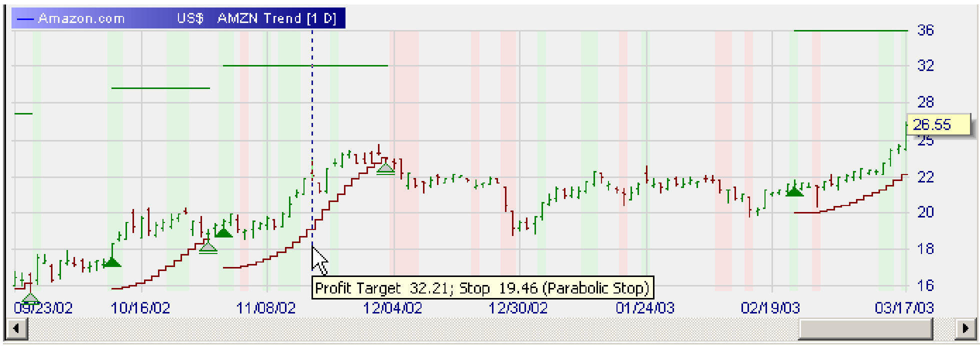


A study may contain as many stops as you like. To close a position it suffices that one of the stops is triggered.

In the Designer-table stops carry the prefix “Stop:” and appear just below the filters:



In case several price based stops are applied, WHS FutureStation automatically selects the tightest stop for each period. When pointing to an open position in the MasterChart with the mouse, a popup window shows the stop and profit target for that period:



The computation of the stops as well as the parameters used to configure them are documented in the section "ParameterOfTheStops".

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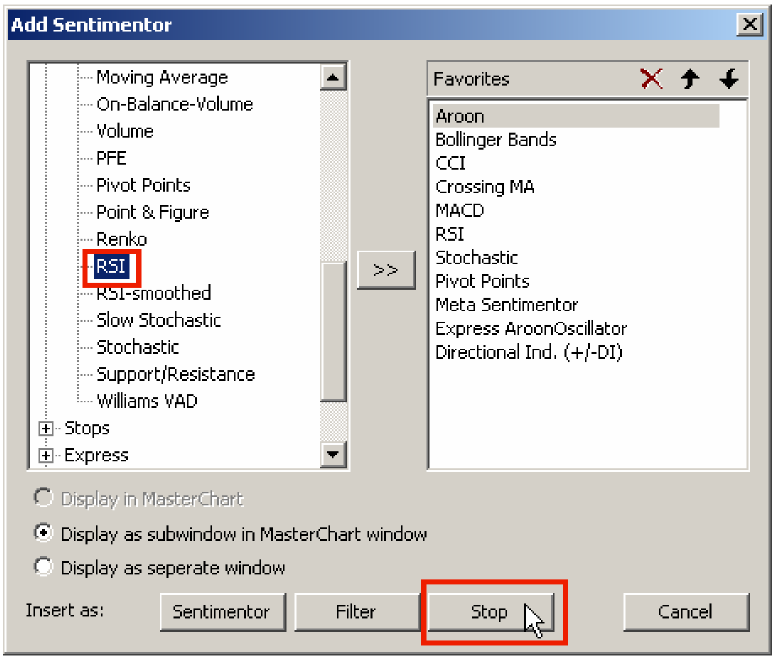
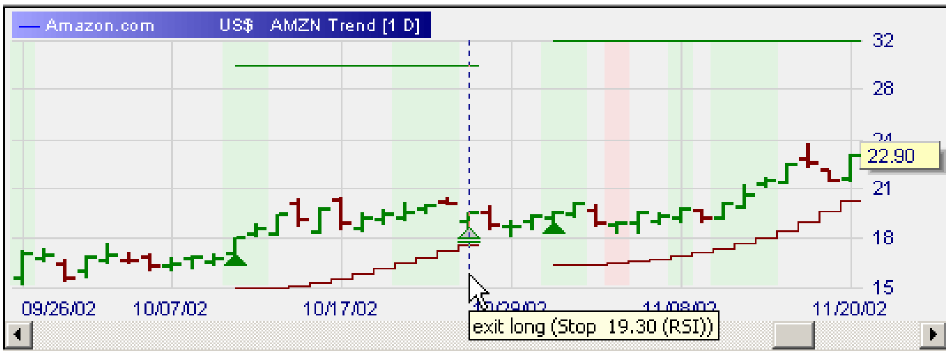
14.32.2 Adding a Sentimentor as a Stop

To add a sentimentor as a stop, first select the sentimentor and then add it by clicking on the Stop-button:



A stop-sentimentor closes a long position if it shows a sentiment of 0. A short position is closed, if it shows a sentiment of 100. The stop leading to exiting a position is shown in a popup window when pointing to the exiting signal:



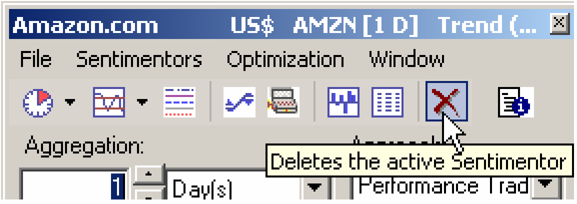
In the example given above, a Parabolic stop is used in conjunction with “Kaufmann’s AMA” used as stop sentimentor. The latter cannot be visualized as it relies on sentiments, not on price levels. The popup window shows that the “Kaufmann’s AMA” is responsible for the exit signal.

Because stop sentimentors are based on sentiments, not on prices, they are always evaluated at the end of a period, not within a period.

top

14.33 Deleting a Sentimentor

To delete a sentimentor, first click on it in the Designer-table to make it the *active* sentimentor. Then press the Delete toolbar button:



A sentimentor can also be deleted by just closing the corresponding window or through its context menu.

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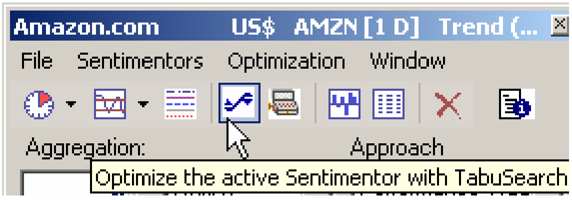
14.34 Optimizing the Active Sentimentor

To start the optimization for the active sentimentor, use the Optimize of the Designer-dialog:



Optimize will start an optimization algorithm relying on the so-called *Tabu Search*. This is a very efficient heuristic optimization algorithm allowing to compute (near)-optimal solutions even if the number of possible parameter combinations is enormously large.

When applying an exhaustive search through the menu entry Optimization|Exhaustive, the parameters of the current trading approach are fixed to their current value. *WHS FutureStation* will then evaluate the active sentimentor for each possible parameter setting. This approach should only be used if the number of feasible parameter combination is rather small (< 1 million).

If *WHS FutureStation* encounters two parameter combinations which result in the same optimal evaluation, it will keep the combination that produces a signal nearer the present.

The best results are obtained when using Tabu Search to optimize the Meta Sentimentor. It is not necessary to find an especially good starting parameter setting manually – usually Tabu Search will find a much better setting in less time. However, the result of an optimization should be stored and can then serve as a starting point for subsequent optimization runs.

In case the sentimentor to be optimized is a Stop or a Filter then the MetaSentimentor, and thus all building blocks of the study, is used for computing the signals. However, only the parameters of the sentimentor to be optimized will be varied.

In case the sentimentor to be optimized is a “normal” sentimentor, i.e., *not* a Stop, a Filter, and *not* the MetaSentimentor, then only the sentiments of this sentimentor are the basis for the signal generation. The Stops and Filters are applied on the sentiments of this sentimentor.

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14.35 Optimizing the Active Parameter

By choosing Exhaustive Search for Active Parameter from the context menu of a sentimentor, the active parameter can be optimized separately. The MetaSentimentor, and thus all building blocks of the study, is used for computing the signals. However, only the active parameter will be varied.

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14.36 „All Exhaustive“-Optimization

With Optimization|All Exhaustive an algorithm can be started which executes the *Exhaustive* algorithm sequentially for each sentimentor except the MetaSentimentor. Because this procedure might take a very long time, the interruptible Script-viewer is used to execute it.

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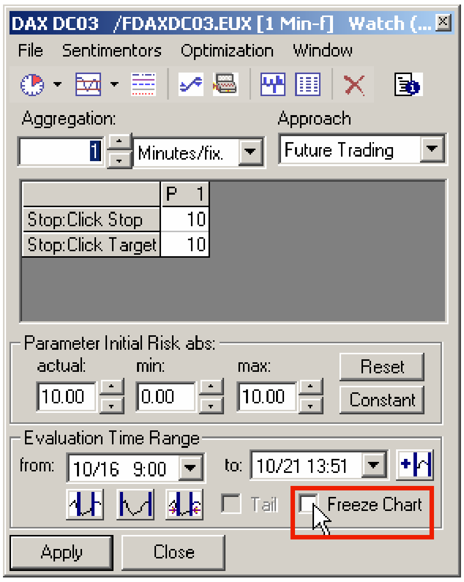
14.37 Freezing Charts

If the Designer-Dialog is targeted to a realtime security, it will include the Freeze Chart-Checkbox:



When this checkbox is activated, all incoming ticks are buffered. Hence, the zoom remains unchanged and the development of a trading strategy becomes more convenient as the underlying price data remains unchanged.
When deactivating the Freeze Chart-checkbox, the buffered ticks are added to the charts.

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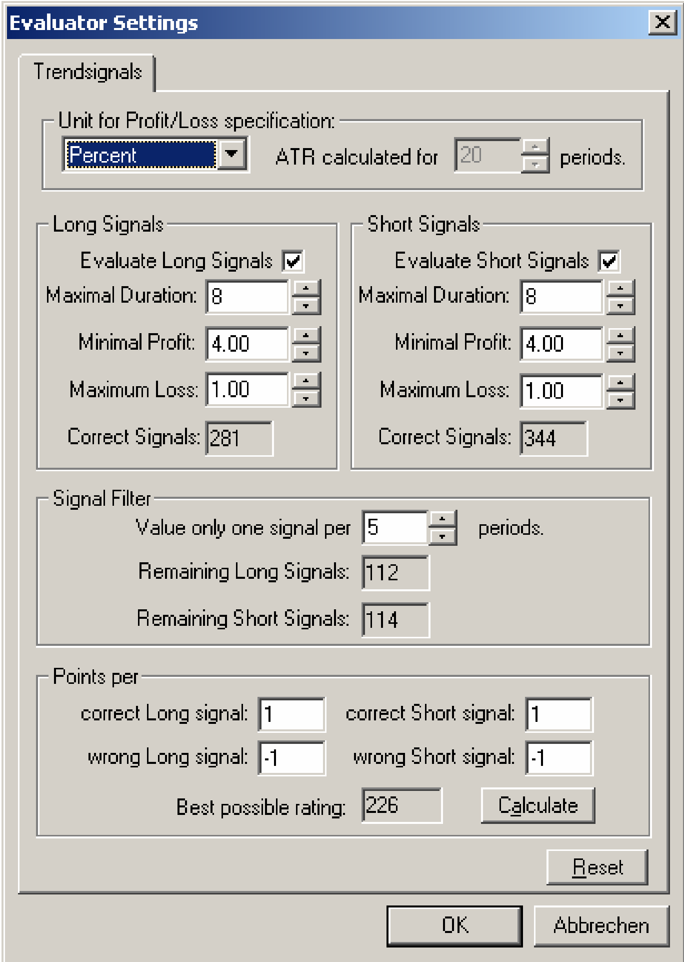
15 Evaluator-Settings Dialog

The Evaluator-Settings-dialog can be started with the Evaluator|Settings menu entry of the Designer-dialog. It allows one to specify the parameters of the evaluators.

15.1 The Trendsignal -Evaluator



The page of the *Trendsignals*-evaluator is structured in four parts.

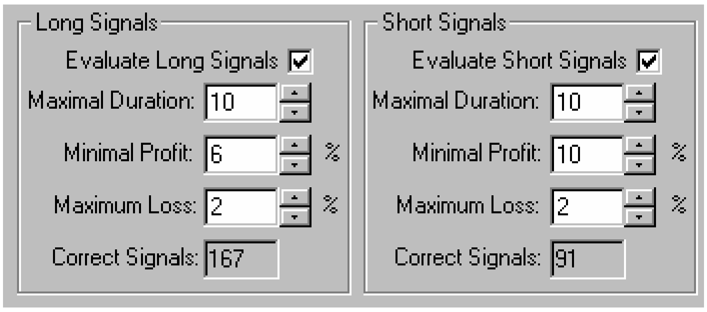
Definition of the unit for profits and losses:

For specifying the unit of profits and losses, *WHS FutureStation* allows to choose between percentages, multiples of the Average True Range (“ATR”), and absolute prices. When choosing “ATR”, the specified number of periods is used for calculating the respective ATR per bar. In this case, the investment goals are automatically adapted to the volatility of the defined time range. The *Average True Range* is a moving average on the *True Range* which is defined as the largest difference of

- today’s high minus today’s low
- today’s high minus yesterdays close
- yesterdays close minus toady’s low

Definition of the Investment Goal:

The groupboxes Long-Signals and Short-Signals are used to define investment goals for long and short positions in the underlying.



Long and short signals can be generated independently of each other. By activating or deactivating the Evaluate Long-Signals and Evaluate Short-Signals checkboxes, you define the types of signals to be generated. The best results are achieved if just one type of signal has to be generated.

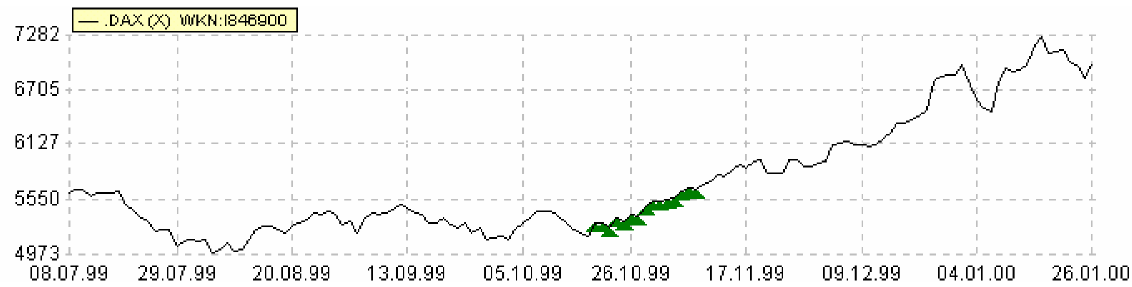
To decide whether a generated trendsignal is *correct*, the following approach is used: A long trendsignal is considered correct if within Maximal Duration days the quote of the underlying raises at least Minimal Profit percent without hitting the stop loss limit of Maximum Loss percent. Otherwise, the trendsignal is considered *wrong*.

The correctness of short trendsignals is determined analogously.

The number of points in time which would have led to a correct signal is displayed in the fields Correct Signals. Moreover, these correct signals are visualized in the MasterChart. Whenever the investment goal is changed, the number of correct signals and the visualization are updated. This allows to verify conveniently how often the current underlying did meet the actual investment goal.

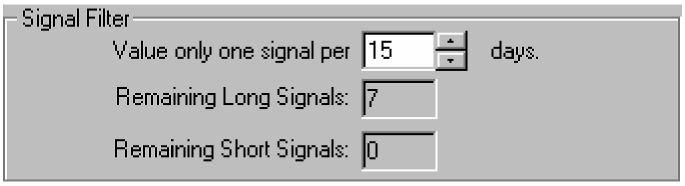
Signal Filter

It happens quite often that within a small time period many correct signals could be created. If the optimization finds a parameter setting that generates signals for such a particular time range, the rating becomes very good and possibly optimal as in the following example:

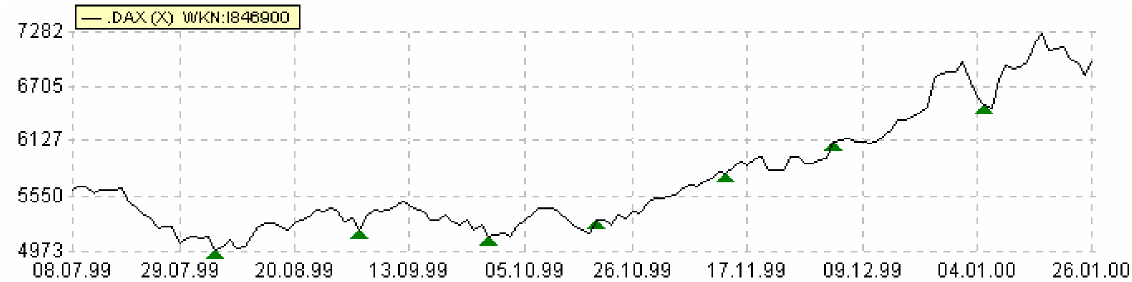


Unfortunately, this optimal parameter setting does not generate any signal outside this small time range. This happens because a parameter setting which would produce signals outside this time range could create less signals in the „accumulation“ period, and thus produces an overall worse rating.

The Signal Filter settings let you overcome this effect:

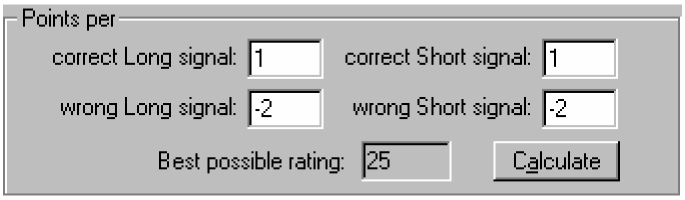


In the example it is specified that within fifteen days at most one correct (or wrong) signal will be used for the evaluation. This results in an optimal solution which is of much more interest:



Evaluation Points

The evaluation assigns points to each generated signal.



In this example each correct signal generated by a sentimentor will be valued with one point, whereas a wrong signal is valued with –2 points, i.e., a wrong signal neutralizes two correct signals.

WHS FutureStation displays the best possible rating that can be achieved if all correct signals are found and no wrong signal is generated. After changing the valuation points, the best possible rating can be recalculated by pressing then Calculate-button.

Resetting the Parameters

By clicking the Reset-button all evaluation parameters are reset to their initial values. This allows for easy experimentation with investment goals, valuation points, and the filter.

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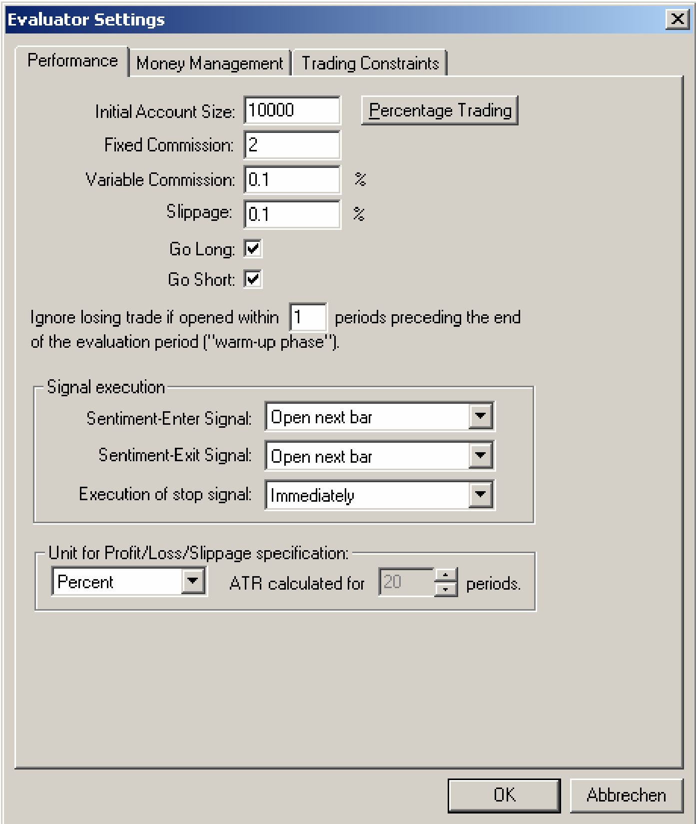
15.2 Performance Evaluator

15.2.1 General Settings



The trading strategy *Performance* starts with a budget as defined in the Initial Account Size-field. When following a long signal, all the cash is invested to buy a maximal number of shares of the analyzed security. The commission to be paid for a trade can be specified through the Fixed commission-field and the Variable commission-field. The latter is defined in percent of the trade volume. Each transaction takes the Slippage into account.

To follow long signals, activate the Go Long-checkbox

To follow short signals, activate the Go Short-checkbox

In case the Initial Account Size is set to zero, the wins and losses are calculated in percentages. When applying this "percentage trading" the commissions should also be set to zero. The button Percentage Trading automatically performs these settings. Using Percentage Trading simplifies the comparison of the performance of different titles.

The Evaluator is also used to specify the unit applied by price based stops to calculate the stop prices: absloute, percentage, or ATR based.

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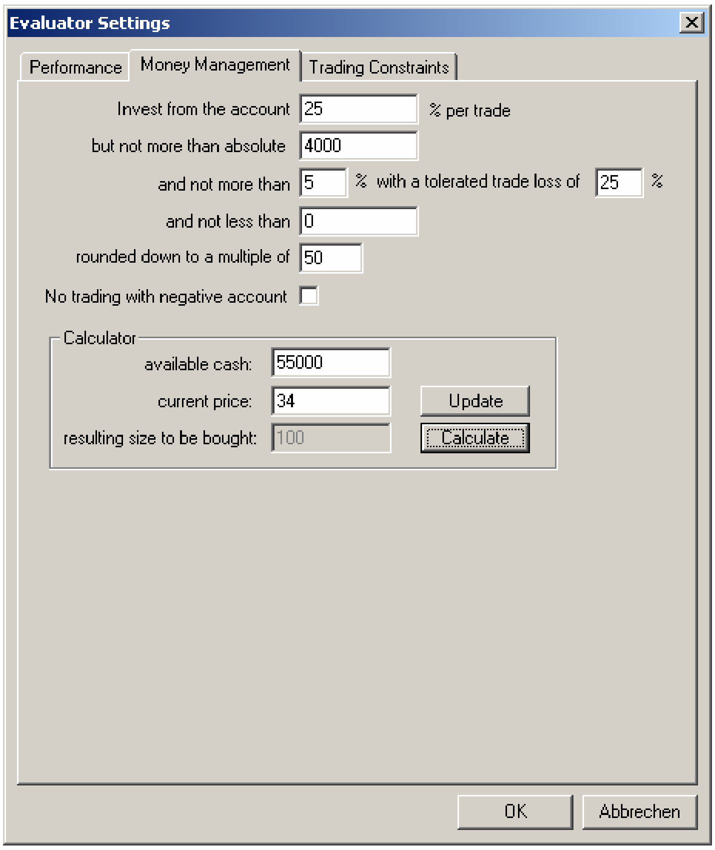
15.2.2 Money Management

Through the rules on the MoneyManagement-page you can define how much of the available cash shall be invested in a trade. (In case of the above mentioned Percentage-Trading, the settings on the MoneyManagerment-page are ignored.

The policy for computing the money to be invested in a trade dramatically influences the overall success or failure of a trading system. For studying Money Management and Risk Management see, e.g., *Van K. Tharp, “Trade your way to financial freedom”*.



The settings shown above will be used to calculate the number of shares to be bought as follows:

The current cash is $ 55000 and we have a Long signal. The price of the security to be bought is $34.

25% of the cash is $ 13.750
This amount is higher than the maximal amount of $4000 we want to invest per trade. Thus, only $4000 are considered to be invested.

As a second upper bound for the money to be invested, we want to ensure that in case the trade becomes a losing trade not more than 5% of the capital is lost if the losing trade is closed with at most 25% loss.

5% of the capital = $ 2750. Hence
trade volume * 0.25 <= $2750, therefore
trade volume <= $ 11.000.

Using the second risk view point, we could invest up to $11.000, which is again larger than our limit of $4000 – so finally we invest $4000.

With a current price of $34 and with taking the commissions into account this leads to 116 shares. Rounded to multiples of 50 we end up with buying 100 shares.

In case the field No trading with negative account is checked, a trade is only entered if the minimum required cash defined under and not less than is available. If this field is unchecked, then any trade is entered using at least the minimal invest, even if the capital becomes negative.

Using the Calculator it is very convenient to compute the shares to be bought for a given capital and security price.

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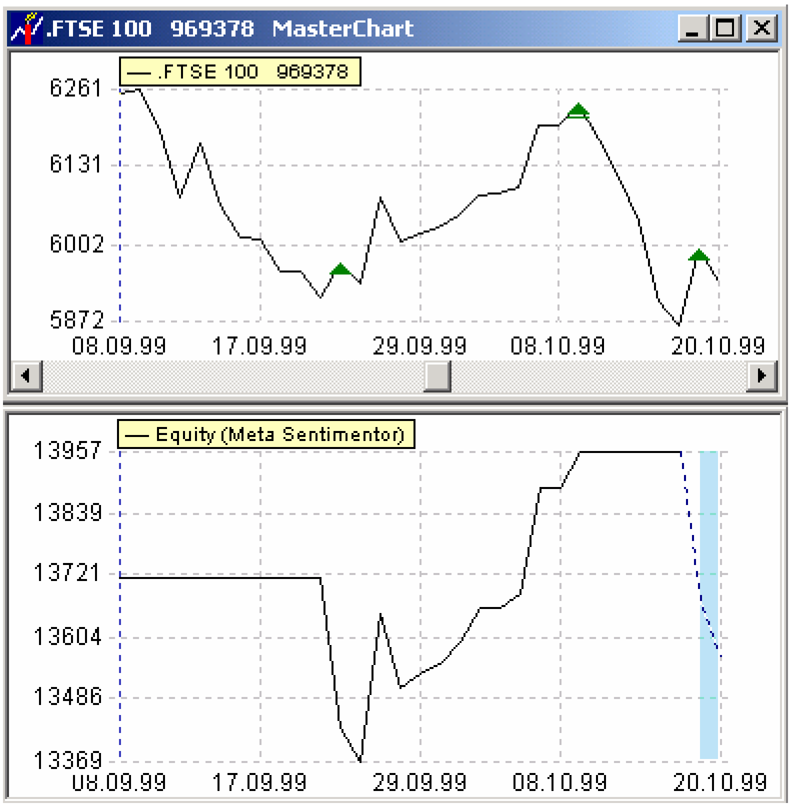
15.2.3 The "Warm-Up Phase"

Because of the slippage and commission a freshly opened trade will always be a losing trade. Thus, if a trade is opened near the present, it will influence the overall performance negatively. As the optimization tries to maximize the overall performance, it finds a parameter setting that gets rid of this trade. However, opening signals very near the present are the most important ones. For this reason, *WHS FutureStation* allows to define a so-called *warm-up phase* near the end of the evaluation period, i.e., if a trade opened within a number of days preceding the end of the evaluation period is still a losing trade, then it will not be taken into account for computing the overall performance.
To view such a circumstance immediately, *WHS FutureStation* visualizes such a trade as follows:



The final trade was opened in the blue-colored warm-up phase. The equity curve is drawn in this region with a dotted line to indicate that although we would have a decrease of the equity at this point in time the decrease is not taken into account for the overall performance calculation.
The blue warm-up phase in the Equity-Window is only drawn if there is a non-closed losing trade within that time.

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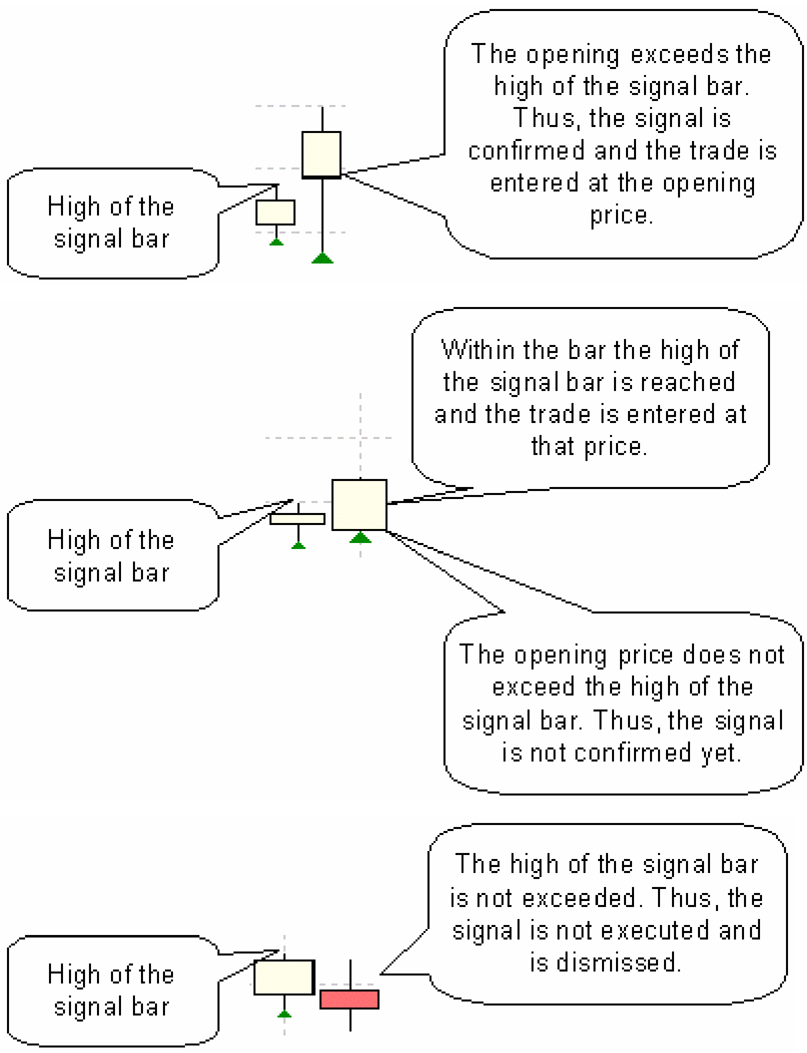
15.2.4 Execution of Signals

WHS FutureStation opens a position always due to a corresponding sentiment, optionally requiring a confirmation in the next period. In contrast, a signal for closing a position can result from a respective sentiment, a triggered *stop loss* or a reached *profit target*.

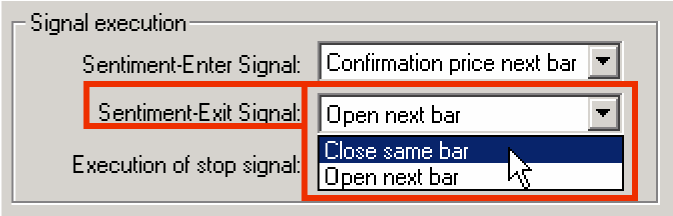
A signal created for a given period is converted by *WHS FutureStation* into a corresponding trading activity. You may choose between certain policies for executing signals:

Sentiment Enter Signals

Signal execution	***Explanation***
Close same bar	The entry signal is traded at the closing price of the bar that generated the signal (plus slippage and commission).
Open next bar	The entry signal is traded at the opening price of the bar

	following the bar that generated the signal (plus slippage and commission).
Confirmation price next bar	The entry signal is traded in the bar following the bar that generated the signal, if a confirmation price is reached: A long signal is confirmed if the high of the signal bar is reached. In case the opening price of the next bar exceeds the high of the signal bar, the opening price is used for the trade, otherwise the high of the signal bar is used (always plus slippage and commission).  A short signal is confirmed if the low of the signal bar is reached. The computation of the entry price is done analogously to the described procedure for long signals.

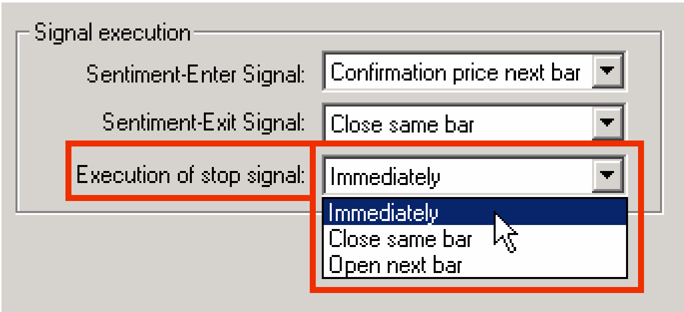
Sentiment Exit Signals



Signal execution	*Explanation*
Close same bar	The position is closed at the closing price of the bar that generated the signal (plus slippage and commission).
Open next bar	The position is closed at the opening price of the bar following the signal bar (plus slippage and commission).

Stop Signals

A stop signal is either triggered by a stop or by a profit target. In a given bar, potentially both stops could be triggered. As *WHS FutureStation* cannot determine the real sequence of ticks in that bar, it always simulates the trades to the disadvantage of the trading result, i.e., a stop signal takes precedence over a profit target signal.



Signal Execution	*Explanation*
Immediately	In case the current bar reaches the stop or the profit target the position is automatically closed at the trigger price (plus slippage and commission). In case the stop or the profit target is reached at the opening of a bar, the position is closed at the opening price (plus slippage and commission).
Close same bar	To determine whether a stop or a profit target has been reached, the close price of the actual bar is taken. In case a signal is triggered, the position is closed at the close price of the actual bar (plus slippage and

	commission).
Open next bar	To determine whether a stop or a profit target has been reached, the close price of the actual bar is taken. In case a signal is triggered, the position is closed at the opening price of the next bar (plus slippage and commission).

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15.3 Optimization Goals and Constraints for Trading Strategies

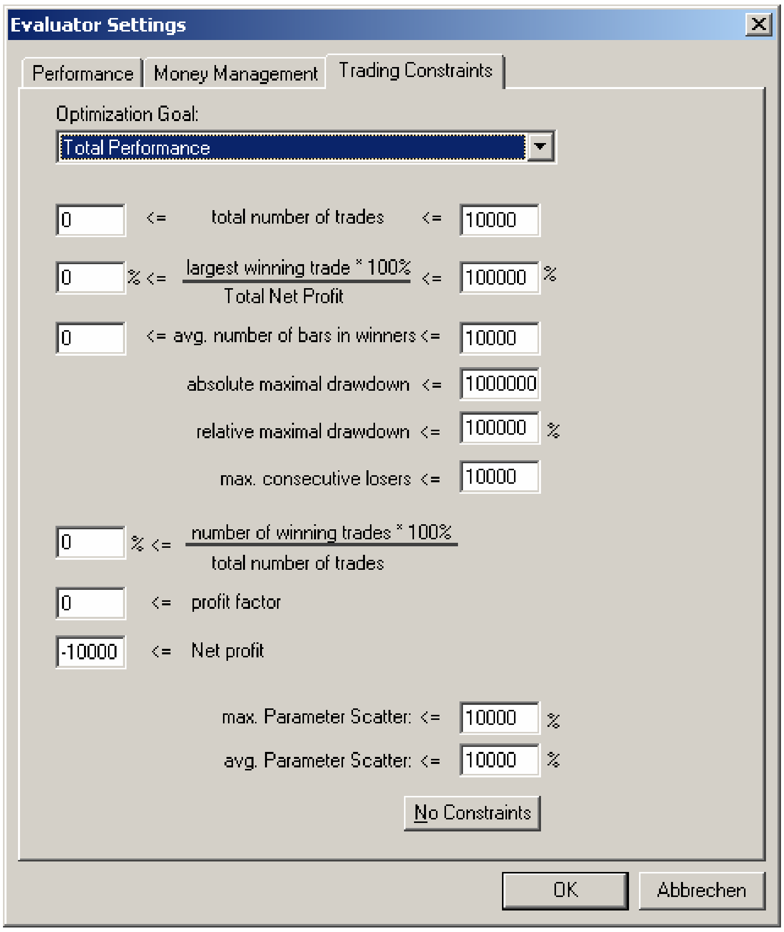
15.3.1 General Notes

The goal of *WHS FutureStation* is to help in creating trading strategies that are as *good* as possible. The notion *good*, however, must always be related to the concrete scenario the strategy is designed for, and to the general conditions defined by the trader. On first sight a strategy is “good” if it creates much profit, but when looking deeper into the strategy, it may well be that the high profit has the price of a high and unacceptable drawdown. It may also be the case, that the profit is high, the drawdown is low, but the strategy created a series of 10 losing trades that are very hard to take from a psychological point of view. Therefore, a strategy has to be both, *good* and *acceptable*.

WHS FutureStation measures the *goodness* of a strategy by a so-called *optimization goal,* sometimes also called the *objective function.*
To express what strategies are acceptable, so-called *constraints* are used, .e.g, “accept only strategies that result in at least 10 and at most 30 trades in the given evaluation period”.

The task of the optimization is to find a parameter setting with a maximal objective value that respects all constraints. Parameter settings violate a constraint are not considered even if they show a higher objective value.

The optimization goal and the constraints are defined on the Trading Constraints page:



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15.3.2 Optimization Goals

WHS FutureStation provides the following choice of optimization goals:

- total performance
- average winning trade
- percent profitable trades
- Expectancy, defined as
  (PW x AW- PL x AL) / AL
  with:
  PW = probability of winning
  AW = average winning trade
  PL = probability of losing
  AL = average losing trade
- Expectancy Score, , defined as
  [(PW x AW- PL x AL) / AL] * Opportunity
  with:
  PW = probability of winning
  AW = average winning trade

PL = probability of losing
AL = average losing trade
Opportunity = # Trades / # Periods in the evaluation period

- max consec winners – max consec losers
- Profit Factor
- total performance / max drawdown
- Happiness-Factor , by Stefan Fröhlich (English Happy = German Fröhlich), defined as:
  [Performance * PW * (ProfitFactor + AW / AL)] /
  [max. drawdown + max. losing trade + max winning trade]
- Average Trade

Because of their definition, many optimization goals require additional constraints, e.g., the maximal possible percentage of profitable trades is 100% - this could be reached by a strategy creating exactly one winning trade. To exclude such “pathological” cases, a minimum required number of trades and/or a minimum performance should be defined as constraints.

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15.3.3 Defining Constraints

A restriction defines a lower and upper bound for a classification number such as profit factor or number of trades. In case the classification number lies outside this range, the constraint is *violated*.

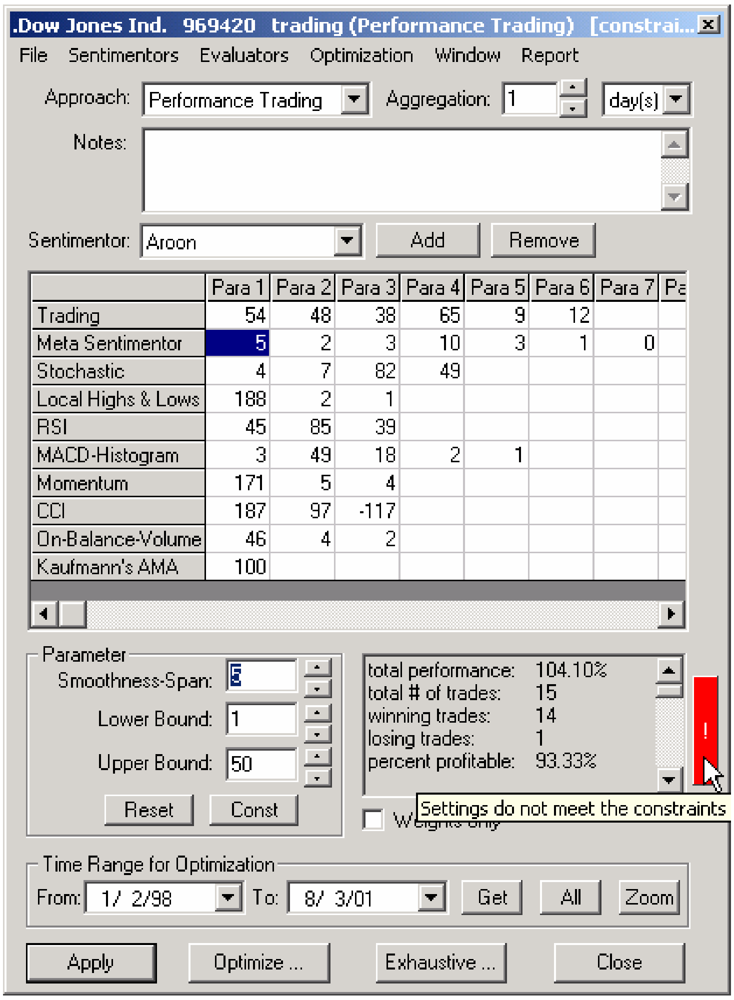
WHS FutureStation requires a parameter setting to comply with *all* constraints.

The default constraints are chosen such that they are not sharp – i.e. every parameter setting of the sentimentors will be feasible.
By clicking the No Constraints button the restrictions are reset to their defaults.

A wise proceeding in working with constraints is to start with the default settings. After an optimization you check whether your personal preferences are met by the computed parameter setting. If not, you sharpen the respective constraints.

Of course it may happen that there exists no sentimentor parameter setting at all that produces a series of signals complying with the constraints.

A parameter setting leading to a violation of the constraints is visualized by a red button in the Designer-dialog:



By clicking this button the Constraints-dialog is displayed. Moreover, the title bar of the main window displays the text „[constraints violated]":

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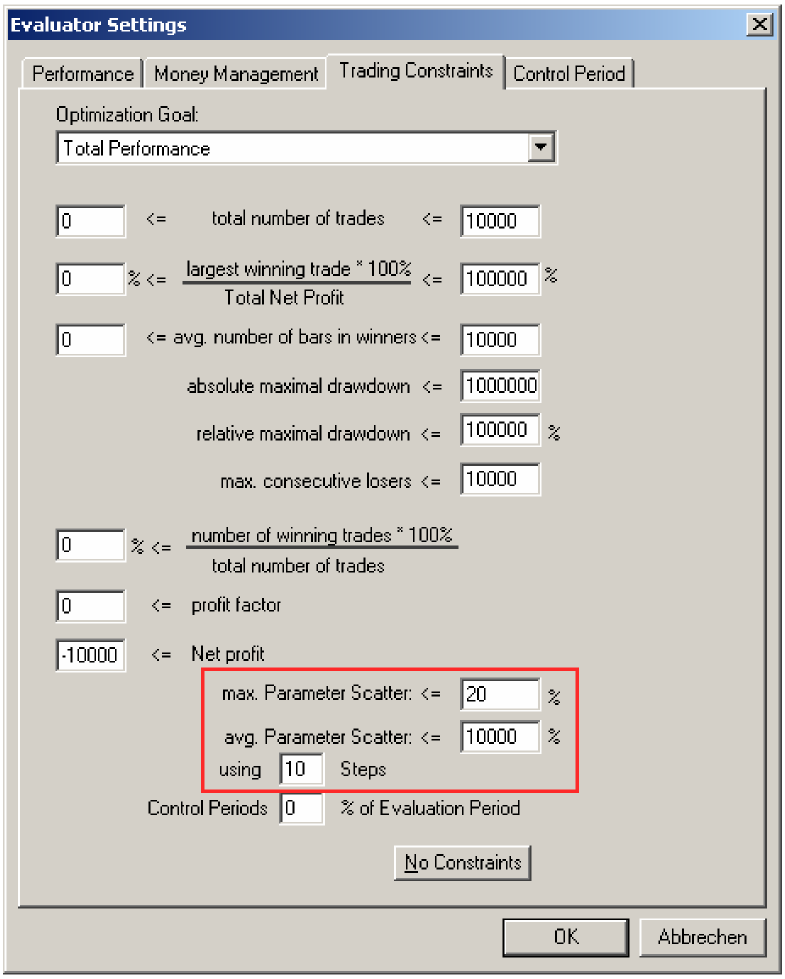
15.3.4 Optimizing with Embedded Sensitivity Analysis

The constraints max Parameter Scatter and avg Parameter Scatter allow to include results from the sensitivity analysis.



In case one of these constraints receives a sharp upper bound *WHS FutureStation* will conduct the sensitivity analysis for every considered parameter change.

Caution: Usually this leads to a significant increase of required computation time.

The rationale behind this is the assumption that the higher the sensitivity of the parameters, the less likely it is that this setting will work on unknown data. By constraining the parameter sensitivity, *WHS FutureStation* automatically attempts to compute more robust parameter settings.

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15.3.5 Optimizing with Embedded Sensitivity Analysis

A detailed description of the control time period can be found in section Evaluation Time Periods.

On the page Control Period restrictions can be defined that are verified for the control time range. The optimization rejects all parameter settings that do not obey these restrictions.

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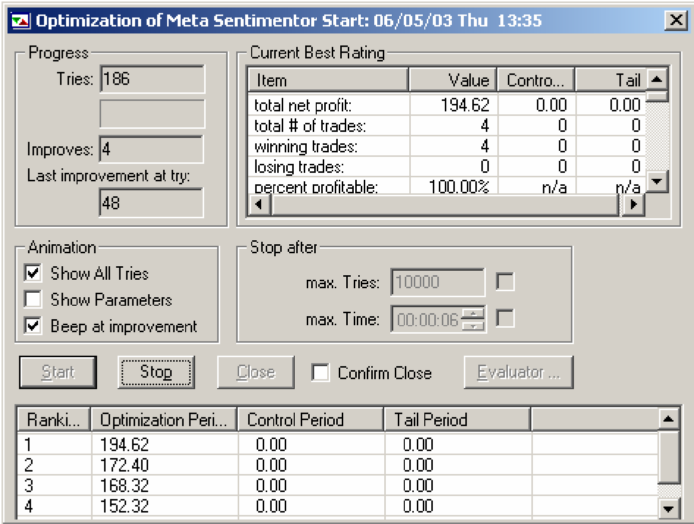
16 Optimize Dialog

The Optimize-dialog can be started in a variety of ways:

- pressing the Exhaustive or Optimize-button of the Designer-dialog
- clicking the toolbar button . This mechanism automatically makes the Meta Sentimentor the active sentimentor.
- through the context menu of a sentimentor

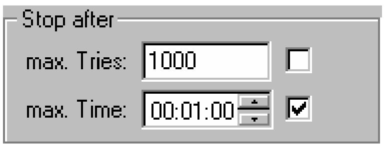


By clicking the Start-button the optimization is started. To interrupt the optimization press the Stop-button. While optimizing the Optimize-dialog displays continuously the progress.
While an optimization is running, the title bar of the Optimize-dialog displays the starting time. After finishing the optimization, it displays the consumed runtime.

top

16.1 Defining the Stop Criterion

The criterion for stopping the optimization can be defined in the Stop after-groupbox:



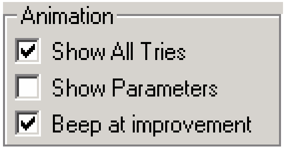
The stop criterion is a combination of number of tries to be performed and the runtime. Use the respective checkboxes to activate the criterions. If both criterions are deactivated the optimization will continue until the Stop-button is pressed, or, in case of exhaustive search, all parameter combinations have been tested.

For exhaustive search, max. Tries has a special meaning: Suppose the max. Tries-checkbox is checked and max. Tries is set to 1000. If there exist, say, 10000 possible parameter combinations for the sentimentor to be optimized then every 10th combination will be checked. This allows one to check *very different* parameter combinations and not just the first 1000 of the complete enumeration.

top

16.2 Animation

The animation settings are defined in the Animation-Groupbox:



When checking the Show All Tries-checkbox, the sentimentor being optimized is continuously redrawn in its window

Moreover the Show Parameters-checkbox allows to display the current computed parameter setting in the Designer-table.

Activate Beep at improvement to let *WHS FutureStation* issue a beep whenever it encounters an improved parameter setting.

The animation settings can be changed even while the optimization is running.

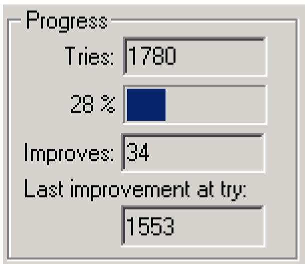
Whenever a new best parameter combination is found it is displayed independently of the animation settings.

The settings for the animation and stopping criterion are stored persistently.

top

16.3 Progress control

The Progress-groupbox informs about the current state of the optimization.



The Tries are a kind of “pass counter” that is increased continuously. The bar and percentage display show the time/effort already consumed until the stopping criterion will be met. The field Improves displays the total number of encountered improved parameter settings.
The “Try”-number where *WHS FutureStation* found the last improvement is displayed in the Last improvement at try-field.

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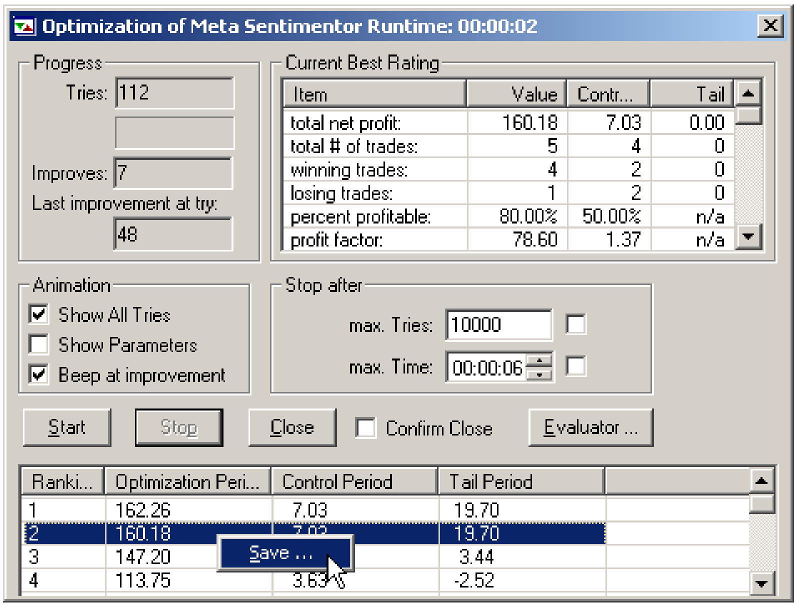
16.4 Optimization History

The lower part of the Optimize dialog shows a history of all found improved solutions. By clicking on a row, the corresponding setting becomes active and the charts, signals, statistics, and Designer dialog are updated accordingly.

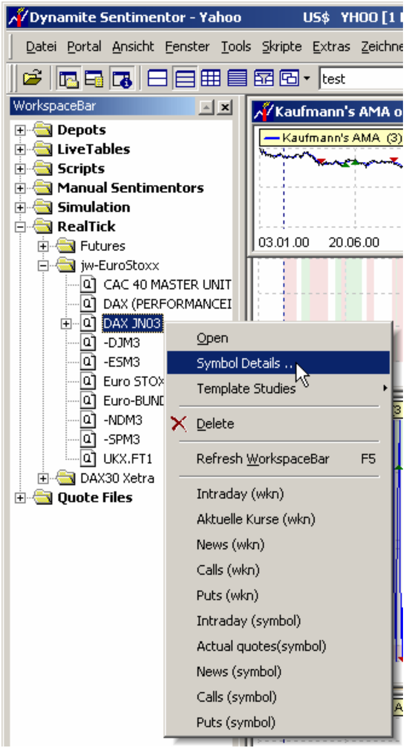
Hint: If you make the complete loaded price data visible before you start the optimization, the course of the optimization can followed visually.

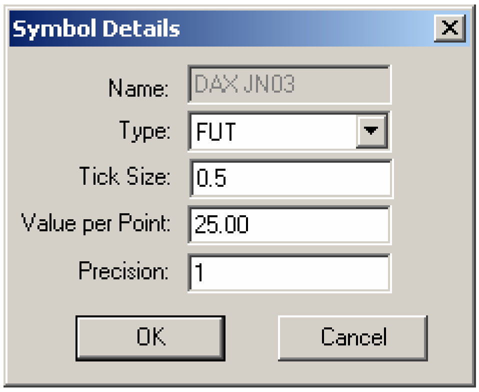
Rightclicking into a row opens a context menu that allows to save the corresponding setting as a study:



17 Symbol Details

By rightclicking onto a security in the WorkspaceBar and selecting Symbol Details some settings for the symbol can be defined:





The Tick Size is the smallest possible change in the price of the symbol. This is used for rounding stop prices and profit targets. Moreover, the Tick Size defines the step size for the ProfitTarget and Trailing Stop parameters.

Value per Point is required for the p/l computation of DySen-DirectTrade.

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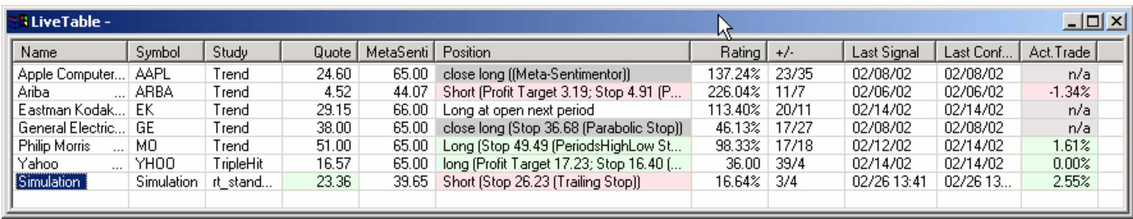
18 LiveTables

18.1 What is a LiveTable?

A LiveTable is a table where each row represents a security with an optionally attached study. The table displays and automatically updates the data for each symbol and the status of the studies:

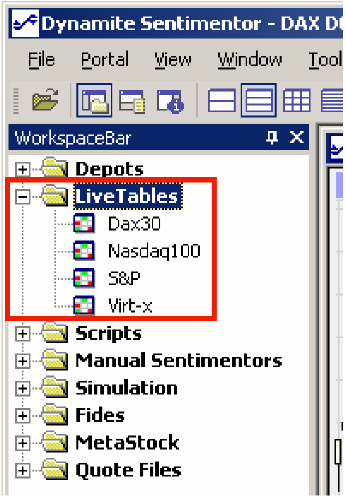

LiveTable -

Name	Symbol	Study	Quote	MetaSenti	Position	Rating	+/-	Last Signal	Last Conf...	Act.Trade
Apple Computer...	AAPL	Trend	24.60	65.00	close long ((Meta-Sentimentor))	137.24%	23/35	02/08/02	02/08/02	n/a
Ariba ...	ARBA	Trend	4.52	44.07	Short (Profit Target 3.19; Stop 4.91 (P...	226.04%	11/7	02/06/02	02/06/02	-1.34%
Eastman Kodak...	EK	Trend	29.15	66.00	Long at open next period	113.40%	20/11	02/14/02	02/14/02	n/a
General Electric...	GE	Trend	38.00	65.00	close long (Stop 36.68 (Parabolic Stop))	46.13%	17/27	02/08/02	02/08/02	n/a
Philip Morris ...	MO	Trend	51.00	65.00	Long (Stop 49.49 (PeriodsHighLow St...	98.33%	17/18	02/12/02	02/14/02	1.61%
Yahoo ...	YHOO	TripleHit	16.57	65.00	long (Profit Target 17.23; Stop 16.40 (...	36.00	39/4	02/14/02	02/14/02	0.00%
Simulation	Simulation	rt_stand...	23.36	39.65	Short (Stop 26.23 (Trailing Stop))	16.64%	3/4	02/26 13:41	02/26 13...	2.55%

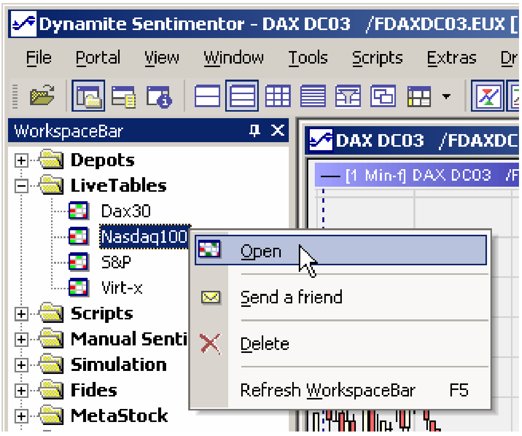
top

18.2 Opening a LiveTable?

The available LiveTables are shown in the WorkspaceBar below the entry LiveTables:



A LiveTable can be opened by doubleclicking the entry in the WorkspaceBar or through the context menu:



In contrast to the classical tabular “price sheets” that simply display the actual price of a security, each line of a LiveTable may represent a complete study that is evaluated continuously. In case the studies rely on tick data that has to be loaded from a certain data provider, it may take a while until the data is available. The loading times vary with the provider and the technology used to receive the data. Once the data is received for a security, *WHS FutureStation* uses a caching mechanism so there is usually no need to reload the same data twice within the same session.

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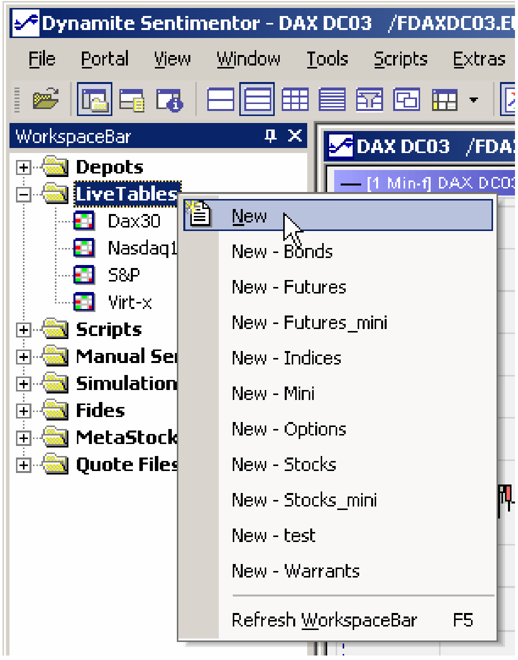
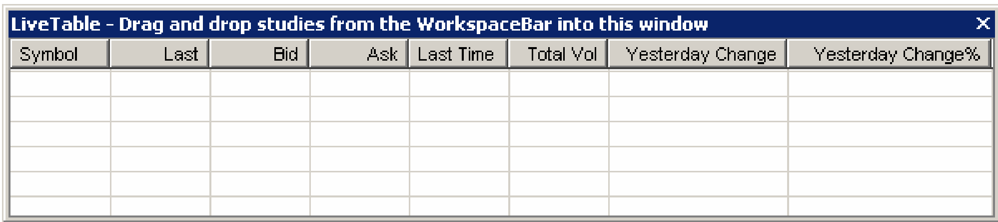
18.3 Creating a new LiveTable?

By rightclicking on the LiveTables entry in the WorkspaceBar and selecting New from the context menu an empty LiveTable can be created.



Each LiveTable contains a definition of the columns to be displayed. A selection of columns can be saved as a scheme. A new LiveTable can be created with such a scheme by selecting the appropriate entry from the context menu, e.g., New – Stocks_mini.



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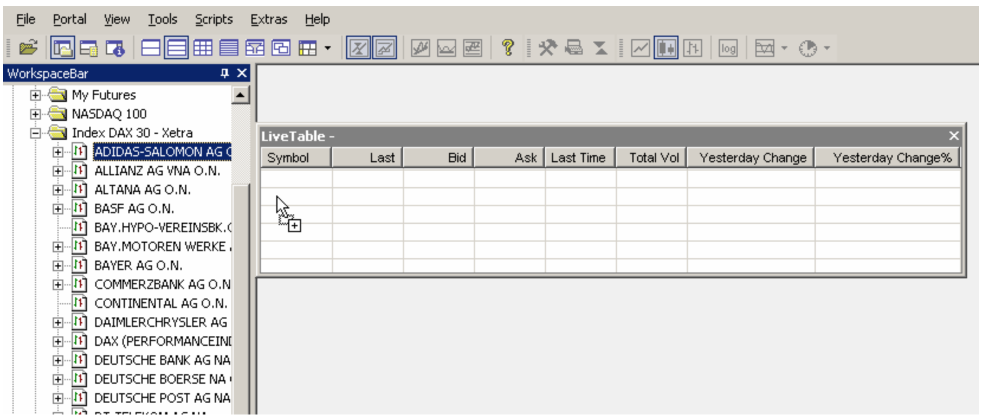
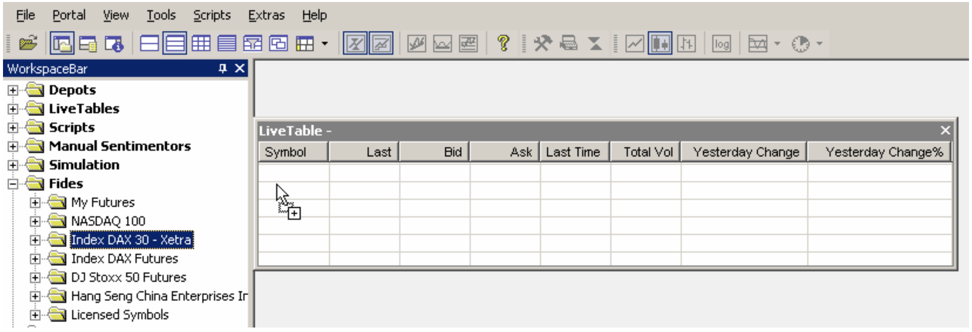
18.4 Adding Studies to a LiveTable

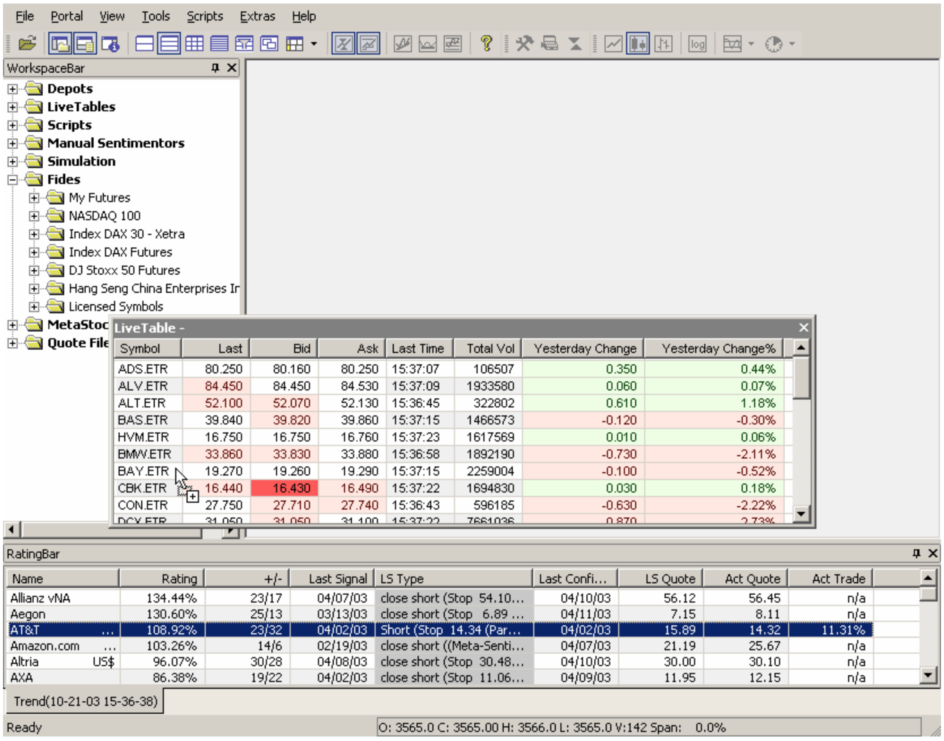
To add a study to a LiveTable, simply drag & drop the study from the WorkspaceBar into the LiveTable:



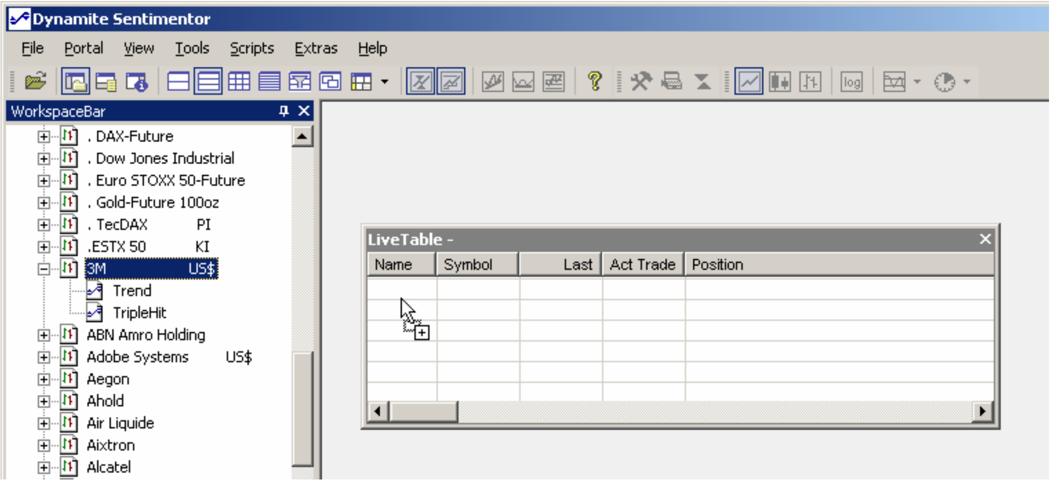
You may also drag & drop a complete folder:

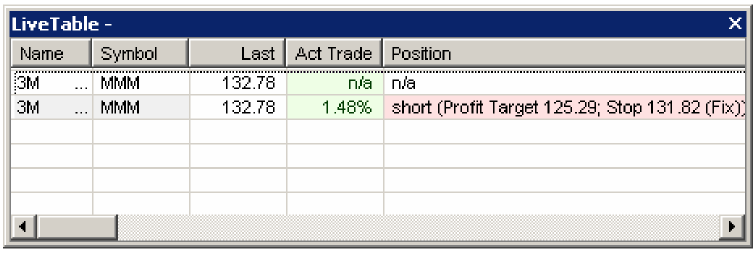


or from the RatingBar:



To add all available studies for a security to a LiveTable, simply drag & drop the security LiveTable while pressing the Shift-key:





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18.5 Removing a study from a LiveTable

To delete a study from a LiveTable, the corresponding line has to be selected by clicking on the Name cell. Then the study can be deleted by pressing the “Del”-key or by selecting Delete Entry from the context menu.

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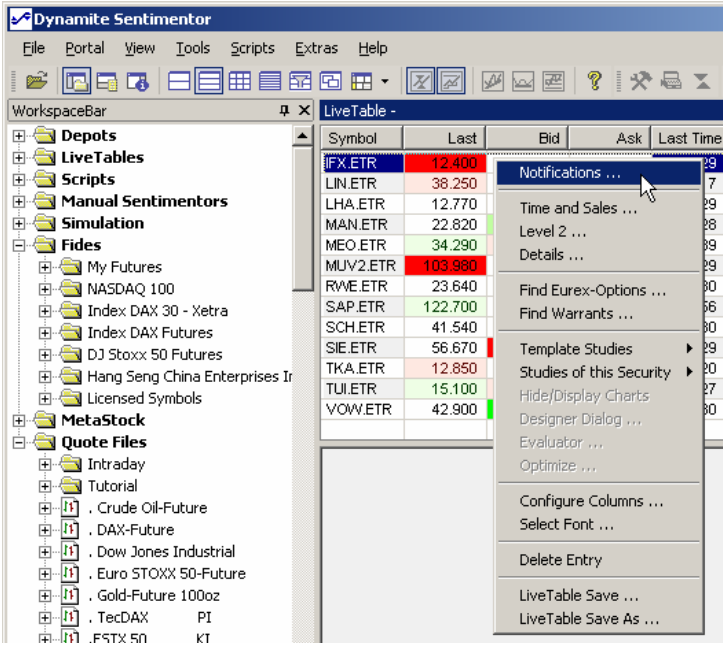
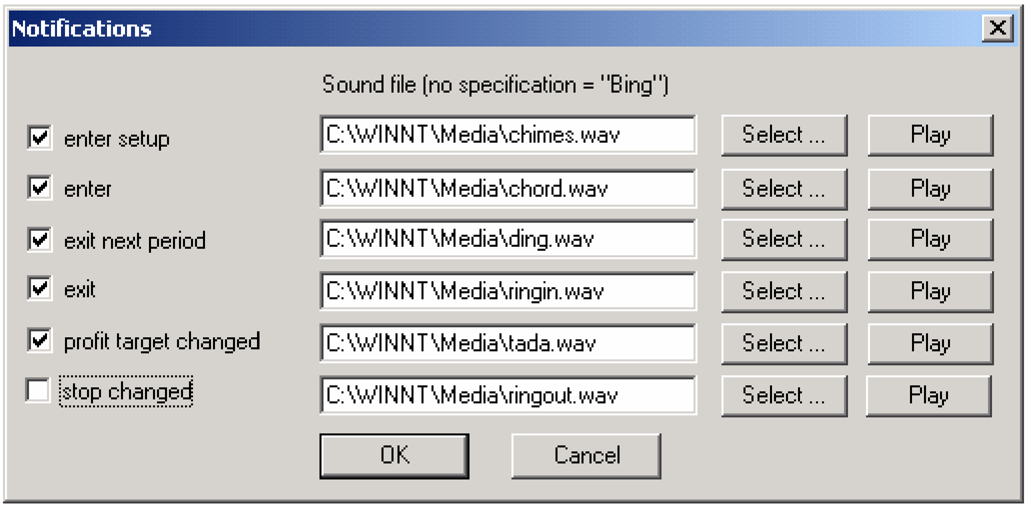
18.6 Specifying Notifications

By selecting Notifications from the LiveTables context menu, the dialog for specifying notifications for certain events can be opened:





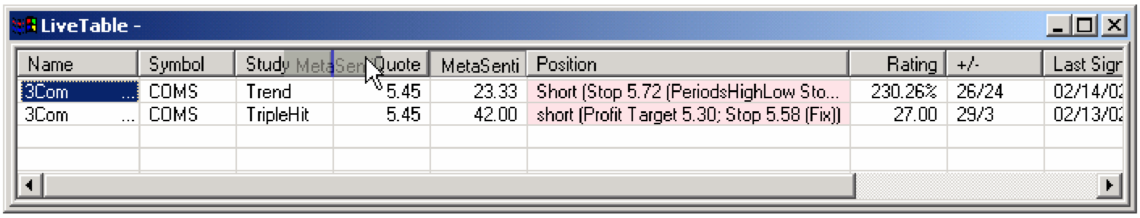
The acoustic signals for the given events can be activated by checking the corresponding check boxes.

In case the an event like “profit target reached” occurs, the LiveTable is brought into the foreground, the study that created the event is highlighted, and the selected sound is played.

top

18.7 Changing the ordering of the columns

The columns of a LiveTable can be reordered by drag & drop:



top

18.8 Saving a LiveTable

When closing a LiveTable you are automatically asked whether you like to save the LiveTable settings. To save a LiveTable with a new name, choose LiveTable Save As from the LiveTables context menu.

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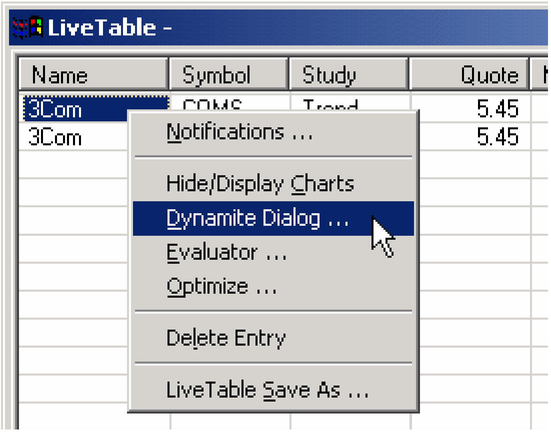
18.9 Displaying the Charts of a LiveTable study

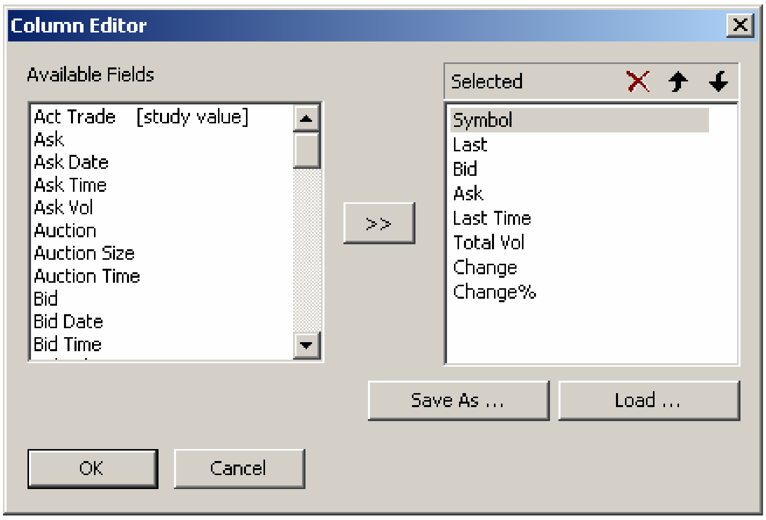
In case a study was dropped into the LiveTable, doubleclicking its row in the LiveTable will open the associated charts. The Designer-,Evaluator-and Optimize-dialog belonging to this study can be started from the context menu.



top

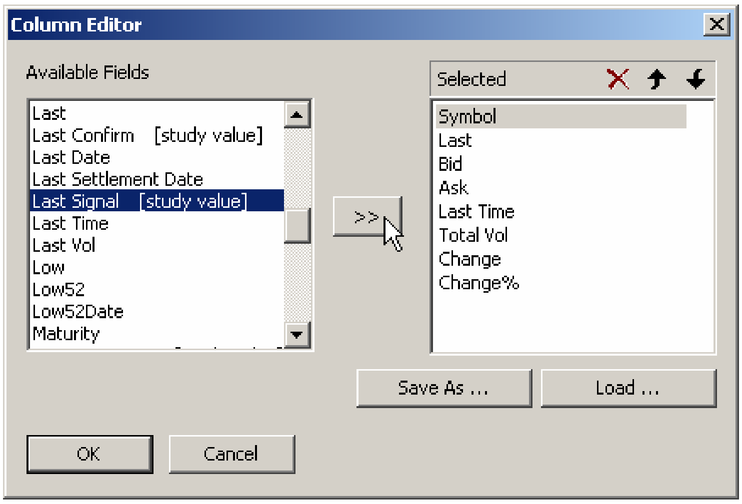
18.10 Configuring Columns

By choosing Configure Columns the Column Editor is displayed:

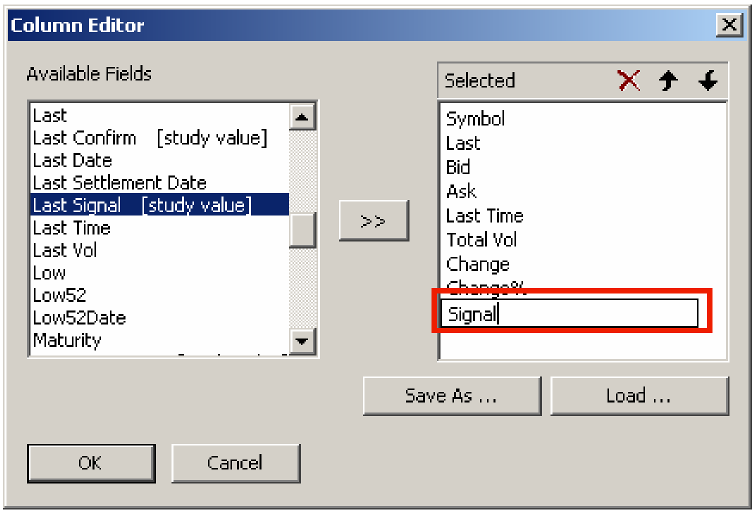


The list of Available fields contains all fields that could be used in a LiveTable. Note: Many fields, specifically fundamental data, are only supported by the *DySen FIDES-Trader.*

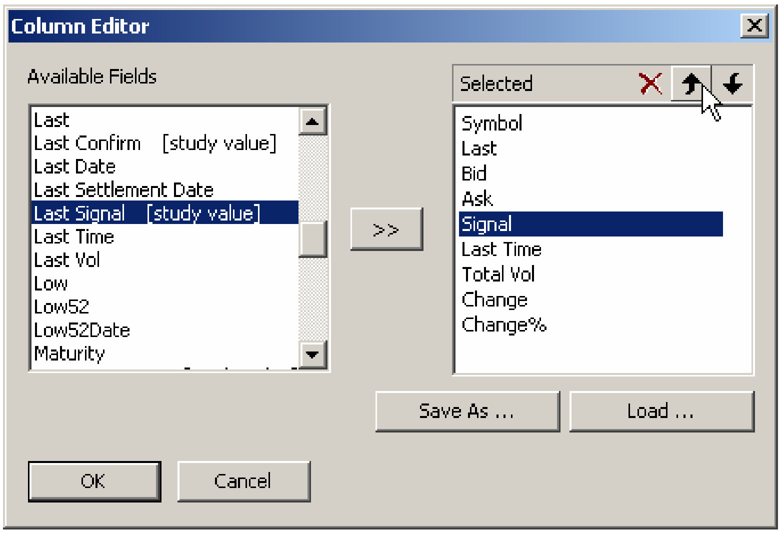
To add a filed to the Selected fields, click on it in the left list and press the >> button:



The displayed column heading can be changed by editing the label:



Use the up/down arrows to change the order of the columns:



A selection of columns may be saved by clicking on Save As or loaded by clicking Load.

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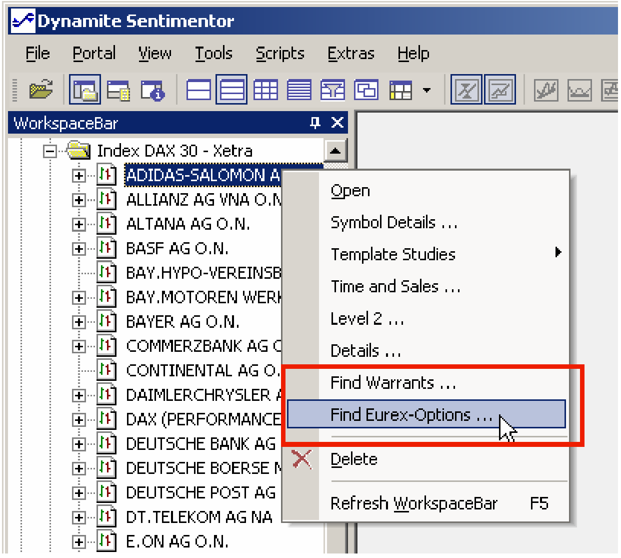
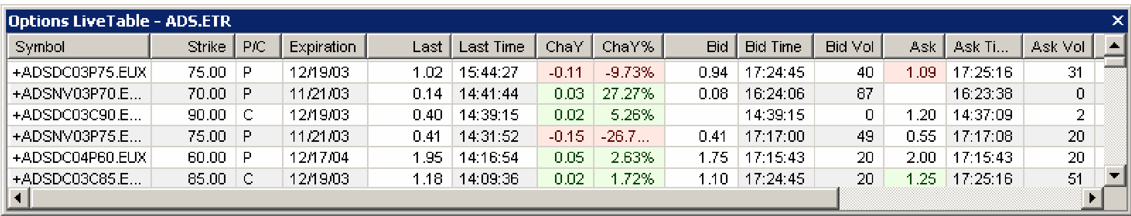
18.11 Warrants and Options

DySen FIDES-Trader Extension:

The security context menus for securities provided by FIDES contain entries for retrieving the Warrants and Options for that security:



Warrants are displayed in a LiveTable using the Warrants columns scheme, whereas Options use the Options columns scheme:



Options LiveTable - ADS.ETR

Symbol	Strike	P/C	Expiration	Last	Last Time	ChaY	ChaY%	Bid	Bid Time	Bid Vol	Ask	Ask Ti...	Ask Vol
+ADSDC03P75.EUX	75.00	P	12/19/03	1.02	15:44:27	-0.11	-9.73%	0.94	17:24:45	40	1.09	17:25:16	31
+ADSNV03P70.E...	70.00	P	11/21/03	0.14	14:41:44	0.03	27.27%	0.08	16:24:06	87		16:23:38	0
+ADSDC03C90.E...	90.00	C	12/19/03	0.40	14:39:15	0.02	5.26%		14:39:15	0	1.20	14:37:09	2
+ADSNV03P75.E...	75.00	P	11/21/03	0.41	14:31:52	-0.15	-26.7...	0.41	17:17:00	49	0.55	17:17:08	20
+ADSDC04P60.EUX	60.00	P	12/17/04	1.95	14:16:54	0.05	2.63%	1.75	17:15:43	20	2.00	17:15:43	20
+ADSDC03C85.E...	85.00	C	12/19/03	1.18	14:09:36	0.02	1.72%	1.10	17:24:45	20	1.25	17:25:16	51

When dragging a security into an Options-or Warrants LiveTable, *WHS FutureStation* will automatically retrieve the corresponding options/warrants for that underlying.

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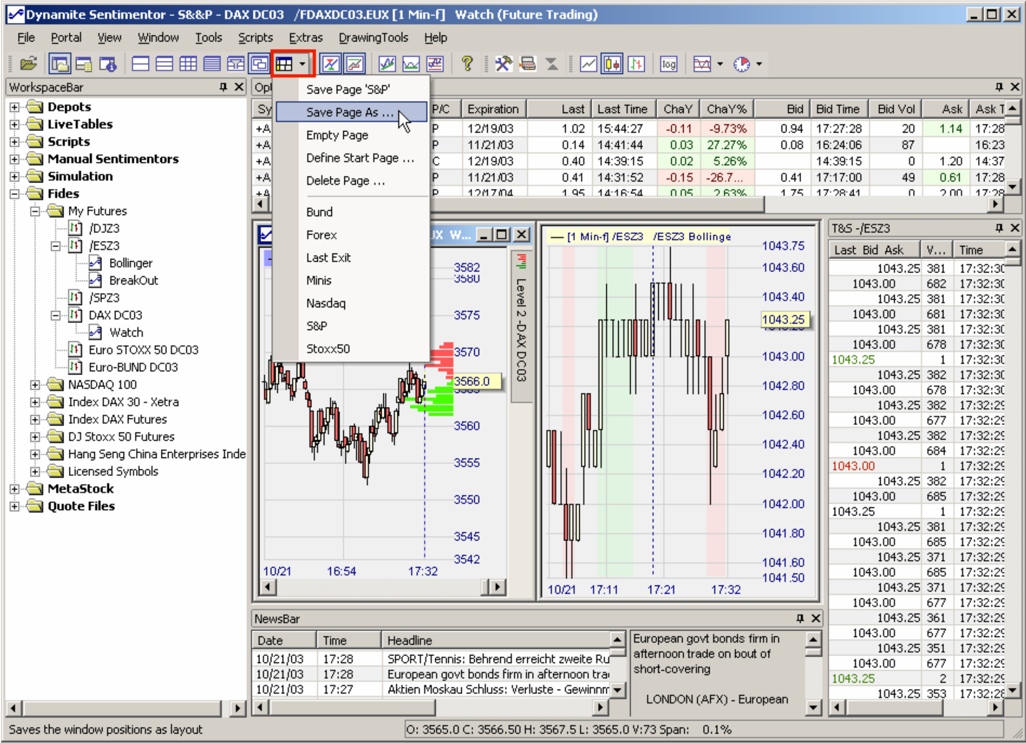
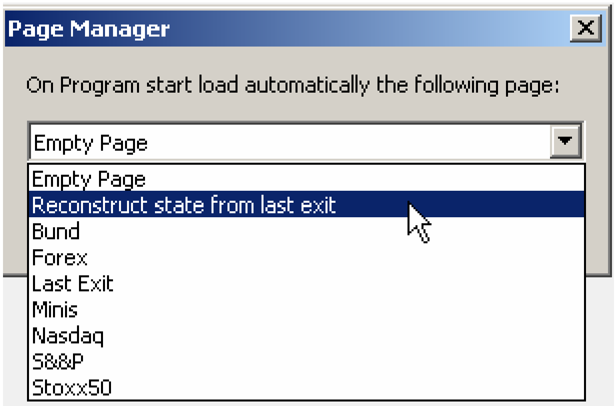
19 Page Definitions

Once a number of studies and Bars have been loaded and the chart windows are arranged, the complete layout can be saved as a *page*. Definition of pages allow to switch between arrangements with one click:



When selecting Define Start Page the following dialog shows up allowing you to define what page to show when *WHS FutureStation* is started:



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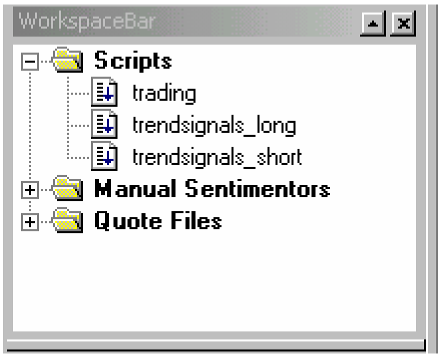
20 Scripts for Automated Study Generation

Scripts enable the automatic optimization of studies for a number of securities. A typical application of scripts is to let *WHS FutureStation* work on the studies in the night. The most promising securities are presented in the morning and can be used as a basis for the trading day.

20.1 Running a Script

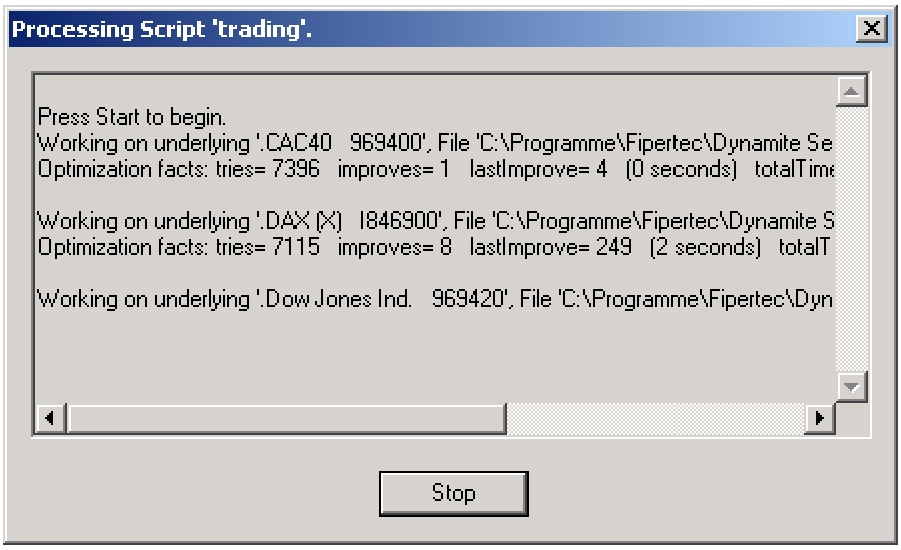
The WorkspaceBar displays the scripts stored in the ScriptsDir below the entry Scripts.



When doubleclicking a script it will be started.

Alternatively, using Scripts|Run a script can be selected from an arbitrary location in the file system or the network.

After starting a script the ScriptViewer comes up. The ScriptViewer is used to monitor the activities while processing the script. A script run can be aborted by clicking the Stop-button of the.

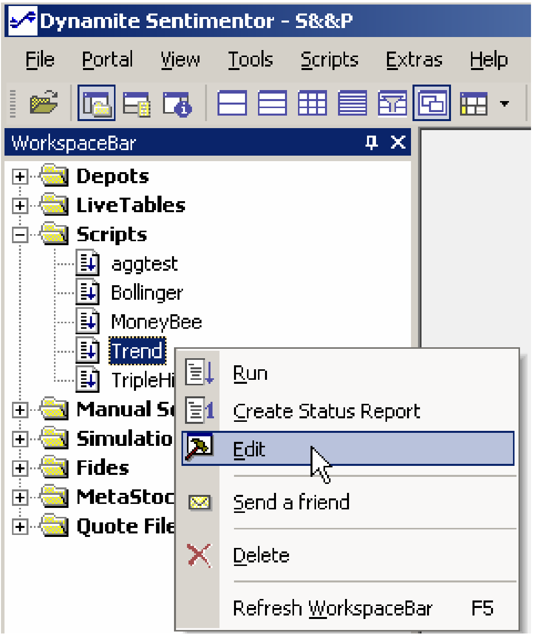


For each optimized security the number of performed tries, the “try” with the last improvement and the consumed runtime are reported. This information can be very helpful to find a good setting for the stopping criterion defined in the script to be used for the next runs.

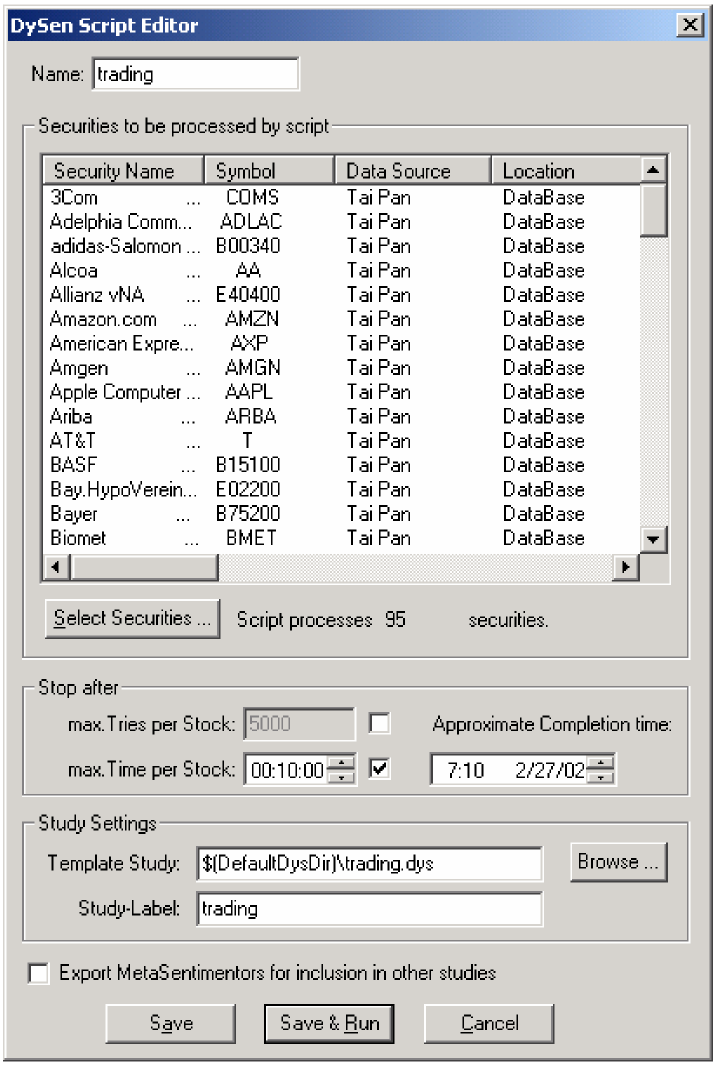
top

20.2 Editing a Script

The ScriptEditor can be started by rightclicking on the script to be edited and choosing Edit in the context menu.



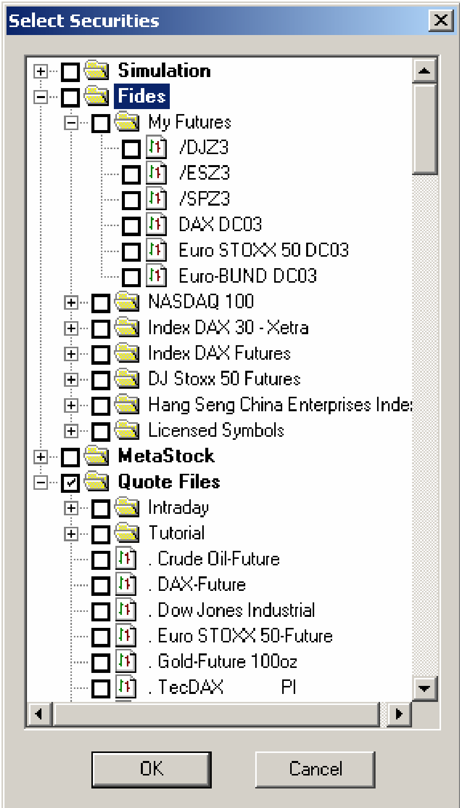
The ScriptEditor looks as follows:



top

20.2.1 Selecting Securities

The securities to be processed by the script can be selected by clicking the Select Securities-button. This will open the following dialog:

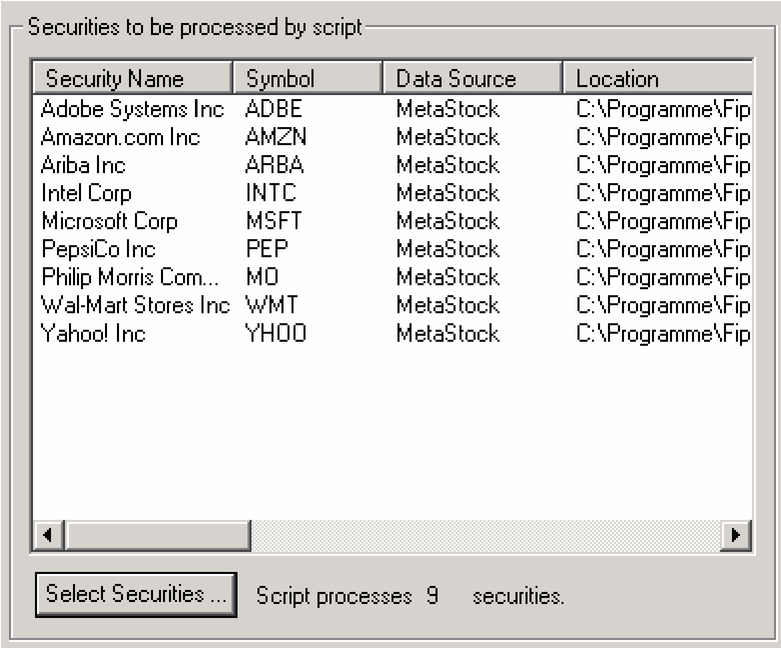


The displayed securities vary with the activated data sources.

Securities to be processed by the script are checkmarked. You may change the selection by checking/unchecking the respective securities. It is also possible to mix securities from different data sources, e.g. from MetaStock and quote files.

If a folder is checkmarked then the securities inside the folder are automatically processed by the script – no matter if the securities of the folder carry a checkmark or not.

After quitting the Select Securities-dialog the securities to be processed are displayed in the ScriptEditor:



In this example, the script has to work on 9 securities.

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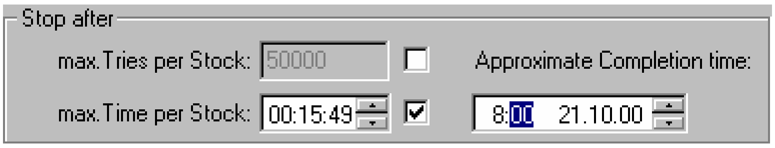
20.2.2 Defining the Runtime per Security

The optimization spends a certain time per security. This time can be specified through the number of tries or in an explicit duration. Thus, the same mechanism as already described for the Optimize-dialog is used.



If both stopping criterions are activated, the optimization stops as soon as the first criterion is met.

If a fixed time per security is defined, then automatically the expected completion time is displayed below the Approximate Completion Time-label. This assumes that the script is started immediately.
Very often one likes to run a script immediately and wants the script to have finished at a certain time. This can be achieved easily by editing the completion time. Editing the completion time will automatically adapt the max Time per Stock setting as required. By leaving the ScriptEditor with the Save & Run-button the script is saved and executed in one step.

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20.2.3 Defining the Study Label and Standard Study

For each processed security, a script loads a corresponding study using the label defined in the script (Study-Label).

In the example given above, for each security to be processed, the script will load the study with label „trading“. In case such a study does not exist for the security, the template study `trading.dys` from the subdirectory `DefaultDys` of the installation directory is loaded.
The loaded study will be optimized until the stopping criterion is met. Finally, the optimized study will be saved with reference to the security.

Whenever possible, the name of a script, the Default Dys-File and the Dys Label should be the same to make the relations as clear as possible.

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20.3 Creating a "Template Study"

To create a Template Study proceed as follows:

1. Load an arbitrary MasterChart and open the Designer-Dialog.
2. Choose a Trading Approach and Evaluator.
3. Adapt the Evaluator to suit your needs.
4. Select the sentimentors to be used in this study.
5. Make sure the upper-and lower bounds of the parameters of the sentimentors and trading approach have meaningful values. This can be achieved most easily by choosing Sentimentors|Reset All from the Sentimentors-menu of the Designer-Dialog.
   You may now change the parameter bounds according to your taste.
6. Choose the start date for the evaluation period.
7. Finally click File|Save As Template Study and store the study using a meaningful name.

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20.4 Exporting MetaSentimentors

In the process of running a script, the MetaSentimentors of the processed studies can be exported by activating the check box

.

The filenames used for storing the MetaSentimenors are of type:

`security name#study label.sent`

The files are stored in the directory "Exported Sentimentors" below the installation directory.

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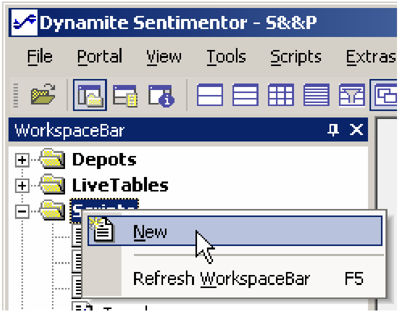
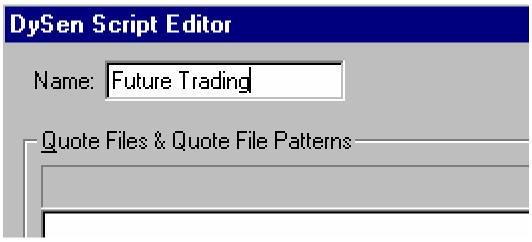
20.5 Creating a New Script

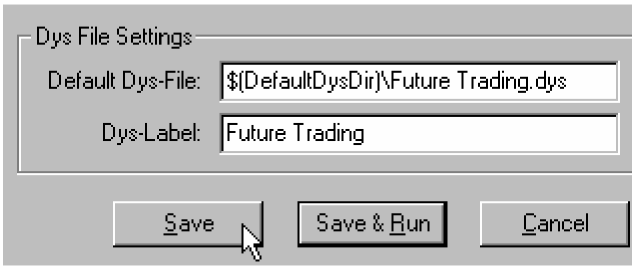
To create a new script start rightclick on Scripts in the WorkspaceBar and select New from the context menu.



The ScriptEditor comes up with an empty script. Now enter a name for the new script, e.g.,



Now complete the entries in the script as described above and save the script using the Save or Save & Run button.



top

20.6 Creating a New Script from an Existing Script

If you just want to adapt an existing script slightly and store it under a new name proceed as follows:

1. Load the existing script into the ScriptEditor.
2. Overwrite the name of the script with the name of the new script
3. Adapt the script settings.
4. Save the script.

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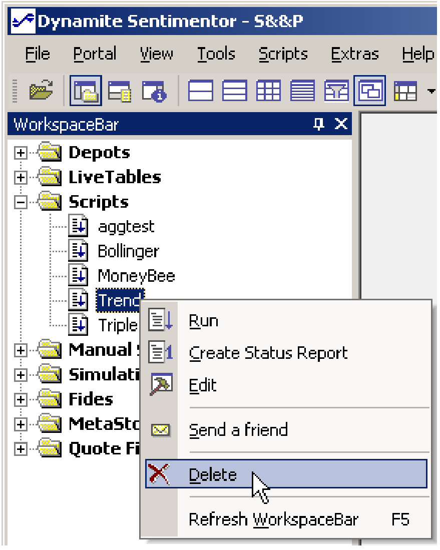
20.7 Deleting a Script

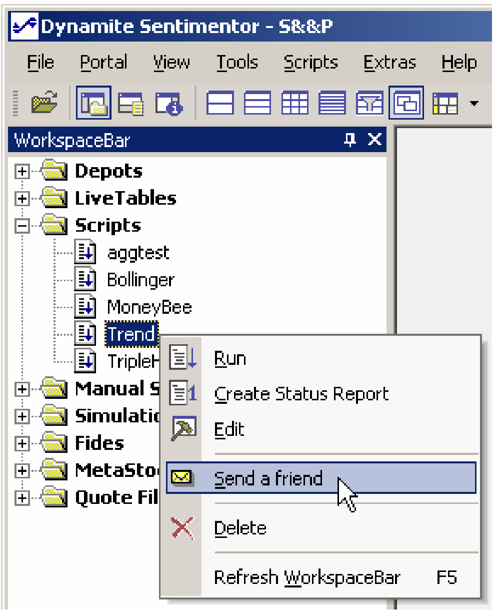
Rightclick on the script to be deleted and choose Delete from the context menu.



top

20.8 Emailing a Script

If you have installed a so-called MAPI email system, e.g., Microsoft Outlook, you can email a script directly from within *WHS FutureStation*. To do this, just open the context menu by rightclicking on the script to be send and choose Send a friend.



The message editor of your mail program will come up having the selected script already attached to the message.

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20.9 Starting Scripts from the Command line

WHS FutureStation allows to start scripts from the command line. This allows to automate an update of the quote files and a subsequent optimization.

The syntax for running scripts from the command line, e.g., MS-DOS Command Prompt, is as follows:

```
dysen.exe -script <script_1.dsb> ... <script_n.dsb>
```

The script files must either be specified using the complete pathname or relative to the execution directory.

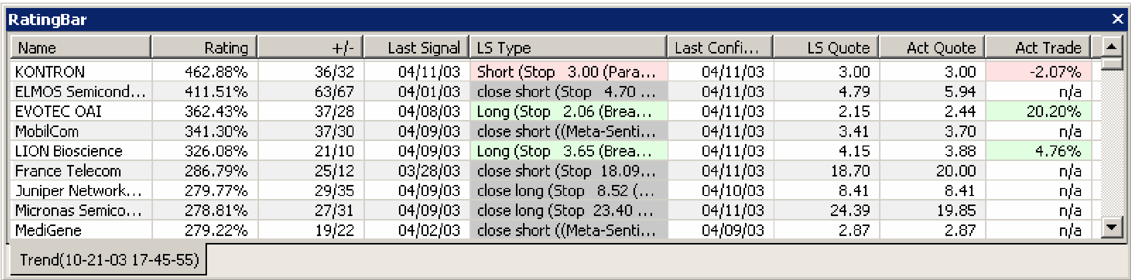
Example:

```
dysen.exe -script „C:\Programs\Fipertec\WHS
FutureStation\Scripts\trading.dsb"
```

top

20.10 RatingBar

At the end of a script run *WHS FutureStation* presents a results report in the so-called RatingBar.



RatingBar

Name	Rating	+/-	Last Signal	LS Type	Last Confi...	LS Quote	Act Quote	Act Trade
KONTRON	462.88%	36/32	04/11/03	Short (Stop 3.00 (Para...	04/11/03	3.00	3.00	-2.07%
ELMOS Semicond...	411.51%	63/67	04/01/03	close short (Stop 4.70 ...	04/11/03	4.79	5.94	n/a
EVOTEC OAI	362.43%	37/28	04/08/03	Long (Stop 2.06 (Brea...	04/11/03	2.15	2.44	20.20%
MobilCom	341.30%	37/30	04/09/03	close short ((Meta-Senti...	04/11/03	3.41	3.70	n/a
LION Bioscience	326.08%	21/10	04/09/03	Long (Stop 3.65 (Brea...	04/11/03	4.15	3.88	4.76%
France Telecom	286.79%	25/12	03/28/03	close short (Stop 18.09...	04/11/03	18.70	20.00	n/a
Juniper Network...	279.77%	29/35	04/09/03	close long (Stop 8.52 (...	04/10/03	8.41	8.41	n/a
Micronas Semico...	278.81%	27/31	04/09/03	close long (Stop 23.40 ...	04/11/03	24.39	19.85	n/a
MediGene	279.22%	19/22	04/02/03	close short ((Meta-Senti...	04/09/03	2.87	2.87	n/a

Trend(10-21-03 17-45-55)

Like the WorkspaceBar and the InfoBar you can position the RatingBar somewhere in the main window or on the desktop.

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20.10.1 The RatingBar Columns

Each line of the RatingBar contains condensed information of the best found parameter setting of an analyzed security. The signification of the columns is as follows:

Name	The name of the analyzed security. If the study violates a trading constraint then the name of the security is preceded with an exclamation mark.
Rating	The evaluation of the best found parameter setting.
+/-	Number of win trades/number of losing trades. When using the trading approach *Trendsignals*, the number of correct signals

	and wrong signals.
Last Signal	The date of the last signal.
LS Type	The type of the last signal. In case the last signal closed a position, the reason for the signal is displayed in braces, e.g. "(Profit Target 12.88)" or . "(Stop Loss 10.78)". In case the last signal opened a position the actual stop and profit targets for this trade are displayed in braces if the study uses these stopping criterions, e.g. "Long (Profit Target 72,32; Stop Loss 62,37)". In case the last signal requires a confirmation the confirmation price is displayed, e.g., "Long (trigger: 45.69)". In case the last signal was denied because the required confirmation price was not reached, the column reads "Long (filtered)" or "Short (filtered)".
Last Confirmation	The last date with a sentiment value reaching a threshold in the direction of the current trade. Reaching the threshold is a confirmation of the current trade and might be used for increasing the position size or an subsequently entering of the position.
LS Quote	LS = Last Signal The quote at the date of the last signal.
Act Quote	The latest quote.
Act.Trade	The current value of an open position.

By clicking a column header the table will be sorted with respect to this column. Clicking again on the same column header will reverse the sorting sequence. Thus, to see the latest signals just click on the column „Last Signal".

Doubleclicking a row of the RatingBar will load the corresponding study.

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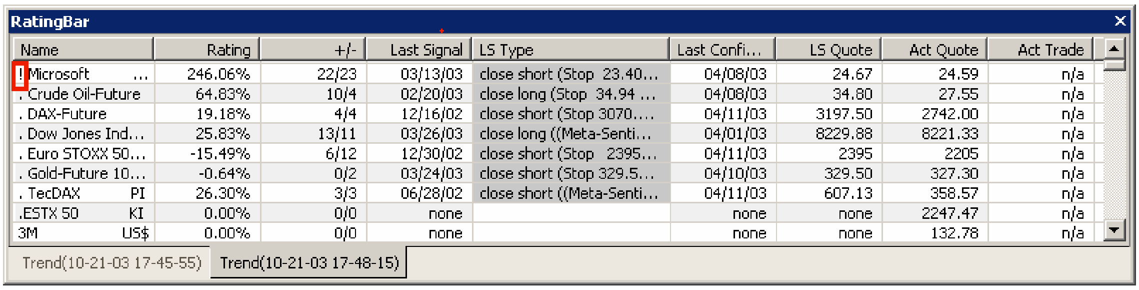
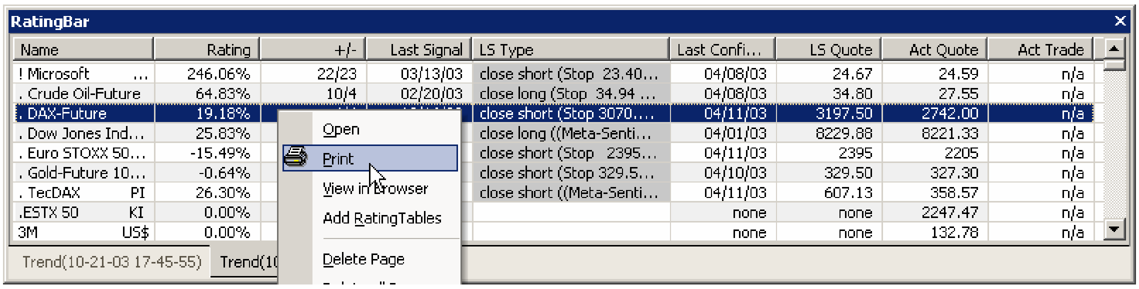
20.10.2 Violations of Trading Constraints

After updating the price data and running a status report for a script it may happen that a study violates its trading constraints, .e.g. because the final has turned into a losing trade that results in an winning/losing trade ratio that is not accepted. In such a case the name of the security in the RatingBar is preceded with an exclamation mark so that a violation of trading constraints becomes immediately visible.



20.10.3 The RatingBar Context-Menu

A rightclick on the RatingBar opens a context menu.



The corresponding functionality is as follows:

Open	loads the study (same as doubleclicking the row)
Print	prints the RatingBar contents
View in Browser	displays the RatingBar contents in a browser (this allows to cut & paste the table, e.g., to send it via email)
Add Rating Tables	More result reports from previous script runs can be loaded. To switch between loaded reports use the tabs at the bottom of the RatingBar.
Delete Page	Deletes the displayed report from the RatingBar.
Delete all Pages	Deletes all reports from the RatingBar.

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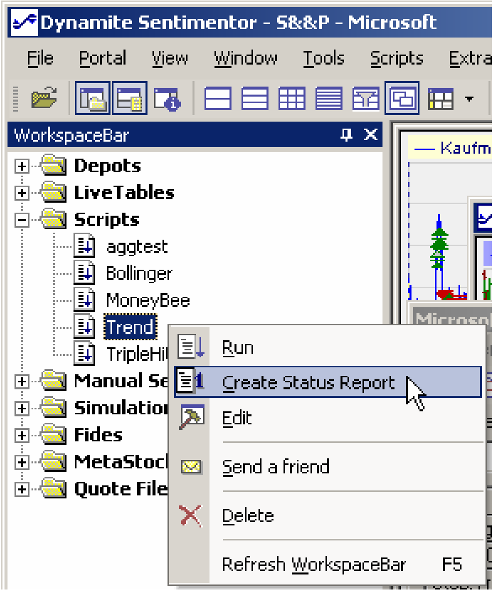
20.11 Creating a Status-Report

Often one just wants to have an overview of the current status of some securities without applying an optimization. Such an overview is called a *status report*. When creating a status report, the script loads subsequently the quote files and their respective studies. Each study is evaluated without optimizing it and the result is taken into the status report.

Depending on the personal strategy a once optimized study can be left unchanged for a longer period. After a quote update, it has to be checked whether the new quotes led to new signals. This can be done most easily by just creating a status report.

To create a status report rightclick on the script in the WorkspaceBar and select Create Status Report from the context menu.



WHS FutureStation will then create the status report on the basis of the script definitions, but ignoring the settings for the stopping criterion, i.e., no optimization is performed.

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20.12 Format of Script Files

In some application scenarios it is very convenient to create scripts automatically by an external software. For enabling such a mechanism *WHS FutureStation* stores script files as plain ASCII-files carrying the extension `.dsb`.
A `dsb`-file contains lines of the format:

`key: value`

At most one key/value pair per line is accepted. The file may contain empty lines. A line starting with an `#` is considered a comment.

If a value denotes a pathname it may contain multiple `*` and `?` wildcards. Moreover, using the syntax `$(<registry key>)` a value from the Windows registry may be referenced.

Key	Description	Examples
`FilePattern:`	Regular expression describing the quote files to be analyzed. Multiple patterns separated by a ; can be provided	`$(QuotesDir)\Dax30\*.txt`
`DefaultDysFile:`	dys-file to use in case no dys file with the appropriate label (see below) can be found for a given quote file. After the optimization, a dys file with the proper label will be created.	`$(DefaultDysDir)\short_buy.dys`

`DysLabel:`	The label of the dys-files to use.	`ShortBuy`
`LogDir:`	Directory for storing log files..	`$(ReportsDir)\Dax30`
`ResultDir:`	Directory for storing the result report.	`$(ReportsDir)\Dax30`
`Algorithm:`	Algorithm to be used. Currently only `TabuSearch` is supported.	`TabuSearch`
`MaxSeconds:`	maximal runtime in seconds per underlying. –1 means unlimited.	`1200`
`MaxTries:`	maximal number of tries per underlying. –1 means unlimited	`-1`

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20.13 Logfiles

When processing a script, a so-called *activity log* is created. The activity log is being displayed in the ScriptViewer. Moreover, a result report is created that is automatically displayed in the RatingBar after the script run has terminated.

The filename of activity logs is of the format:
`<Dyslabel>_log_<date time>.log`.

Result report files are named:
`<Dyslabel>_result_<date time>.log`

Using Scripts|Print Logfile a result report can be printed.

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21 Manually defined Sentimentors

21.1 Areas of Application

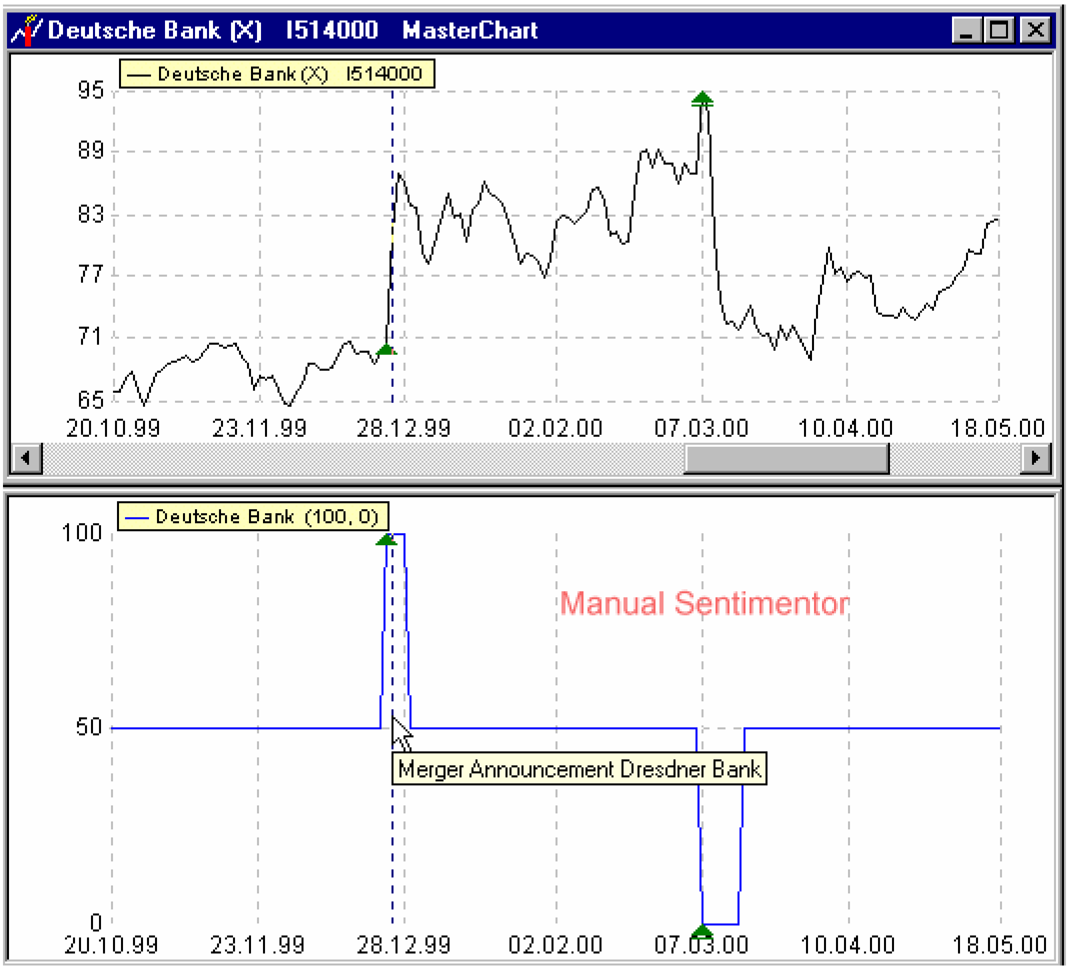
A sentimentor can be created manually by defining fixed sentiment values for time periods. Typically, a manually defined sentimentor is used in conjunction with the Meta Sentimentor to bias the sentiment in certain periods and thus to influence the meta sentiments as well as the resulting signals..

The definition of such a *Manual Sentimentor* is extremely valuable whenever non-formal and/or fuzzy knowledge should be taken into account for an analysis, e.g.,

- exchanging companies in an important index
- uncertainty before the next FED meeting
- Making ones intuition explicit. This is a very comfortable way to create and communicate „complete“ studies. Moreover, making ones intuition and feelings explicit allows to learn and improve by recapitulating the decisions of the past.

- empirical peaks preceding important announcements (e.g., raising quotes at the customer fairs of SAP – this is normally the time to announce strategic decisions)
- retrospective incorporation of important company announcements.

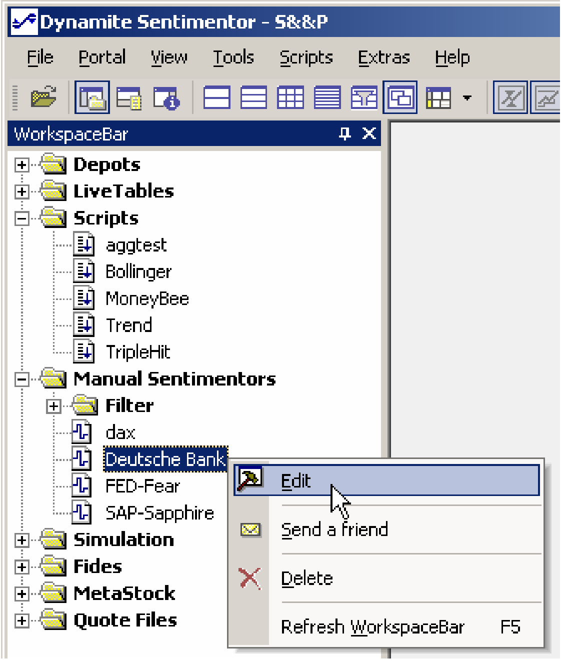
Here is an example for the latter point:
An unexpected merger announcement may lead to a dramatic change in the quotes as exemplified with the announced merger and subsequent merger cancellation of Deutsche Bank and Dresdner Bank:



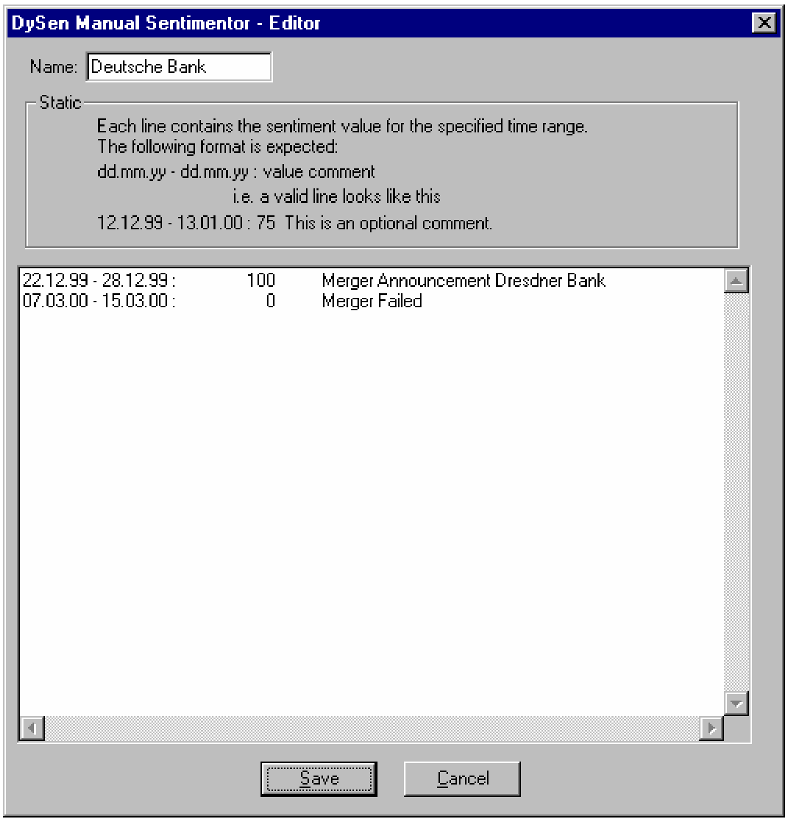
By defining a Manual Sentimentor the announcements can be captured. To achieve this the sentiment values are set to 100 at the announcement of the merger and to 0 at the cancellation announcement. By incorporating this Manual Sentimentor into future Deutsche Bank analyses, it will be ensured that the system is invested in the „correct“ direction with respect to the announcements. This releases the optimization from trying to find parameters that would take advantage of these drastic quote changes. This is important as there is no realistic chance for repeating such a quote pattern in the future.

21.2 Editing a Manual Sentimentor

The editor for Manual Sentimentors can be started by rightclicking on a Manual Sentimentor and selecting Edit from the context menu.



The editor looks as follows:



A manually defined sentimentor is a text consisting of lines with the following format:

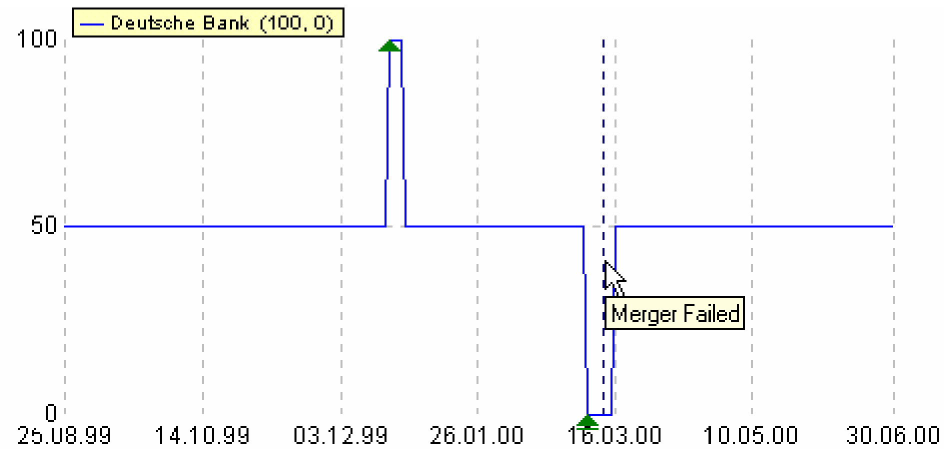
```
dd.mm.yy[yy] - dd.mm.yy[yy]: sentiment comment
```

`sentiment` represents the sentiment value for the specified period, thus it must be an integer between 0 and 100. The specification of a comment is optional.
Obey the `-` and `:` characters when editing a line. Spaces and tabs may be used to format a line.

If time periods are overlapping, the last value for a multiply covered date is taken.

For all are uncovered dates, *WHS FutureStation* uses the neutral sentiment (50).

The comment will be displayed by *WHS FutureStation* when the Manual Sentimentor is used in a study and the mouse points to a period with a specified sentiment.



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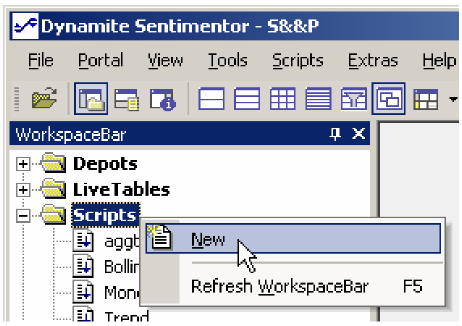
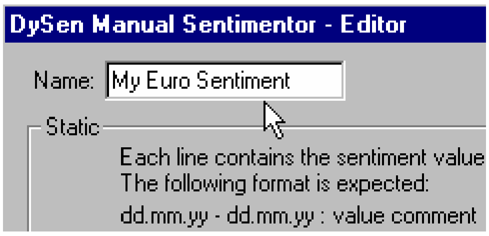
21.3 Creating a New Manual Sentimentor

To create a new Manual Sentimentor start the Manual Sentimentor Editor by rightclicking on the entry Manual Sentimentors in the WorkspaceBar.



The editor starts with an empty file. Now provide a name for the new Manual Sentimentor, e.g.:



After specifying the sentiment values as described above close the dialog by clicking Save.

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21.4 Creating a new Manual Sentimentor from an existing

If you want to change and save an existing Manual Sentimentor with a new name proceed as follows:

1. Load the Manual Sentimentor in the Manual Sentimentor Editor.
2. Overwrite the name of the Manual Sentimentor with the new name.
3. Change the sentiment specifications at your wish.
4. Save the Manual Sentimentor.

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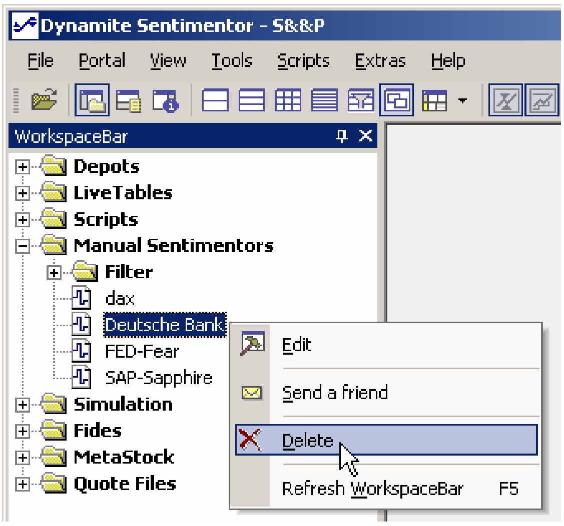
21.5 Deleting a Manual Sentimentor

In the WorkspaceBar, rightclick on the Manual Sentimentor to be deleted and choose Delete from the context menu.



21.6 Adding a Manual Sentimentor to a Study

As all other sentimentors, the Manual Sentimentors can be added to a study using the Designer-dialog.

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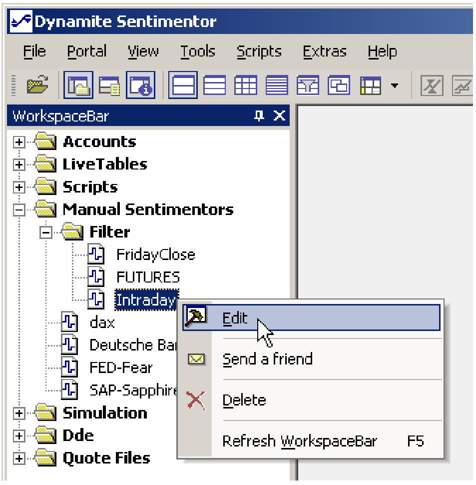
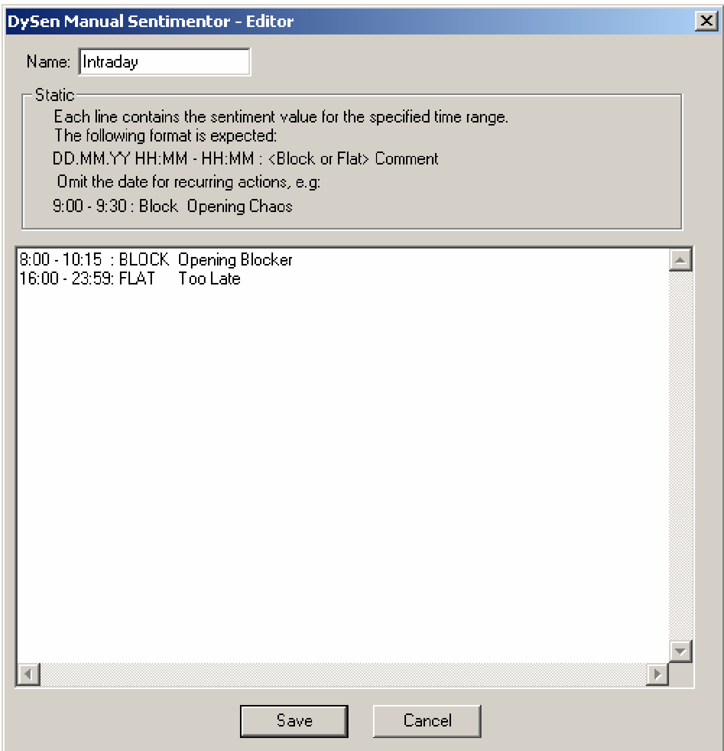
21.7 Manual Sentimentors used as Filters

Sometimes it is desired to exclude certain periods in time from trading, e.g., the opening phase of a trading session or the five minutes before and after import statistics are announced. In these periods all signals should be suppressed.

To achieve this Manual Sentimentors can be created as *Filters*:



Instead of sentiment values the symbolic names *FLAT* and *Block* are used:

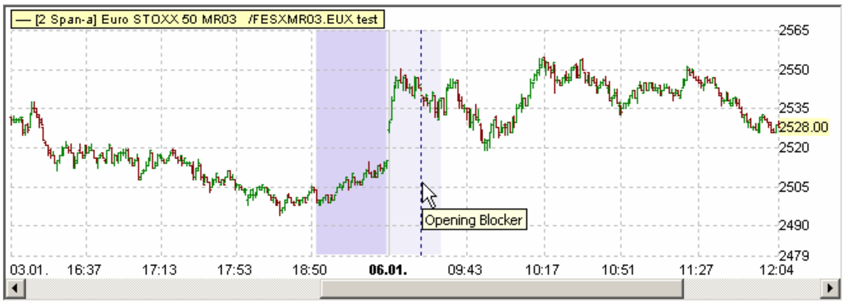


FLAT ensures that an open position is closed and that new entry signals are suppressed.

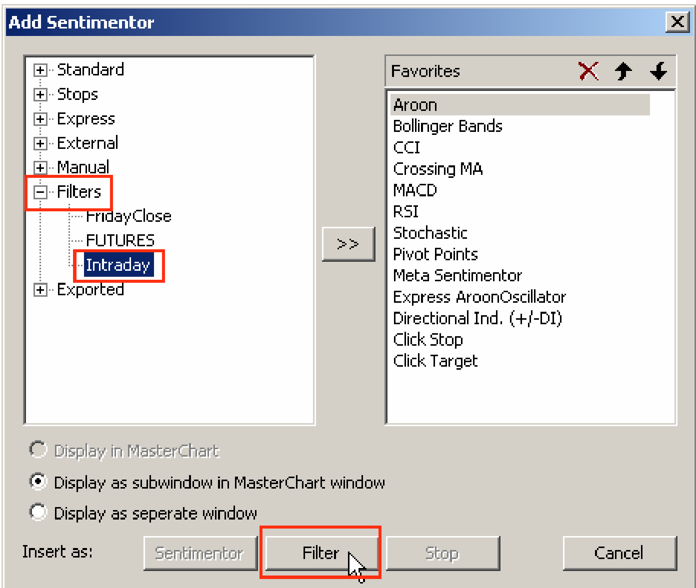
BLOCK is less restrictive in that open positions are left untouched until an exit signal occurs, but entry signals are suppressed.

In case the periods are repetitive, as in the example above, no date needs to be specified. If the period is bound to a specific date then the complete date and time need to be specified.

The MasterChart visualizes BLOCK and FLAT periods with light blue and blue:



These filter sentimentors are added to a study through the normal Add Sentimentor dialog:



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21.8 Creating a Manual Sentimentor with an External Tool

Manual Sentimentors can also be used to incorporate results of other programs or specific indicators into *WHS FutureStation.*

To enable this process, Manual Sentimentors are stored as plain ASCII files with the suffix `.sent`. Such a file must be stored in the ManSentisDir, which is by default a subdirectory of the installations directory.

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22 Parameters of the Trading Approaches

A trading approach defines how a sentiment series is used to generate signals. The generation scheme is driven by parameters that are also considered by the optimization.

22.1 Parameters of the *Trendsignals* approach

The *Trendsignals* approach relies on two parameters serving as thresholds.

Threshold Long: If a sentiment value hits or exceeds this threshold, a long signal is generated.

Threshold Short: If a sentiment value hits or falls below this threshold, a short signal is generated.

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22.2 Parameters of the *Trading* approach

The *Trading* approach relies on four parameters serving as thresholds an on a fifth parameter defining the “Trailing Stop”.

Threshold Long: If a sentiment value hits or exceeds this threshold, a long signal is generated.

Threshold Short: If a sentiment value hits or falls below this threshold, a short signal is generated.

Close Long: A long position is closed in case a sentiment value hits or falls below this threshold.

Close Short: A short position is closed in case a sentiment value hits or exceeds this threshold.

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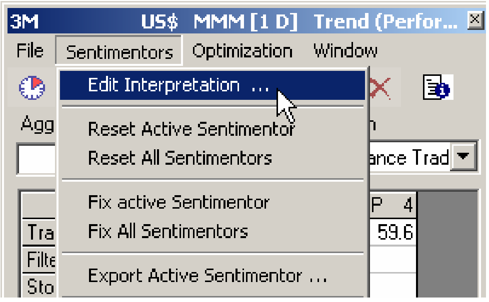
23 Determining the Sentiments

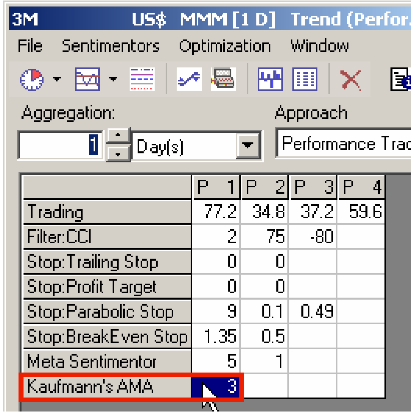
The conversion of an indicator into a sentiment series is called *interpretation.* A sentimentor is always a combination of an indicator (in its broadest sense) and an interpretaion. *WHS FutureStation* allows to define for nearly all sentimentors to configure their respective interpretation using simple to use dialogs.

In most of the cases the interpretation is performed using one of five standardized interpretation schemes. These schemes are explained in detail in the following sections.

The configuration dialog associated with a given sentimentor is opened by either doubleclicking the sentimentor in the Designer table or by first activating the sentimentor and then selecting Sentimentors|Edit Interpretation from the menu of the Designer dialog:



or



The principle way of working with an interpretation configuration dialog is described using the dialog for the interpretation scheme “Trigger Line”. The other dialogs work in exactly the same way. The provided screenshots show the default setting of the schemes used by *WHS FutureStation.*

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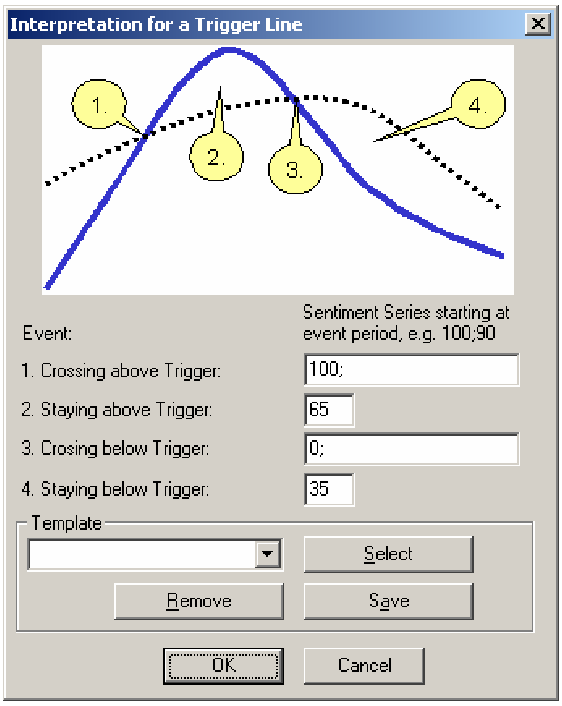
23.1 Interpretation Scheme: Trigger Line

The dialog for configuring the interpretation scheme Trigger Line looks as follows:



All dialogs for configuring an interpretation scheme are divided into three parts. The upper part contains a graphic explaining the scheme. The middle part consists of a number of fields for defining the sentiments, and the lower part allows provides functionality to work with *templates*.

The interpretation of an indicator is based on so-called *events*, e.g., the crossing of two lines or the entering of a curve into a zone. At the Trigger Line interpretation scheme these events are caused by two lines, as known from the classical “Crossing Moving Averages” sentimentor – here the slow moving average plays the role of the trigger.

The graphic of the configuration dialog shows four different events. The dotted line represents the trigger line.
Event 1 occurs whenever the trigger line is crossed from below. The sentiment used to signify this event is defined in the corresponding input field:

Analogously the sentiments can be defined for the events 2, 3, and 4. Recall that a sentiment is a value between 0 and 100.

The interpretation distinguishes between *primary* and *secondary* events. In the Trigger Line scheme, the crossing events (events 1 and 3) are the primary events. The sentiment input fields for primary events are larger as those for secondary events. For primary events, *WHS FutureStation* allows to specify the sentiment for the bar where the event occurred and for an arbitrary number of subsequent bars. This can be achieved by specifying several sentiments separated by semicolons:

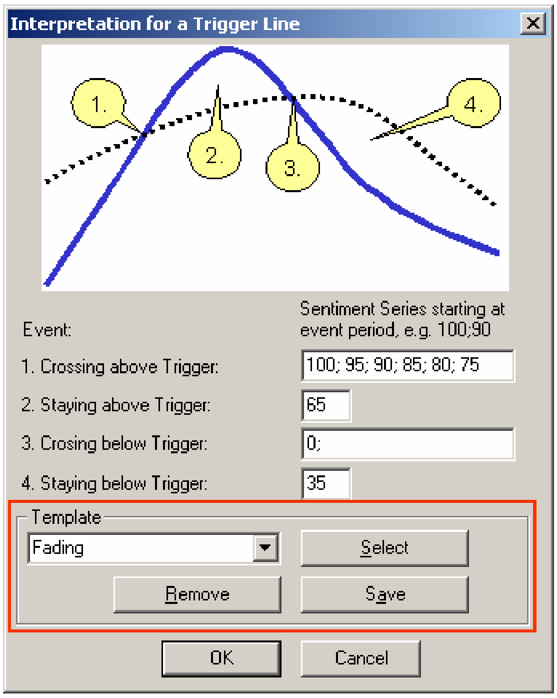
Using this specification the good sentiment of 100 would carry over to the two bars following the “event bar”. This technique is especially useful when combining several sentimentors that have to show similar sentiments at “roughly” the same bar.

A fading of the sentiment is also possible, as in:

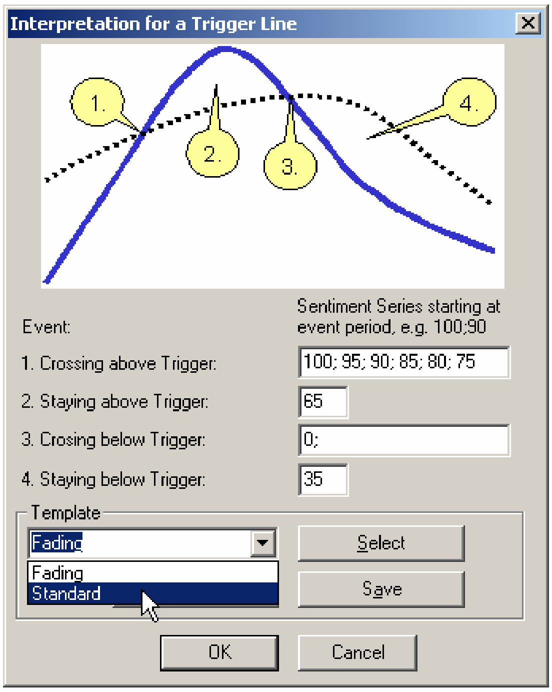
Such a sequence of sentiments can be stopped if a new primary event occurs, e.g., if two periods after an upward crossing of the trigger line a downward crossing occurs. Secondary events cannot stop a sequence originated by a primary event.

Working with Templates

Usually an interpretation configuration that has been defined with a certain idea in mind should be reusable in other sentimentors that apply the same interpretation scheme. For this reason *WHS FutureStation* allows to save a configuration setting as a *template*.



To save the current setting as a template, first specify a symbolic name and then click on the Save button. To load a template, select it from the list of available templates and click Select.



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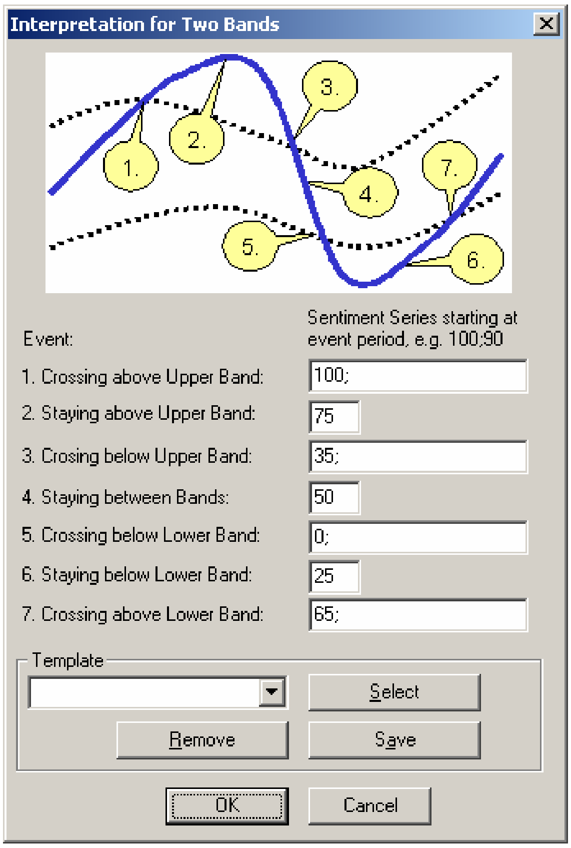
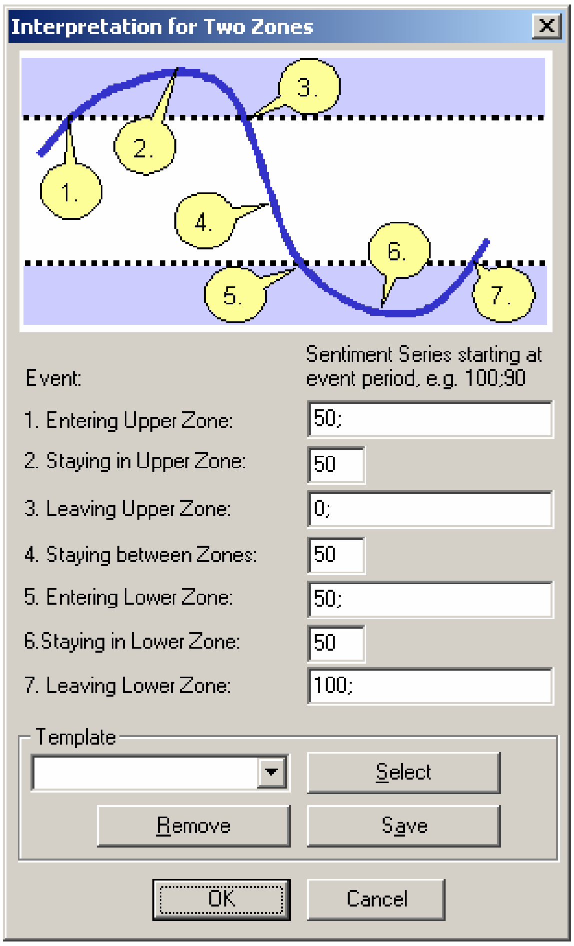
23.2 Interpretation Scheme: Bands



top

23.3 Interpretation Scheme: Two Zones



The interpretation scheme Zones uses two parameters “Threshold Up” and “Threshold Down” that are defined by the sentimentors using this scheme.

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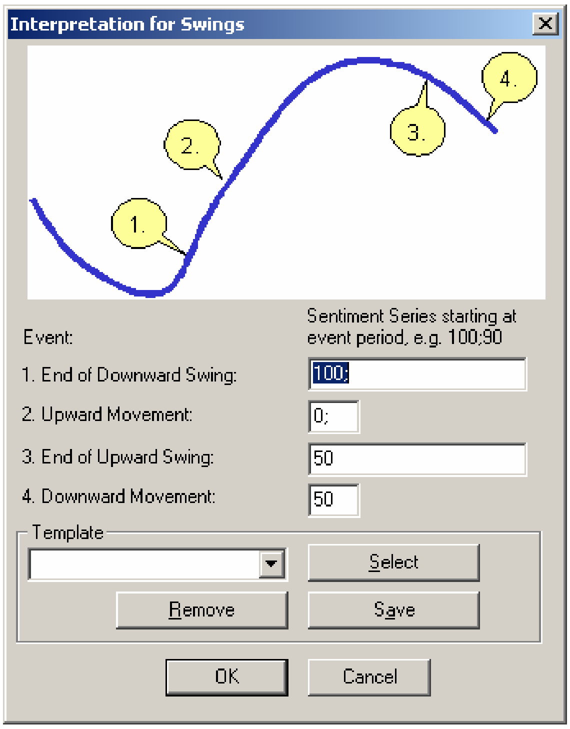
23.4 Interpretation Scheme: Swing



The interpretation scheme Swing relies on two parameters:

Span Left: examination range „before“ an extreme point

Span Right: examination range „after“ an extreme point

The end of a „Downward Swing“ (Event 1) is given, if the examined curve falls “Span Left” bars and then rises “Span Right” bars.

In “Upward Movement” occurs if the value of the current bar is greater than that of the previous bar.

“End of Upward Swing” and “Downward Movement” are defined analogously.

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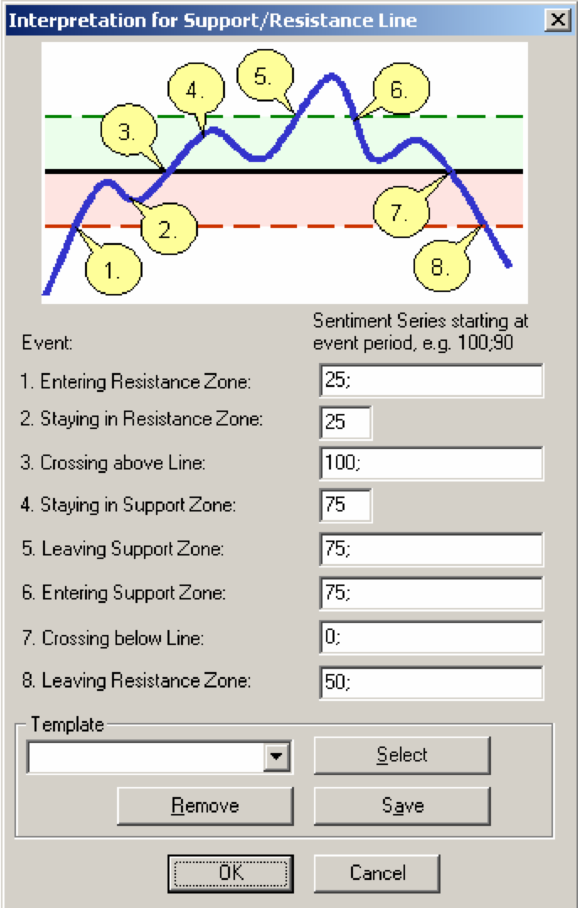
23.5 Interpretation Scheme: Support/Resistance



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24 Parameters of the Sentimentors

24.1 Meta Sentimentor

The role of the Meta Sentimentor is the computation of the overall sentiment based on the individual sentimentors constituting the study. To do this *WHS FutureStation* provides two different mechanisms:

- the computation of a weighted average of the sentiments
- the free definition of the Meta Sentiments based on simple logical expressions (*if then conditions*)

24.1.1 Meta Sentiments as Weighted Average

Computation:
First of all the weighted sum of the sentiment series of the sentimentors is computed. The weights to be used are defined by parameters. Then a moving average (MA) on the weighted sum is computed.

Parameter:
Smoothness-Span: speed of the MA

per sentimentor: the weight to be used for computing the weighted sum

Interpretation:
The moving average is the resulting sentiment series that will be used for generating signals by the trading approaches.

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24.1.2 Free Definition of the Meta Sentiments

Sometimes it is desirable to define the Meta Sentiment based on a number of “if then” conditions, e.g.

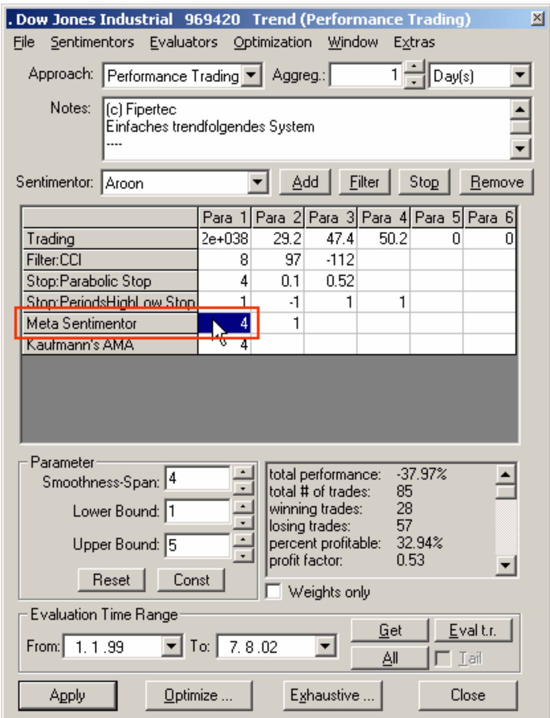
If the CCI indicates an upward trend and there is an upward crossing in the “Crossing Moving Average” sentimentor then the Meta Sentiment is 100.

These kind of conditions are commonly used in the “classical” approaches for defining trading systems.

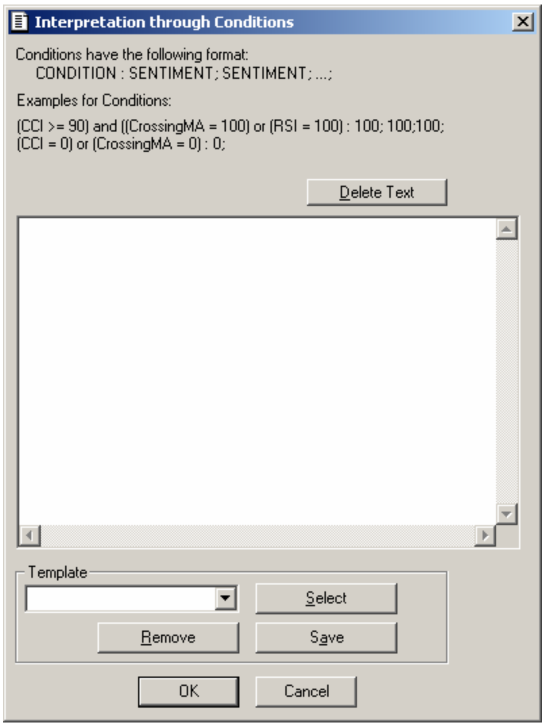
WHS FutureStation allows to define such rules by accessing the sentiments of sentimentors used in the study.

Starting the Condition Editor

The Condition Editor is started by double clicking the Meta Sentimentor in the Designer table:



The Editor looks as follows:



Format of a Condition

A condition, also called a *logical expression,* has the following general format:

<condition> : sentiment ;

To state a *condition*, the following elements can be used:

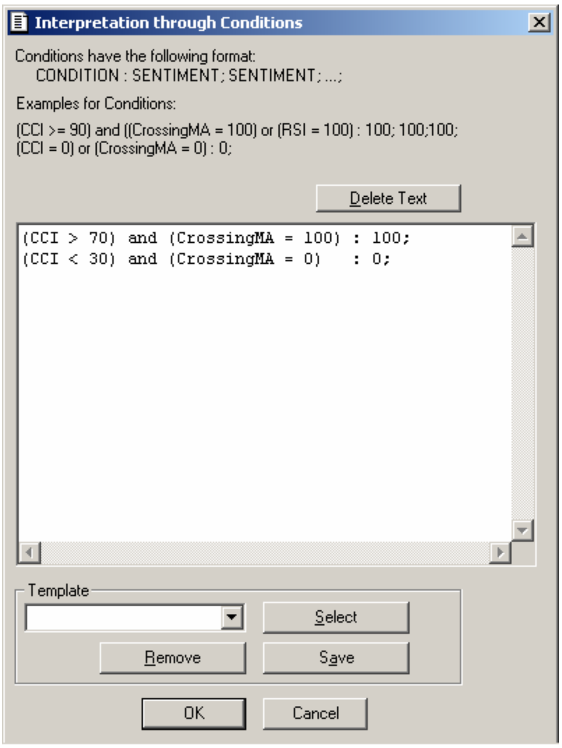
- The name of a Sentimentor used in the study. Such a name represents the sentiment value of the respective sentimentor at the currently processed bar.
  Some names of Sentimentors contain spaces of special characters – for referring such a Sentimentor, these characters have to be omitted, e.g. “Crossing MA” is referenced by `CrossingMA` and “Directional Ind. (+/-DI)“ by „`DirectionalIndDi`“.
  The names are not case sensitive, i.e., you may use capital or lower characters at your wish.
- The relational operators
  `>` greater than
  `<` less than
  `>=` greater than or equal
  `<=` less than or equal
- The logical operators `AND` and `OR`.
- The numbers 0 – 100 as the sentiment values.
- Parenthesis to group expressions

Here is an example for a complete condition:

```
(CCI > 70) and (CrossingMA = 100) : 100;
```

The condition `(CCI > 70) and (CrossingMA = 100)` refers the sentiments of the CCI Sentimentor and „Crossing MA" Sentimentor. The resulting Meta Sentiment, in case the condition is met, is defined as 100. This sentiment value is separated from the condition by a colon. Finally, a condition is ended by a semicolon.

An arbitrary number of conditions can be defined:



Evaluation of the Conditions

WHS FutureStation computes the Meta Sentiments beginning with the first bar (the „leftmost" bar) and then moving bar by bar to the final bar.

For each bar the defined conditions are checked in the order of their definition. In case a condition is met then the sentiment defined for this condition becomes the Meta Sentiment and the subsequent conditions are ignored.

In case no condition is met for a given bar, then the Meta Sentiment for this bar is set to 50, i.e. neutral.

Assigning Multiple Sentiments

If a condition is met that represents a *strong* signal, then sometimes it is interesting to assign a Meta Sentiment not only for the given bar where the signal occurred, but also to some following periods. Thus, a signal can be converted into a trading action even some bars after its initial occurrence in case the general condition, like filters or confirmation prices, are also met.

Using the notation

<condition> : sentiment ; sentiment ; ... sentiment ;

the Meta Sentiment is assigned to the actual period and the subsequent periods.

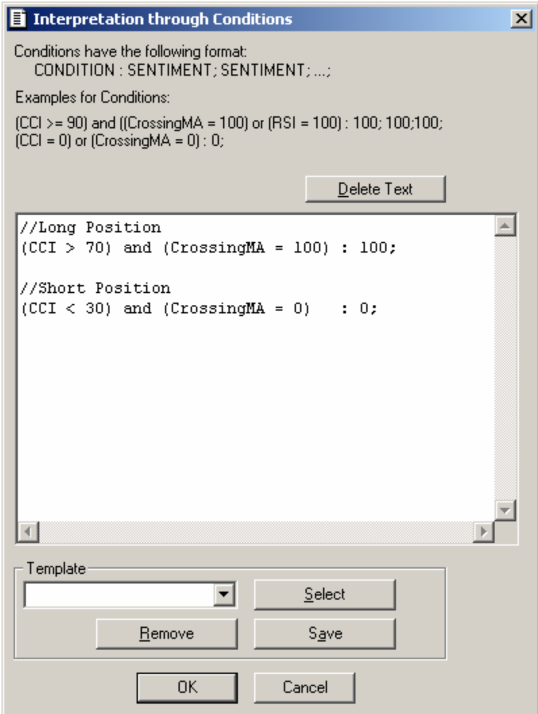
Example:

```
(CCI > 70) and (CrossingMA = 100) : 100; 100; 100;
```

In this example, the signal is “valid” for three periods.

Comments

The Condition Editor interprets all characters following an double slash `//` until the end of the line as a comment. Comments can be used to structure the conditions and to make them more readable.



Using multiple Instances of one Sentimentor Type

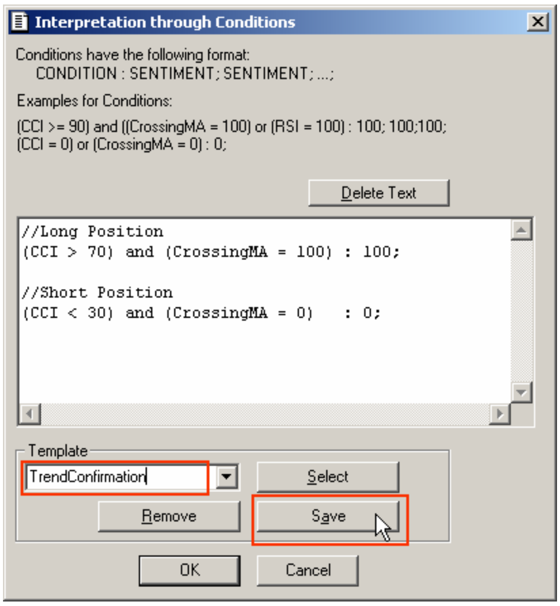
If a study uses multiple sentimentors of the same type, e.g., two RSI sentimentors, then referring to these sentimentors requires an indexing:

```
(RSI1 > 70) and (RSI2 > 50) : 100;
```

The first (up most) RSI Sentimentor in the Designer table is denoted `RSI1`, the second `RSI2`, and so forth.

Templates

Once a set of conditions has been specified it can be saved as a *template* for reusage in other studies. To do this, enter a symbolic name for the template and then click on the Save button:



Switching back to the Weighted Average

To change back from the conditions to the Weighted Average scheme, simply delete all conditions (probably after saving them as a template). This can be done most easily by clicking the Delete Text button.

When quitting the dialog by clicking OK *WHS FutureStation* will change to the Weighted Average computation.

top

24.2 Sentimentors Based on Technical Indicators

Each sentimentor relying on a technical indicator will be described by its computation, its parameters, and the generation of the sentiment values. The generation of a sentiment value is always discussed with respect to a specific date *t*. In order to keep the description easy, we will not mention this fact explicitly any more.

24.2.1 ADX

The ADX is a trend indicator that merely states the strength of a trend, but not the trend direction. Therefore, the ADX can only be used as a *blocker*, i.e., in case the ADX shows the existence of a trend, enter signals in both directions are passed, otherwise enter signals are blocked.

Computation:
plusDM[i] = max(high[i] – high[I-1], 0)

minusDM = max(low[I] – low[I-1], 0)

trueRange[I] = max (close[i-1], high[i]) - min (close[i-1], low[i]);

sumPlusDM = sum over the last *Span* plusDM-values

sumMinusDM = sum over the last *Span* minusDM-values sumTrueRange = sum over the last *Span* trueRange -values

plusDI = 100 * sumPlusDM / sumTrueRange

minusDI = 100 * sumMinusDM / sumTrueRange

averagePlusDI = MA over the last *Span DM* days of plusDI

averageMinusDI = MA over the last *Span DM* days of minusDI

DMI = 100 * abs (plusDI – minusDI) / (plusDI + minusDI)

ADX = MA over DMI with length *Span ADX*

Parameter:
Span: number of days to consider for computing the DMI

DM Span: speed of the MA for averagePlusDI and averageMinusDI

ADX Span: speed of the MA for the ADX

Trend Threshold: values above the threshold indicate a trend

Interpretation:
ADX >= Trend Threshold: enter signals are passed

ADX < Trend Threshold: enter signals are blocked

top

24.2.2 Aroon

Computation:

i_{max} = number of days since the maximum of the last *Span* days occurred

i_{min} = number of days since the minimum of the last *Span* days occurred

bandMax = 100 * (*Span* - i_{max}) / *Span*
bandMin = 100 * (*Span* - i_{min}) / *Span*

Parameter:
Span: number of days to consider

Threshold: Aroon-threshold

Interpretation:
bandMax crosses the threshold from below and bandMin < threshold: sentiment value = 100

bandMax crosses the threshold from below and bandMin crosses the threshold from above: sentiment value = 100

bandMin crosses the threshold from above and bandMax > threshold: sentiment value = 75

bandMin < threshold and bandMax > threshold: sentiment value = 75

bandMin crosses the threshold from above and bandMax < threshold: sentiment value = 65

bandMax crosses the threshold from above and bandMin < threshold: sentiment value = 35 bandMax < threshold and bandMin > threshold: sentiment value = 25

bandMax crosses the threshold from above and bandMin > threshold: sentiment value = 25

bandMin crosses the threshold from below and bandMax crosses the threshold from above: sentiment value = 0

bandMin crosses the threshold from below and bandMax < threshold: sentiment value = 0

otherwise: sentiment value = 50

top

24.2.3 Bollinger Bands

Computation:

MA = moving average over the last *Span* days

s = standard deviation over the last *Span* days

bandUp = $close_t$ + Factor (1/10 StdDev) * s

bandDown = $close_t$ - Factor (1/10 StdDev) * s

Parameter:
Span: number of days to consider for the moving average and the standard deviation

Factor (1/10 StdDev): factor for the width of the bands, measured in 1/10 of the standard deviation

Interpretation:

close crosses bandUp from below: sentiment value = 100

close > bandUp: sentiment value = 75

close crosses bandDown from below: sentiment value = 65

close crosses bandUp from above: sentiment value = 35

close < bandDown: sentiment value = 25

close crosses bandDown from above: sentiment value = 0

otherwise: sentiment value = 50

top

24.2.4 CCI – Channel Commodity Index

Computation:
1.) $\mathbf{X}_t = (High_t + Low_t + Close_t) / 3$ the so-called „significant quote“

2.) MA(X) = Moving Average of the significant quote

3.) $sX_t = (abs(X_t - MA(X)_t) + abs(X_{t-1} - MA(X)_t) + \dots + + abs(X_{t-n+1} - MA(X)_t))/n$ standard deviation of the significant quote

4.) $CCI_t = (X_t - MA(X)_t) / (0.015 * sX_t)$

Parameter:
Span: Parameter *n* used in the computation

Threshold Up-Trend: CCI-threshold indicating an upward trend

Threshold Down-Trend: CCI-threshold indicating an downward trend

Interpretation:
CCI crosses the „Threshold Up-Trend“ from below => sentiment value = 100

CCI crosses the „Threshold Up-Trend“ from above => sentiment value = 40

CCI > „Threshold Up-Trend“ => sentiment value = 75

CCI crosses the „Threshold Down-Trend“ from above => sentiment value = 0

CCI crosses the „Threshold Down -Trend“ from below => sentiment value = 60

CCI < „Threshold Down -Trend“ => sentiment value = 25

Otherwise: sentiment value = 50

top

24.2.5 Channel Breakout

Computation:
First of all, a moving average (MA) of the close quotes is computed. Then the highest and lowest quotes per period are determined

Parameter:

Smoothness Span: speed of the MA

Period Length: length of the period for computing the highs and lows.

New Highs Long: number of required subsequent highs until a positive breakout is stated

New Lows Short: number of required subsequent lows until a negative breakout is stated.

Interpretation:
positive breakout: sentiment = 100

negative Breakout: sentiment = 0

else:
The sentiment is determined by the relative position of the smoothed close quote with respect to the periods high and low mapped onto the sentiment interval [35 –65], i.e.
$\text{sentiment}_t = 35 + (MA_t - \text{period low}_t) / (\text{period high}_t - \text{period low}_t) * 30$

top

24.2.6 Crossing MA

Computation:
Two moving averages with a different speed are computed from the close prices.

Parameter:

Fast MA Span: speed of the fast MA

Slow MA Span: speed of the slow MA

Interpretation:
slow MA > fast MA: sentiment value = 35

slow MA <= fast MA: sentiment value = 65

fast MA crosses the slow MA from below: sentiment value = 100

fast MA crosses the slow MA from above: sentiment value = 0

top

24.2.7 Directional Ind. (+/-DI)

Computation:
plusDM[i] = max(high[i] – high[I-1], 0)

minusDM = max(low[I] – low[I-1], 0)

trueRange[I] = max (close[i-1], high[i]) - min (close[i-1], low[i]);

sumPlusDM = sum over the last *Span* plusDM-values

sumMinusDM = sum over the last *Span* minusDM-values

sumTrueRange = sum over the last *Span* trueRange -values

plusDI = 100 * sumPlusDM / sumTrueRange

minusDI = 100 * sumMinusDM / sumTrueRange

averagePlusDI = MA over the last *Span* days of plusDI

averageMinusDI = MA over the last *Span* days of minusDI

Parameter:
Span: number of days to consider

MA Span: speed of the MA

Interpretation:
averagePlusDI crosses averageMinusDI from below: sentiment value = 100

averagePlusDI crosses averageMinusDI from above: sentiment value = 0

averagePlusDI > averageMinusDI: sentiment value = 65

averagePlusDI < averageMinusDI: sentiment value = 35

otherwise: sentiment value = 50

top

24.2.8 DMI – Dynamic Momentum Index

Computation:

s = standard deviation over the last *Deviation Span* days

S = MA over the last *Smoothness Span* days of s

T = INT (14 * S / s)

RS = (sum of the ascending close-values of the last T days) / (sum of the descending close-values of the last T days)

RSI = 100 – (100 / (1 + RS))

Parameter:

Deviation Span: number of days to consider for the standard deviation

Smoothness Span: speed of the MA

Overbought Threshold: threshold for the overbought region

Oversold Threshold: threshold for the oversold region

Interpretation:
DSI-curve leaves the overbought region => sentiment value = 0

DSI-curve leaves the oversold region => sentiment value = 100.

Otherwise: sentiment value = 50

top

24.2.9 DSS – Double Smoothed Stochastik

Computation:

$$low[i] = \min_{j=0..Span-1} close[j]$$

$$high[i] = \max_{j=0..Span-1} close[j]$$

$$DSS = 100 \cdot \frac{XMA_{1.EMA-Span}\left(XMA_{2.EMA-Span}\left(close - low\right)\right)}{XMA_{1.EMA-Span}\left(XMA_{2.EMA-Span}\left(high - low\right)\right)}$$

Parameter:

Span: number of days to consider for the computation of the maximums and minimums

1.EMA-Span: speed of the first EMA

2.EMA-Span: speed of the second EMA

Threshold Up: threshold for the overbought region

Threshold Down: threshold for the oversold region

Interpretation:
DSS-curve leaves the overbought region => sentiment value = 0

DSS-curve leaves the oversold region => sentiment value = 100.

Otherwise: sentiment value = 50

top

24.2.10 KAMA - Kaufmann's Adaptive Moving Average

Computation:

$$efratio[i] = \frac{|close[i] - close[i - span]|}{\sum_{j=i-span+1}^{i} |close[j] - close[j-1]|}$$

$$const\ FASTEST = \frac{2}{2+1}$$

$$const\ SLOWEST = \frac{2}{30+1}$$

$$smoothed[i] = (efratio[i] * (FASTEST - SLOWEST) + SLOWEST)^2$$

$$KAMA[i] = KAMA[i-1] + smoothed[i] \cdot (close[i] - KAMA[i-1])$$

Parameter:

Span: number of days to consider

Interpretation:
close crosses KAMA from below: sentiment value = 100

close crosses KAMA from above: sentiment value = 0

close > KAMA: sentiment value = 65

close < KAMA: sentiment value = 35

Otherwise: sentiment value = 50

top

24.2.11 Linear Regression

Computation:

A linear fit is calculated through the last *Smoothness Span* days. The value of this linear regression is calculated for the current day and stored in %regression.

A moving average over the last *Span* days is also calculated and stored in %Smoothed.

Parameter:
Span: number of days for the linear regression

Smoothness Span: speed of the MA

Interpretation:
%smoothed crosses %regression from below: sentiment value = 100

%smoothed crosses %regression from above: sentiment value = 0

%smoothed > %regression: sentiment value = 65

%smoothed < %regression: sentiment value = 35

Otherwise: sentiment value = 50

top

24.2.12 Local Highs & Lows

Computation:
A MA from the close quotes is computed.

Parameter:

Smoothness Span: Speed of the MA

Span Left: examination range „before“ an extreme point

Span Right: examination range „after“ an extreme point

Interpretation:
There exists a *local high* at the date *t,* if for „span left“ days before *t* the smoothed close quotes are ascending and for „span right“ days after *t* the smoothed close quotes are descending.
A *local low* is defined analogously.

local high at date *t*: sentiment value = 0 at date *t* + „Span Right“

local low at date *t*: sentiment value = 100 at date *t* + „Span Right“

otherwise: sentiment value = 0

top

24.2.13 MACD

Computation:
Computation of the difference of two exponential moving averages (EMA) of the close quotes as well as an EMA on that difference. The latter EMA is called the „trigger“.

Parameter:
EMA diff fast: speed of the fast EMA used for computing the difference

EMA diff slow: speed of the slow EMA used for computing the difference

EMA: speed of the „trigger“ EMA

Interpretation:
EMA diff > Trigger: sentiment value = 65

EMA diff < Trigger: sentiment value = 35

EMA diff crosses Trigger from below: Sentiment value = 100

EMA diff crosses Trigger from above: Sentiment value = 0

top

24.2.14 MACD-Histogram

Computation:
Like MACD, but finally the difference between „EMA diff“ and the „Trigger“ is computed.

Parameter:
EMA diff fast: see MACD

EMA diff slow: see MACD

EMA: see MACD

Span Left: see „Local Highs & Lows“

Span Right: see „Local Highs & Lows“

Interpretation:
The sentiment values are derived from the extreme points of the computed difference applying the scheme as described for „Local Highs & Lows“.

top

24.2.15 Momentum

Computation:
First of all a MA on the close quotes is computed. The Momentum for date *t* is then computed as

$$MOM_t = ((MA_t / MA_{t-1}) - 1) * 100$$

Parameter:
Smoothness Span: speed of the MA

Span Left: see „Local Highs & Lows“

Span Right: see „Local Highs & Lows“

Interpretation:
The sentiment values are derived from the extreme points of the computed Momentum applying the scheme as described for „Local Highs & Lows“.

top

24.2.16 Moving Average

Computation:

$$average[i] = \frac{1}{Span} \cdot \sum_{j=i-Span+1}^{i} close[i]$$

Parameter:
Span: number of days

Interpretation:
close crosses average from below: sentiment value = 100

close crosses average from above: sentiment value = 0 close > average: sentiment value = 65

close < average: sentiment value = 35

Otherwise: sentiment value = 50

top

24.2.17 On-Balance-Volume

Computation:
$OBV_0 = 0$
If Close today > Close yesterday:
OBV today = OBV yesterday + volume today

If Close today < Close yesterday:
OBV today = OBV yesterday - volume today

else
OBV today = yesterday

On the OBV a MA is computed.

Parameter:
Smoothness Span: speed of the MA of OBV

Span Left: see „Local Highs & Lows“

Span Right: see „Local Highs & Lows“

Interpretation:
The sentiment values are derived from the extreme points of the computed MA applying the scheme as described for „Local Highs & Lows“.

top

24.2.18 PFE – Polarized Fractal Efficiency

Computation:

$$PFE\_unsigned[i] = \frac{\sqrt{(close[i] - close[i-span])^2 + span^2}}{\sum_{j=i-span+1}^{i} \sqrt{(close[j] - close[j+1])^2 + 1}}$$

$$PFE[i] = \begin{cases} PFE\_unsigned[i] & for\ close[i] > close[i-span] \\ -PFE\_unsigned[i] & otherwise \end{cases}$$

smoothed = MA over the last *Smoothness Span* days of PFE

Parameter:
Span: number of days considered in the PFE

Threshold Buy: threshold for the overbought region

Threshold Sell: threshold for the oversold region

Smoothness Span: speed of the MA

Interpretation:
smoothed crosses *Threshold Buy* from below: sentiment value = 100

smoothed > *Threshold Buy:* sentiment value = 75

smoothed crosses *Threshold Buy* from above: sentiment value = 40

smoothed crosses *Threshold Sell* from above: sentiment value = 60

smoothed > *Threshold Sell*: sentiment value = 25

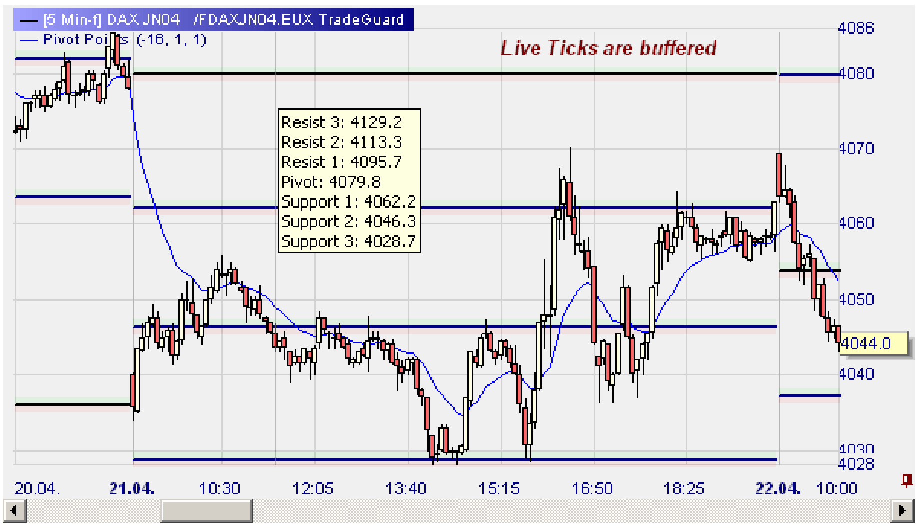
smoothed crosses *Threshold Sell* from below: sentiment value = 0

Otherwise: sentiment value = 50

top

24.2.19 Pivot-Points

The Pivot Points are computed based on the previous' day trading range. Quite often they mark significant support/resistance levels for the actual trading day.



The visualization displays the support/resistance lines at the level of the Pivot Points. Moreover, a moving average of the close is displayed. This MA is used for generating the signals. In case the span of the MA is set to 0, the MA is not drawn and the close prices of the bars are taken for the signal generation.

Computation:

Pivot = (PrevDayHigh + PrevDayLow + PrevDayClose) / 3

Resist 3 = 2 * (P – PDL) + PDH
Resist 2 = P + (PDH – PDL)
Resist 1 = (2 * P) – PDL
Support 1 = (2 * P) – PDH
Support 2 = P – (PDH – PDL)
Support 3 = 2 * (P – PDH) + PDL

Parameter:
Span: speed of the MA

Support-Delta: absolute price value for defining the support zone (0 = no support zone)

Resist-Delta: absolute price value for defining the resist zone (0 = no resist zone)

Interpretation: Scheme „Support/Resistance“, whereby the MA is used for generating the signals.

24.2.20 Point & Figure

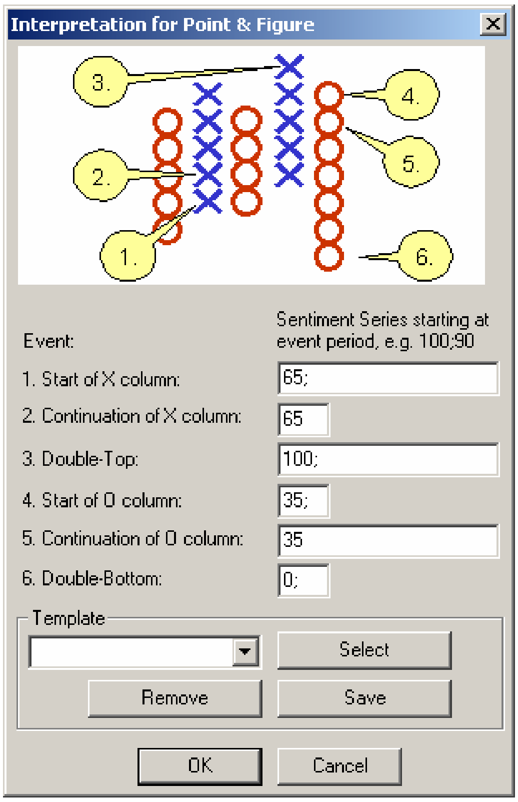
The Point & Figure technique transforms the given price data in a specific way in order to just show “significant” price moves.

Parameter:
Box-Size: Defines the size of a box. In case this value is given as a positive number it is interpreted as an absolute price value. A negative number is interpreted as a percentage.

Reversal Amount: Required minimum change in boxes in order to signal a trend reversal.

HiLo; Close: Defines if the boxes are calculated based on the High/Lows or on the Close price. (Choose 0 for High/Low; choose 1 for Close).

Interpretation: The interpretation can be defined through the “Point & Figure” scheme:



top

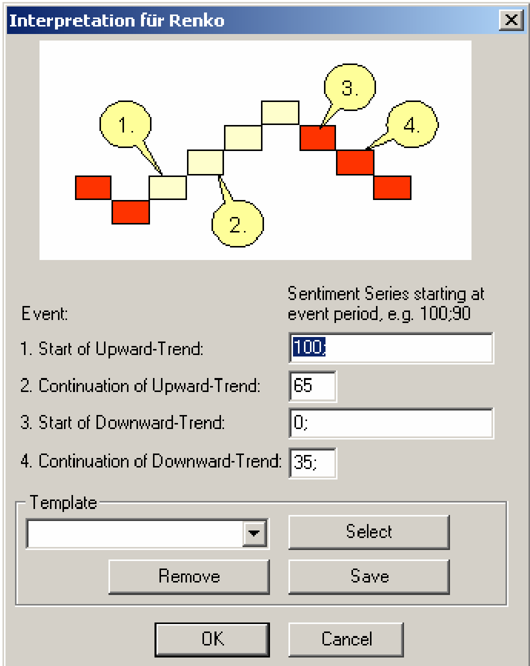
24.2.21 Renko

The Renko technique transforms the given price data in a specific way in order to just show “significant” price moves.

Parameter:
Box-Size: Defines the size of a box. In case this value is given as a positive number it is interpreted as an absolute price value. A negative number is interpreted as a percentage.

Reversal Amount: Required minimum change in boxes in order to signal a trend reversal.

Interpretation: The interpretation can be defined through the “Renko” scheme:



top

24.2.22 RSI

Computation:
RS = (sum of the quote gains of the last „Span“ days) / (sum of the quote losses of the last „Span“ days)

RSI = 100 – (100 / (1 + RS))

Parameter:
Span: number of days to consider

Overbought Threshold: threshold for the overbought region

Oversold Threshold: threshold for the oversold region

Interpretation:
RSI-curve leaves the overbought region => sentiment value = 0

RSI-curve leaves the oversold region => sentiment value = 100.

Otherwise: sentiment value = 50

top

24.2.23 RSI-smoothed

Computation:
RS = (sum of the quote gains of the last „Span“ days) / (sum of the quote losses of the last „Span“ days)

RSI = 100 – (100 / (1 + RS))

RSI-smoothed = MA over the last *Smoothness Span* days of RSI

Parameter:
Span: number of days to consider

Overbought Threshold: threshold for the overbought region

Oversold Threshold: threshold for the oversold region

Smoothness Span: speed of the MA

Interpretation:
RSI-smoothed-curve leaves the overbought region => sentiment value = 0

RSI- smoothed -curve leaves the oversold region => sentiment value = 100.

Otherwise: sentiment value = 50

top

24.2.24 Slow Stochastic

Computation:
%K = (close – low_{Span}) * 100 / ($high_{Span}$ – low_{Span})

%Fast = MA over the last *Span %K* days of %K

%Slow = MA over the last *Span %D* days of %Fast

%D = (2 * %Fast + %Slow) / 3

where low_{Span} is the minimum over close of the last *Span days and* $high_{Span}$ is the maximum over close of the last *Span days.*

Parameter:
Span %K: number of days considered to calculate %K

Span %D: speed of MA for %Slow and %Fast

Overbought Threshold: threshold for the overbought region

Oversold Threshold: threshold for the oversold region

Interpretation:
%D leaves overbought region => sentiment value = 0

%D leaves oversold region => sentiment value = 100

Otherwise: Sentiment value = 50

top

24.2.25 Stochastic

Computation:
%K = (close – low_{Span}) * 100 / ($high_{Span}$ – low_{Span})

%D = MA of %K

with low_{Span} denotes the low of the last *Span* days, and $high_{Span}$ denotes the high of the last *Span* days.

Parameter:
Span %K: span in days for the %K-computation

Span %D: speed of the %D MA

Overbought Threshold: threshold for the overbought region

Oversold Threshold: threshold for the oversold region

Interpretation:
%D leaves overbought region => sentiment value = 0

%D leaves oversold region => sentiment value = 100

Otherwise: Sentiment value = 50

top

24.2.26 Williams' Variable Accumulation Distribution (WVAD)

Computation:
The WAVD is calculated iteratively:

$$WVAD[i] = WVAD[i-1] + \frac{close[i] - open[i]}{high[i] - low[i]} \cdot volume[i]$$

After that two moving averages are calculated over the WAVD:

%Fast = MA over the last *Fast MA-Span days of WVAD*

%Slow = MA over the last *Slow MA-Span days of WVAD*

Parameter:
Fast MA-Span: speed of the fast MA

Slow MA-Span: speed of the slow MA

Interpretation:
%Slow crosses %Fast from below: Sentiment value = 100

%Slow crosses %Fast from above: Sentiment value = 0

%Slow > %Fast: Sentiment value = 65

%Slow < %Fast: Sentiment value = 35

Otherwise: Sentiment value = 50

24.2.27 Volume

The Volume sentimentor can only be used as a *blocker*, i.e., in case the Volume exceeds a threshold, enter signals in both directions are passed, otherwise enter signals are blocked.

Computation:
No computation

Parameter:
Threshold: necessary volume to let enter signals pass

Vol * 10^x: determines the multiplier for the Threshold (see below).

Span: speed of the volume MA.

As the volume may range from several contracts to a daily volume of several million shares, the given Threshold is multiplied with a power of 10 – this allows to work with a small number that fits well into the Designer-table. The following table gives some examples:

10^x	Multiplier
0	1
1	10
2	100
3	1.000
4	10.000
5	100.000
6	1.000.000

Thus:

Threshold Para	x	Resulting Threshold
25	1	25
3	3	3.000
500	3	500.000
2	6	2.000.000

Interpretation:
MA of Volume >= Threshold: enter signals are passed

MA of Volume < Threshold: enter signals are blocked

top

24.3 Candle Stick

24.3.1 Visualization of Candle Stick patterns

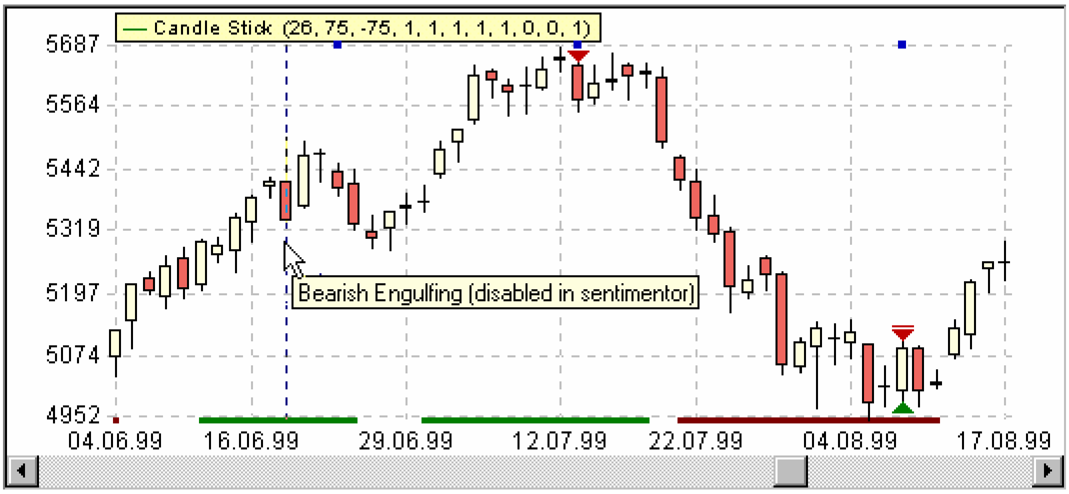
Most of the candle stick patterns are need to appear in a certain trend in order to be significant. Therefore, the Candle Stick sentimentor works in two phases: It starts with determining trends using the CCI indicator, followed by searching for certain candle stick patterns. A pattern is only taken into account if it occurs within the required trend.

WHS FutureStation uses some specific visualization techniques to make this two-phase approach as transparent as possible. Let's have a look at the following screenshot:

First of all, above the date axis red and green lines are displayed to indicate the current trend. A green line is used for up trends, a red line for down trends. If no line is displayed, we have a trendless phase.

When moving the mouse over the candle sticks, *WHS FutureStation* displays all recognized patterns in popup windows. In case a pattern is not taken into account for generating sentiments, the popup also displays the reason for this exclusion. This might be, because the pattern does not lie within the correct trend:

… or because the pattern has been deactivated in the sentimentor:

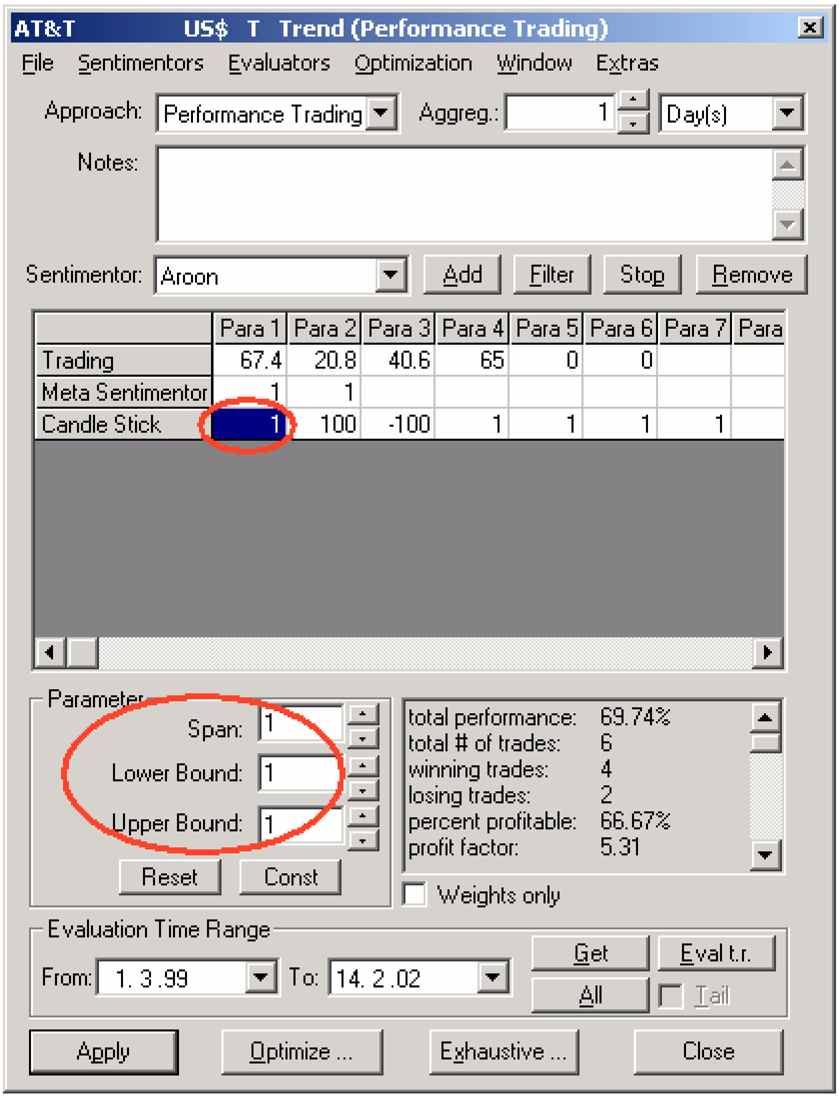


To see at a glance where valid patterns have been recognized that have been taken into account for generating sentiments, *WHS FutureStation* draws little blue squares at the top of the value scale: (Note that recognizing a pattern does not automatically lead to a signal, e.g., if the system is already invested in the corresponding direction.)

top

24.3.2 Deactivation of the Trend Component

To deactivate the trend component of the Candle Stick sentimentor, simply fix the first parameter to a value of 1:



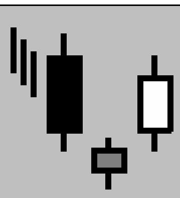
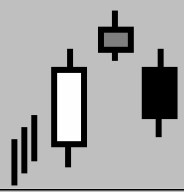
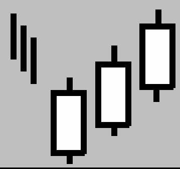
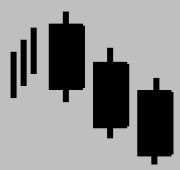
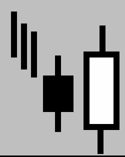
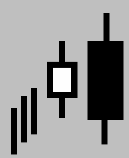
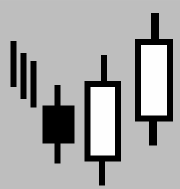
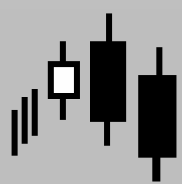
top

24.3.3 The Recognized Candle Stick Patterns

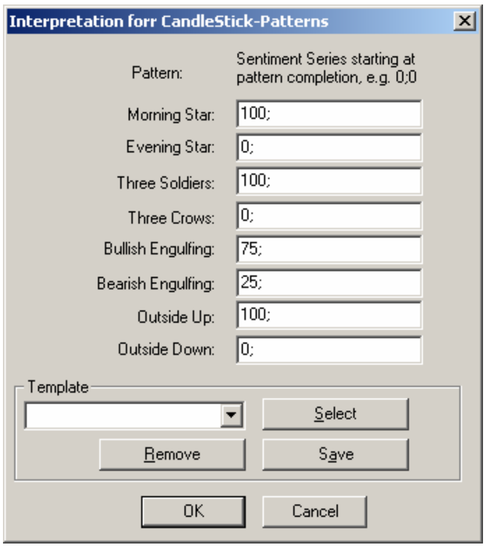
All of the recognized patterns indicate a trend reversal. The sentiment value is generated for the day a pattern has been completed.

If no pattern is completed for a given day, the sentiment value is set to neutral (50) at that day.

Name	Pattern	Sentiment

Morning Star		100
Evening Star		0
Three Soldiers		100
Three Crows		0
Bullish Engulfing		75
Bearish Engulfing		25
Outside Up		100
Outside Down		0

The sentiments can be configured in the sentiment editor:



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24.3.4 The Parameters of the Candle Stick Sentimentor

The first three parameters are the same as described for the CCI-Sentimentor. If the „Threshold Up-Trend“ is exceed, an up trend is stated and vice versa for the „Threshold Down-Trend“.

The other parameters refer respectively to candle stick patterns. If a parameter is set to 1, the corresponding pattern taken searched for. If set to zero, the corresponding pattern is ignored.

Parameter:
Span: Parameter *n* used in the computation. A value of 1 deactivates the trend component such that a pattern is stated independently of the current trend.

Threshold Up-Trend: CCI-threshold indicating an upward trend

Threshold Down-Trend: CCI-threshold indicating an downward trend

Morning Star: search = 1; ignore = 0

Evening Star: search = 1; ignore = 0

Three Soldiers: search = 1; ignore = 0

Three Crows: search = 1; ignore = 0

Bullish Engulfing: search = 1; ignore = 0

Bearish Engulfing: search = 1; ignore = 0

Outside Up: search = 1; ignore = 0

Outside Down: search = 1; ignore = 0

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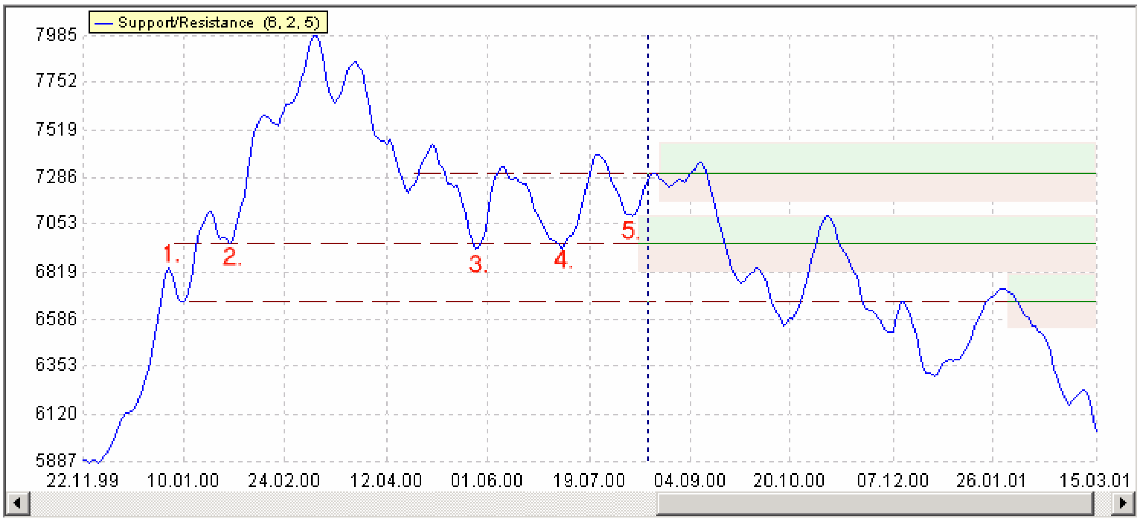
24.4 Support/Resistance-Sentimentor

24.4.1 The Computation of Support/Resistance-Lines

The support/resistance sentimentor computes price levels that can be interpreted as support/resistance lines. If the quotes approach such a price level from above the level is interpreted as a support line and it is assumed that the prices do not fall below this level. Analogously such a price level is interpreted as a resistance line if the prices approach this level from below.

Before a price level is interpreted as a support/resistance line the prices have to show several turnarounds “near” this level. “Near” means the price must be contained inside an *x*-percent interval of the price level in question. A turnaround is defined as two ascending prices followed by two descending prices. The low or top of a turnaround has be near the price level.
This method of computing support/resistance lines ensures that the interpretation is always independent from the future.

The following example shows the computation of a support/resistance line, where “near” is defined as a 2% interval and 5 turnarounds are required before the line is established and taken into account for interpretation:



The numbering shows the five required turnarounds near the support/resistance line. (Note that a turnaround is finished two days after the respective high or low. This is reflected in the graphic.)

As long as the line does not show enough tests, it is drawn as a dashed line. When it becomes a valid line after the fifth test its support region is visualized with green and the resistance region with red.

In order to have some meaningful interpretation of the support/resistance lines for a security it is necessary that their respective support/resistance regions do not overlap. If this is the case for a pair of lines that one with the most hits is taken. If both lines have the same number of hits the line is taken that reaches the minimal required hits earlier.

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24.4.2 Using the Support/Resistance-Sentimentors in Constant Studies

By construction of the support/resistance lines it may happen that the computed lines change after updating the price data. This may happen if the new price data contains some turnarounds that lead to a displacement of previously established lines. Hence, this may result in new sentiment values for the past so that the signal series may change.

In the case that a once optimized study should be used without re-optimization for a longer period this may lead to unpleasant results. Hence, you should not use the support/resistance sentimentors in this type of study.

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24.4.3 The Parameters of the Support/Resistance-Sentimentor

Parameter:

Smoothness Span: speed of the MA of the MasterChart

Delta %: maximal distance of a turnaround’s high/low from a price level

min. Tests: number of required tests of a price level

Interpretation:
smoothed price inside the lower half of the support region => sentiment value = 75

smoothed price inside the upper half of the support region => sentiment value = 65

smoothed price inside the lower half of the resistance region => sentiment value = 35

smoothed price inside the upper half of the resistance region => sentiment value = 25

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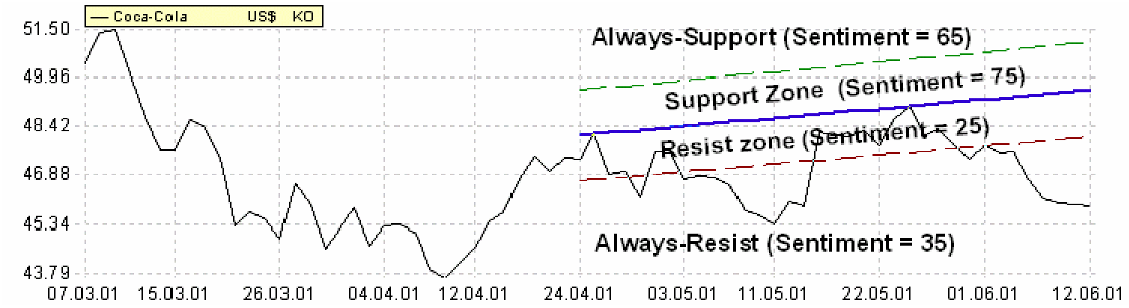
24.5 Trendline Sentimentor

A trendline drawn into the MasterChart is automatically created as a Trendline-Sentimentor. In addition to crossing a trendline the position of the current stock price relative to the trendline is also taken into account when computing the sentiment of a Trendline-Sentimentor.

The *support zone* is the zone between the trendline itself and the line resulting when displacing the trendline by *Support -Delta%.* Analogously, the *resistance zone* is defined as the zone between the trendline and the trendline displaced by *Resistance Delta %.*

In case the price is above the support zone or below the resistance zone, the sentimentor can be configured to expel a specific sentiment.

The following graphic shows the zones of a trendline:



Parameter:

Support-Delta %: for defining the support zone (0 = no support zone)

Resist-Delta %: for defining the resist zone (0 = no resist zone)

Always-Support: 1 = activation of Always-Support-Sentiment; 0 = deactivation

Always-Resist: 1 = activation of Always-Resist-Sentiment; 0 = deactivation

Interpretation:
Trendline is crossed from below => Sentiment = 100

Trendline is crossed from above => Sentiment = 0

Price inside the Support Zone => Sentiment = 75

Price inside the Resist Zone => Sentiment = 25

Price above the Support Zone and parameter „Always Support“ is set to 1 => Sentiment = 65

Price below Resist Zone and parameter “Always Resist” is set to 1 => Sentiment = 35

Else: Sentiment = 50

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24.6 Manually defined Sentimentors

A manually defined sentimentor provides the parameters *buy threshold* and *sell threshold* which are used for interpretation.

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25 Parameter of the Stops

25.1 Some Notes concerning Pricebased Stops

The stop for the next period of a trade is calculated based on the current period and the past. In case this stop is not triggered in the next period, a new stop is calculated again. Hence, for each period there are *two* stop levels: the first valid for the period and the second being calculated for the next period. This is taken into account by the visualization:

For the first period of a trade the following special case applies: If the entry policy is set to “Open next period” or “Confirmation price next period” in combination with the stop execution policy “Immediately” then for testing if the stop triggers in that initial period the close price is taken.

Use the Evaluator to specify the unit applied by price based stops to calculate the stop prices: absloute, percentage, or ATR based.

All price based stops are tightened by the amount of the slippage as defined in the Evaluator.

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25.2 Trailing Stop / Trailing Stop EoP

Computation:
If the current value of a position drops for more than this amount from the maximal value of the position attained so far, then the position is closed. The rule for determining if the stop has been reached is defined by the signal execution policy of the Evaluator.
If this parameter is set to zero, then *no* Trailing Stop will be applied. The lower and upper bound of this parameter should be adjusted with respect to your personal risk management. You may also wish to fix this parameter at a certain value.

DySen provides two versions of the Trailing Stop:

- Trailing Stop EoP (**E**nd **o**f **P**eriod):
  As the name suggests, the actual stop value is computed only at the completion of a period based on the close of that period.

- Trailing Stop:
  This implementation is targeted to day traders using the TradeGuard functionality of *DySen DirectTrade.*
  The stop computation is performed *with each incoming tick* from the moment of the opening of a position. This permits to open a position in

the middle of a, say, 60 minutes bar, and to tighten the stop in case the position runs deeper into profit *within* a bar.
Hence, whenever a complete system is to be designed you will have to choose the EoP version.

Parameter:

Long Stop:	initial offset from fill price for long positions 0 = deactivate Stop for long positions
Short Stop:	initial offset from fill price for short positions 0 = deactivate Stop for short positions

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25.3 Profit Target

Computation:
If the price changed for the specified amount in the direction of the position with respect to the opening price of the trade then the position is closed. The rule for determining if the profit target has been reached is defined by the signal execution policy of the Evaluator.
.

Parameter:

Target Long:	offset from fill price for long positions 0 = deactivate Stop for long positions
Target Short:	offset from fill price for short positions 0 = deactivate Stop for short positions

top

25.4 End-of-Day Stop

Computation:
An open position is closed at the close of the day.

Parameter:

Close at EoD:	1 = activate Stop 0 = deactivate Stop

top

25.5 Time Stop

Computation:
An open position is closed if it survived *Max Periods* periods.

Parameter:
Max Periods: maximal duration of a trade. (0 = deactivate Stop)

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25.6 Parabolic Stop

Computation:

1. Determination of the SIP (Significant Point), which equals the initial stop PS(t).
   For long positions the SIP is the lowest low of the previous *span* periods.
   For short positions the SIP is the highest high of the previous span periods.
2. Determination of the AF (Acceleration Factor). As a default, the AF has an initial value of 0.02 that is increased by 0.02 after each period until a maximum of 0.20 is reached.
3. For long positions, the EP (Extreme Point) is the highest high reached within the trade.
   For short positions, the EP is the lowest low
4. Computation of the Parabolic Stop of the next period:
   PS (t+1) = PS (t) + AF(t) * (EPTrade - PS (t))
   AF(t+1) = min (*Acceleration Max*, AF(t) + *Acceleration increment)*

Parameter:

Span for initial High/Low: number of periods for determining the highest high/lowest low.

Acceleration Increment: the increment of the acceleration factor

Acceleration Max: the maximal value of the acceleration factor

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25.7 Linear Stop

Computation:
Starting from the entry price a straight line with a fixed gradient is computed. When crossing the line, the stop is executed.
The applied unit is specified in the evaluator (percental, multiple of ATR, absolute).

Parameter:
Long Gradient: minimal price increase per period for long positions

Short Gradient: minimal price decrease per period for short positions

Offset: the offset is subtracted from the entry price for long positions, added to the entry price for short positions

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25.8 KaseDev Stop

Computation:

1. Computation of the True Range
2. Computation of the Moving Average of True Range: ATR

3. Computation of the standard deviation of the True Ranges: SDEV
4. Computation of the Dev Stop Reversal Value: DDEV
5. DDEV = ATR + (f * SDEV)
6. Dev Stop Long = Trade High – DDEV
   Dev Stop Short = Trade Low + DDEV

Trade High denotes the highest high during the trade, Trade Low the lowest low.

Note that because of the incorporation of the standard deviations of the true ranges the KaseDev Stop may rise *and* fall. In other words, the KaseDev Stop enables a trade to "breath with the volatility".

Parameter:

Span ATR: number of periods used to compute the ATR

Span StdDev: number of periods used to compute the standard deviation of the True Ranges

StdDevs: corresponds the factor *f* from the formula given above

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25.9 PeriodsHighLow Stop

Computation:
The stop for a long position is defined by the *n*-periods low – *delta.*

For a short position, the stop is the *n*-periods high + *delta*.

The applied unit is specified in the evaluator (percental, multiple of ATR, absolute).

Parameter:
Periods for Low: number of periods for determining the low

Stop = Low + Delta: correction of the low

Periods for High: number of periods for determining the high

Stop = High + Delta: correction of the high

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25.10 BreakEven Stop / BreakEven Stop EoP

Computation:
The calculation of the BreakEven stop relies on two primary stop levels. The first level gets active directly after entering the trade. This level is called "Initial Risk". In case the trade develops into the correct direction, the stop is changed like a trailing stop until it reaches the "BreakEven level". From this point on, the stop stays constant.

As with the Trailing Stop, *DySen* provides an **E**nd **of** **P**eriod (EoP) implementation and a Tick by Tick implementation. For details please see the comments on the Trailing Stop.

Parameter:
Initial Risk: Offset for the initial risk with respect to the entry price

BreakEven: Offset for the BreakEven level.

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26 Accessing Price Data

WHS FutureStation allows to access a number of price data bases directly. Moreover it can read the price data from structured text files, called *quote files*, that can be created by most of the popular chart software by using their respective data export functionality. In this document we will not describe the direct access of the German chart software such as Market Maker or Tai Pan. Please refer to the German User's Manual.

The data source containing price data are configured with the Data Source-dialog that can be started via the menu Extras|Data Sources.

WHS FutureStation allows to ignore price data preceding a given date. This date can defined with the Options-dialog reachable by Extras|Options. (More details concerning the Options-dialog can be found here.)

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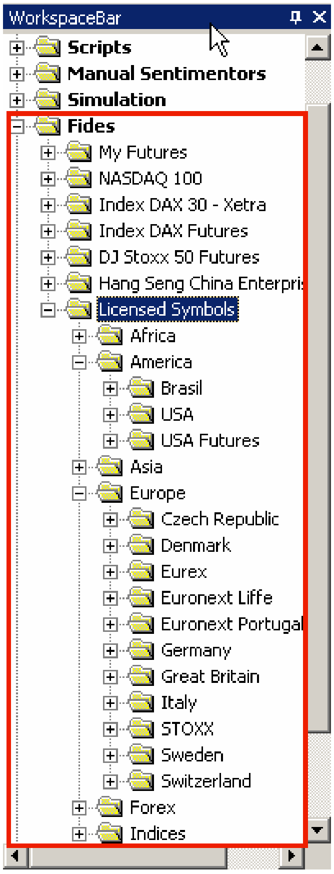
26.1 Accessing FIDES data

DySen FIDES-Trader Extension

The *DySen FIDES-Trader* comes with built-in price data access. Below the entry Fides in the WorkspaceBar all symbols covered by your license are displayed hierarchically:



Fides administers all changes in indices, new emissions, etc. for you, so the hierarchy of the your licensed symbols is always up to date.

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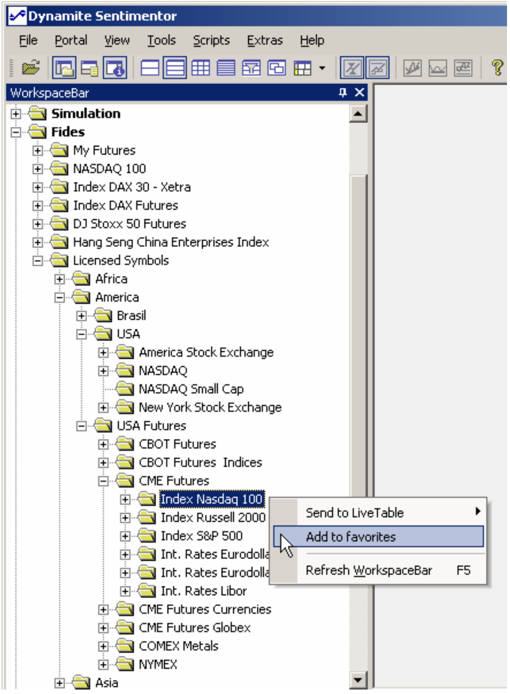
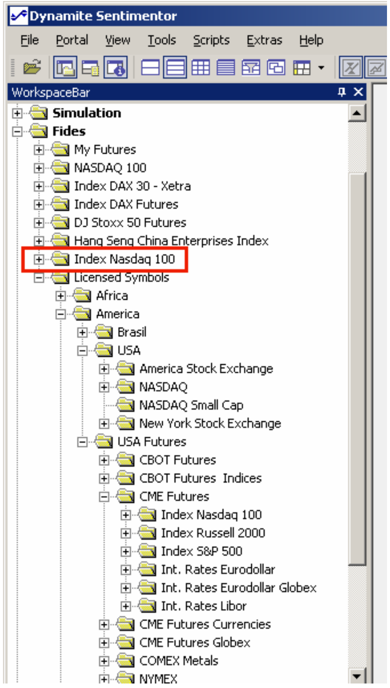
26.1.1 Defining Favorite Symbol Groups

In order to give you fast access to frequently used symbol groups, right click on a group and select Add to favorites:





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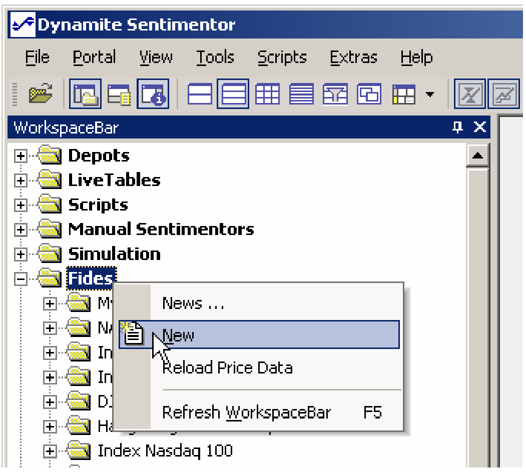
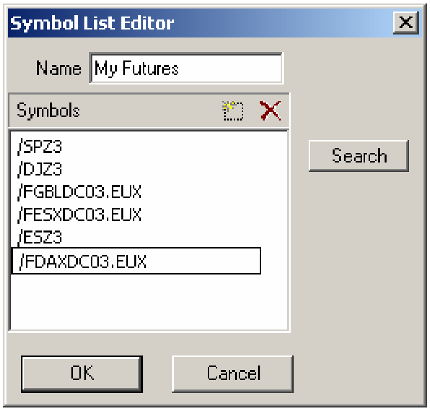
26.1.2 Defining Favorite Lists

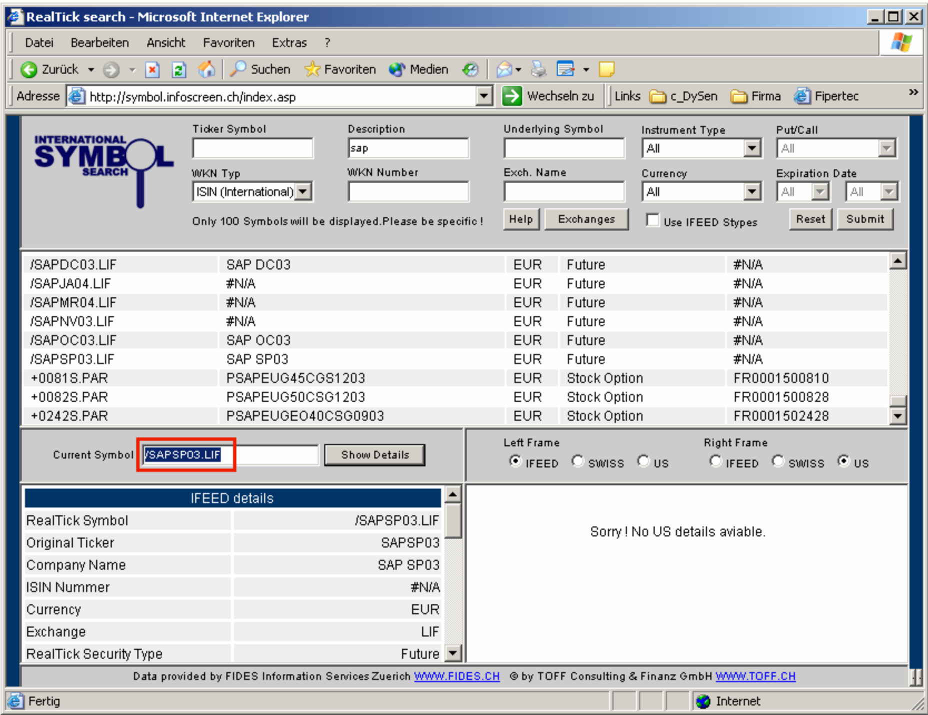
You may also create your own symbol lists by choosing New from the Fides context menu:



Simply type in the symbols you want to see in the list:



By clicking the Search button and given that you have licensed the functionality, a Symbol Search dialog is started providing a world wide symbol search:



The red marked Current Symbol field can be dragged and dropped into the Symbol List Editor.

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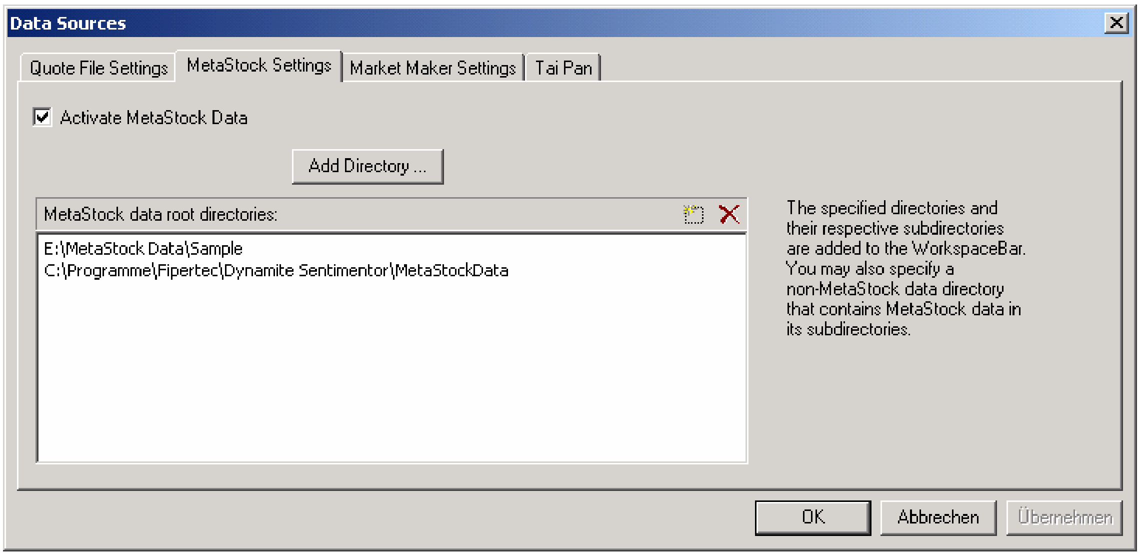
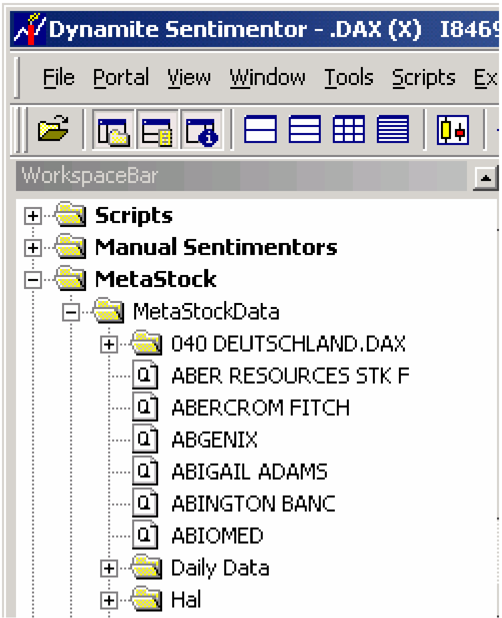
26.2 Accessing MetaStock data

To activate the MetaStock data access, please checkmark the Activate MetaStock-checkbox.
Now select the MetaStock directories to be shown in the *WHS FutureStation* WorkspaceBar by clicking the button Add Directory ... . Usually, you will select a directory that contains MetaStock data, but it is also possible to select a "normal" windows directory that contains MetaStock data in its subdirectories.

With you can remove a directory from the list. With a directory can be entered manually.





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26.3 Accessing Quote Files

The subsequent sections explain how to access price data from structured text files, so-called *quote files*, that can be created with popular chart software.

26.3.1 Filename of a Quote File

WHS FutureStation makes no special assumptions with respect to the filename of a quote file. However, usually you will choose the name of the underlying or the symbol, e.g.,

```
DaimlerChrysler DCX.txt
```

If the security contains the `#` character then the part preceding the `#` will be interpreted as the name and the trailing part as the symbol. The Designer-dialog will display this appropriately.
Example: `DaimlerChrysler#DCX.txt`

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26.3.2 Renaming Quote Files

In case your charting software does not create „nice" filenames for quote files, you can rename the quote files using *WHS FutureStation*.

The renaming functionality relies on the text file `WknToName.txt` of the installation directory. Each line of this files consists of two entries of type

`<old filename>: <new filename>`
e.g.

`DCX.txt: DaimlerChrysler#DCX.txt`

You can use an arbitrary text editor, e.g., Notepad, to adapt `WknToName.txt` to suit your needs.

To start the renaming mechanism, use the menu entry Extras|Rename Quote Files. This will rename each file of the `Quotes`-directory as specified in `WknToName.txt`.

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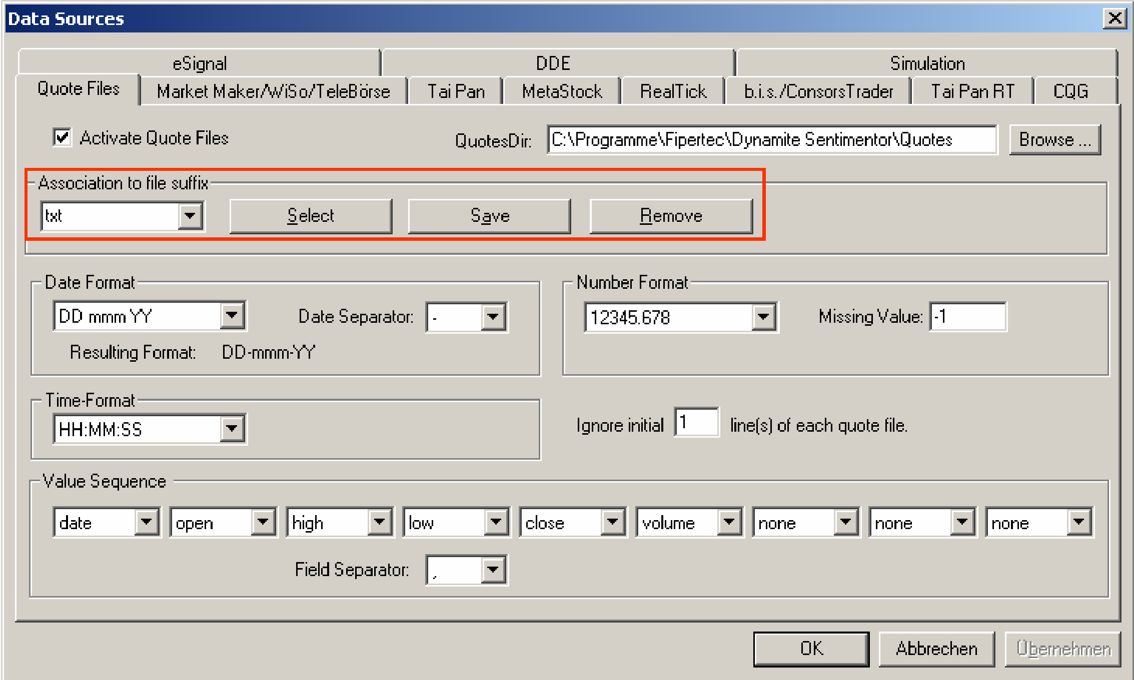
26.3.3 Structure of a Quotes File Line

WHS FutureStation allows to specify an arbitrary number of quote file layouts. These layouts are associated with the file suffix, e.g., txt or prn, of the quote files. When loading a quote file, *WHS FutureStation* automatically selects the corresponding layout.



Each line of a quotes file consists of a date, a close quote and optionally of open/close/low/high quotes as well as the volume and open interest for that date. It is assumed that the lines of a quote file are in ascending order with respect to the date.

As default the expected format is

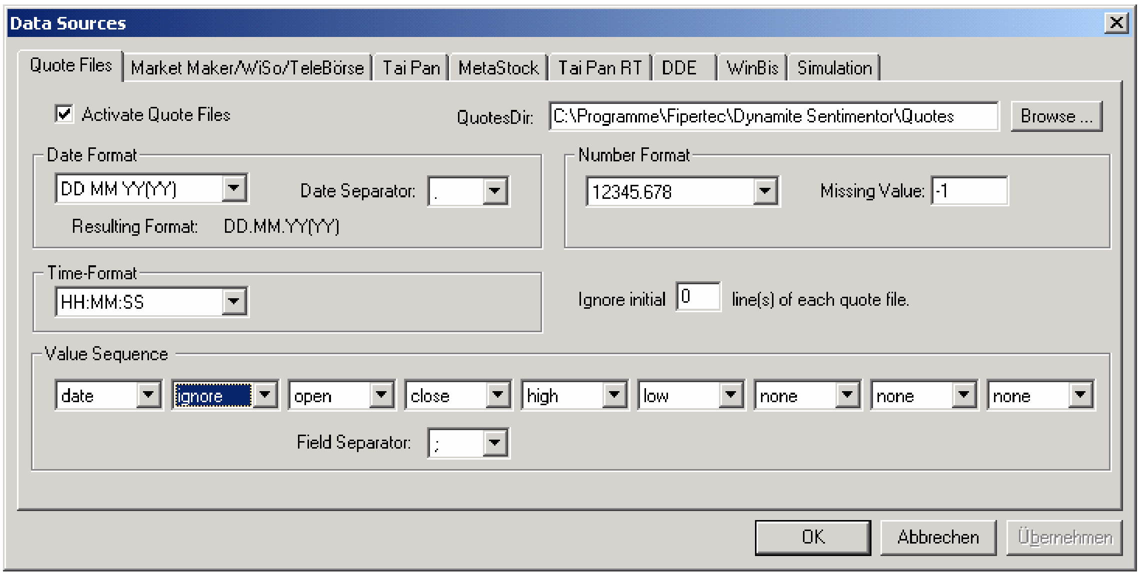
`DD.MM.YY(YY);Open; Close; High; Low; Volume;`

Thus, a feasible line of a quote file with respect to this specification could look like this:

`18.5.00;100.00; 90.75; 119.10; 85.12; 350000.00;`

The „none“-entries in the given example specify that the „volume“ value is the final value of each line.

Some chart software exports values that are not used by *WHS FutureStation*. To ignore such values, enter „ignore“ for the respective value in the value sequence, e.g.:



Sometimes quote files may contain some introductory lines without price information. To skip a number of introductory lines, define the number of lines to be skipped:

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26.3.4 The Date Format

Using Date Format the ordering of day, month, and year in a date can be specified. The Separator defines how the elements of a date are separated. Suppose the Date Format were `MM DD YY(YY)` and the Date Separator were „/“ then `5/18/00` would comply to this specification.

In case „`YYMMDD`“ or„`YYYYMMDD`“ is chosen as the Date Format, then Date Separator will ignored. Thus, a valid date sequence for „`YYYYMMDD`” would be `20000518`.

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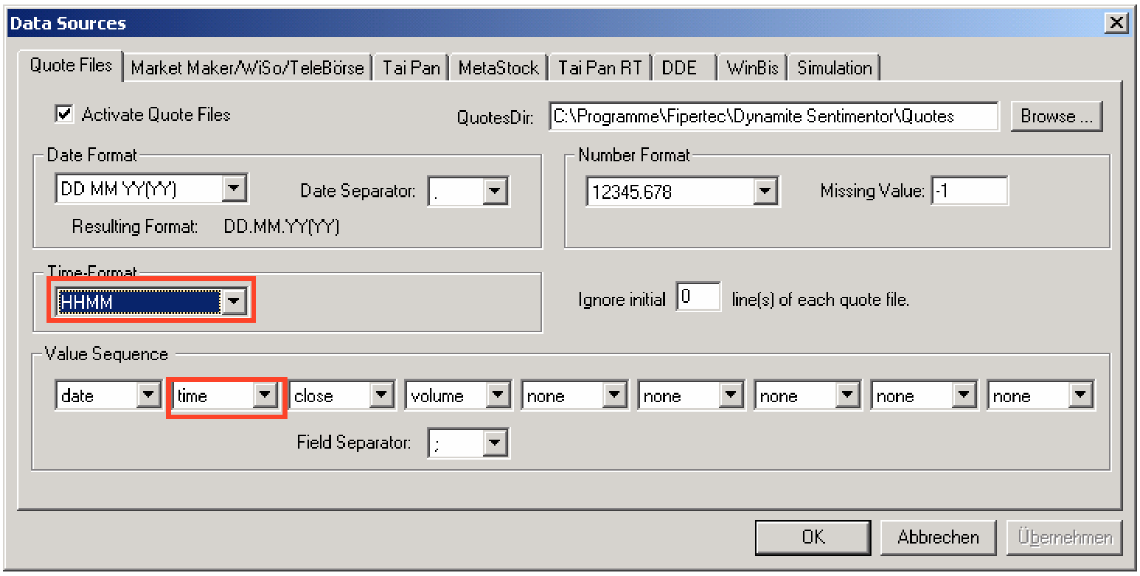
26.3.5 The Time Format

For reading in intraday data the time format needs to be specified, e.g.:



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26.3.6 The Number Format

Use Number Format to specify the format of real numbers.

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26.3.7 Missing Values

Some chart software that can be used for generating quote files through data-export create data also for days where the quotes are missing. *WHS FutureStation* skips these lines. However, to let *WHS FutureStation* detect missing quotes, you have to define the character sequence used by your chart software to denote a missing value, e.g. `-1` or `n/a`. Enter this sequence into the Missing Value field. If your software simply writes nothing for a missing value, then you have to clear the Missing Value field completely (make sure not to leave a blank in the Missing Value field).

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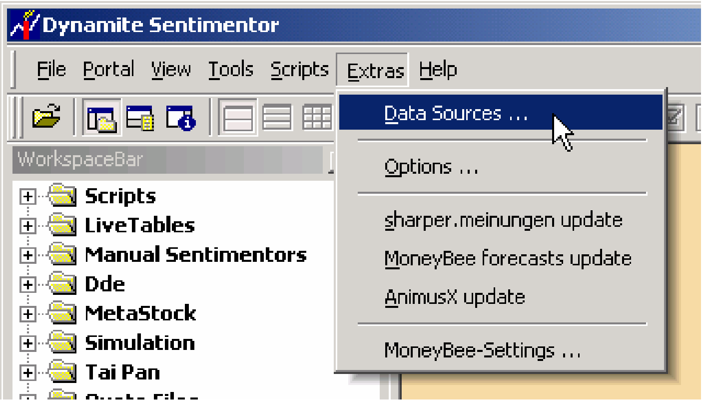
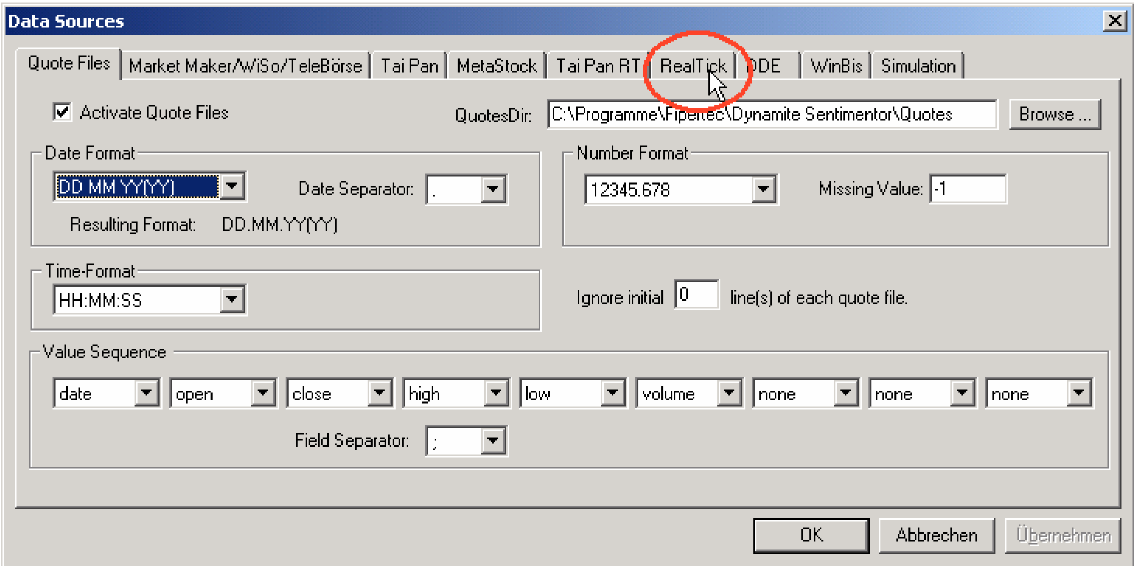
26.4 Accessing RealTick Data

To activate the access to RealTick data, please proceed as follows:

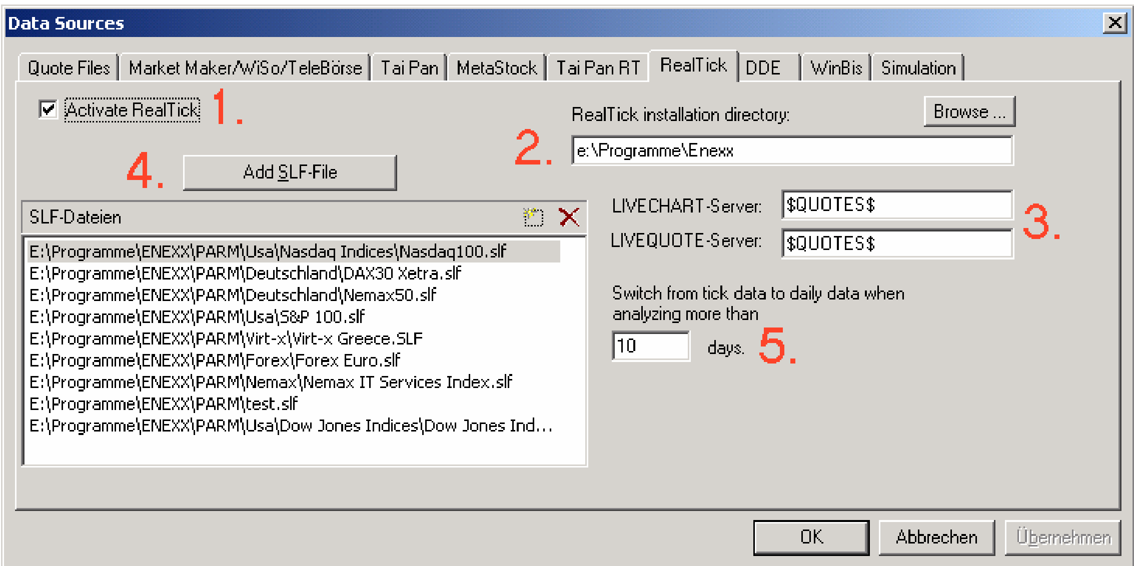
Choose Extras|Data Sources from the main menu:



Now select the RealTick page of the Data Sources-dialog:

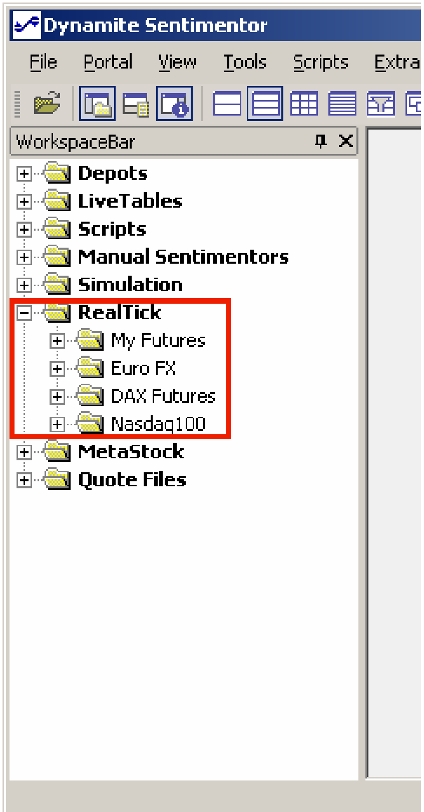


Make the following entries corresponding to your infrastructure:

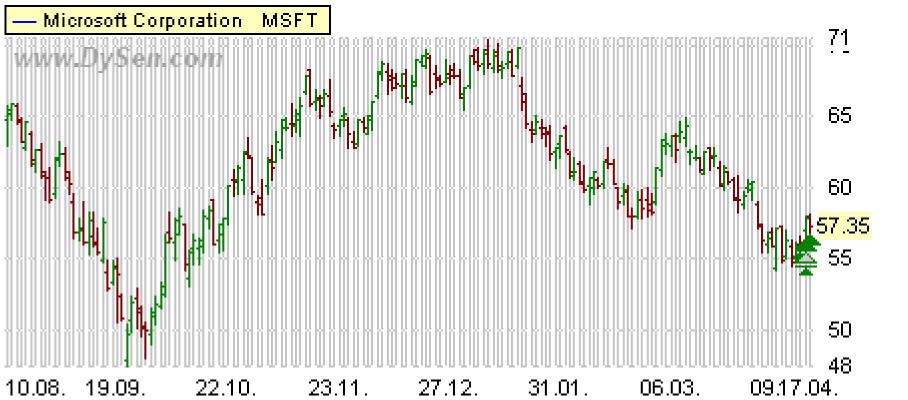


1. Activate the DySen access to RealTick
2. Enter the installation directory of RealTick on your local machine.
3. Enter the servers to be accessed. (For details see your RealTick documentation.)
4. Select the SLF-files to be displayed in the WorkspaceBar of *WHS FutureStation*
5. DySen can load and analyze both, end of day data and tick data. When requesting more than the given number of days for a study, DySen will automatically query daily data.

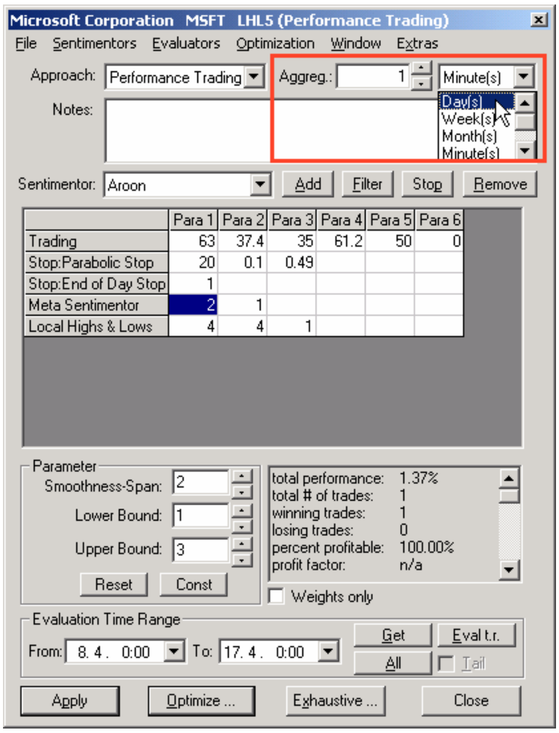
Quit the dialog by clicking OK. The WorkspaceBar of *WHS FutureStation* is updated automatically and shows the SLF filenames as folders:



If after loading historical dailiy data the chart looks like this



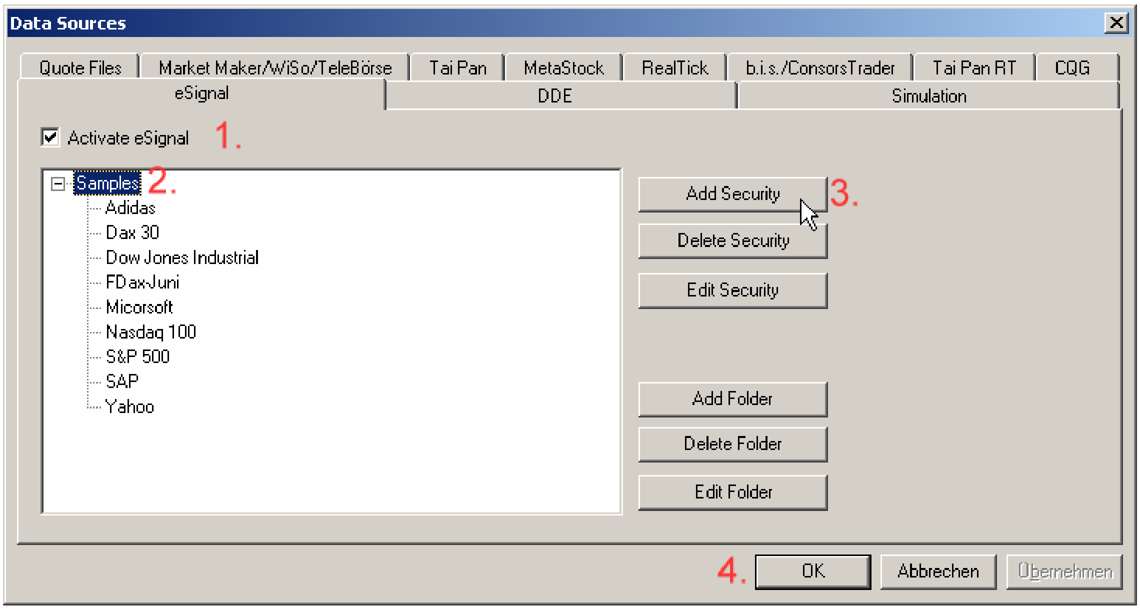
then simply change the aggregation of the data to Daily: (A vertical grey line indicates the beginning of a new day in intraday charts.)



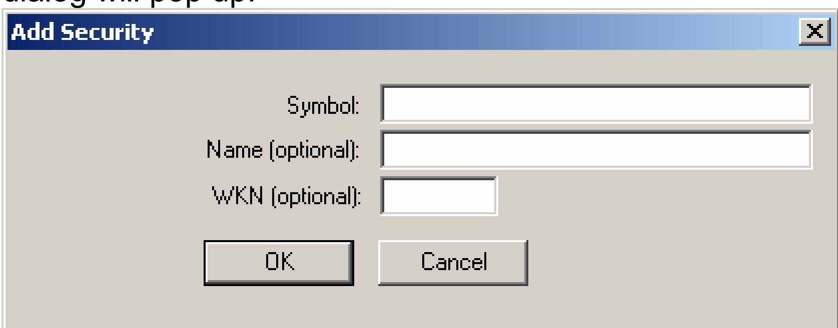
top

26.5 Accessing eSignal Data

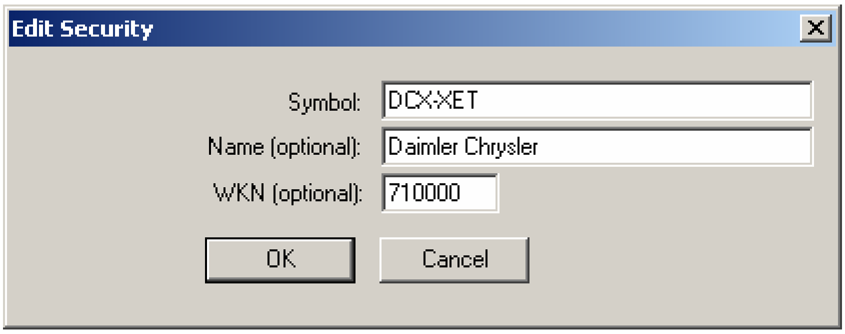
To activate the eSignal access choose Extras|Data Sources from the main menu, select the eSignal page, and proceed as follows:



1. Activate the DySen access to eSignal
2. DySen lets you organize the securities you want to access into folders. A “Sample“-folder is part of the distribution. New securities are added to the highlighted folder.
   a. Click the Add Security Button to define a new security. The following dialog will pop up:

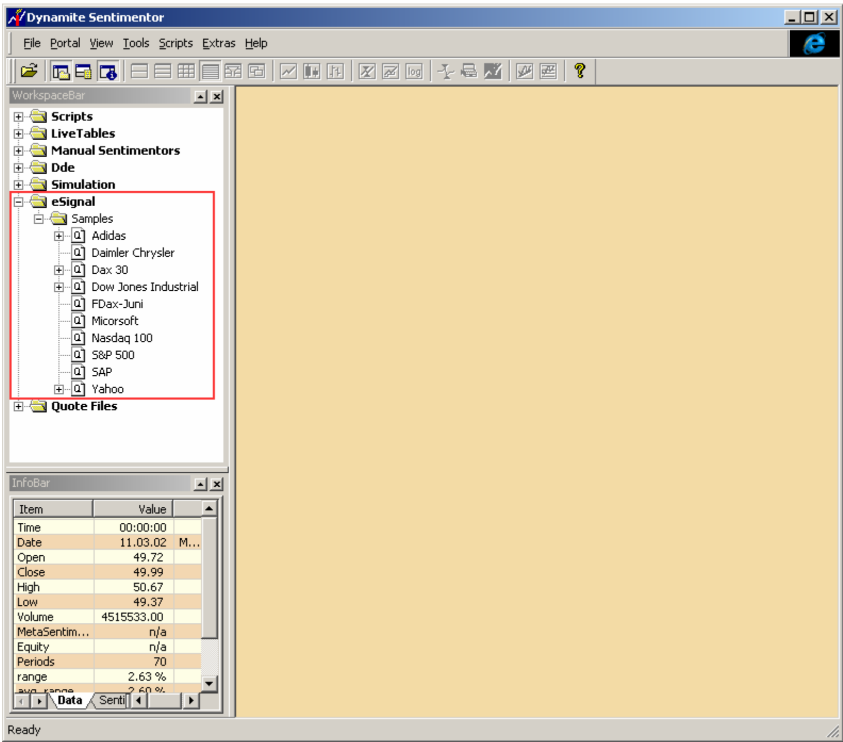


- Enter the Symbol of the security to be made available in DySen. The “symbology” is exactly as in eSignal.
- Name is the symbolic name of the security displayed in the WorkspaceBar of DySen. If it is left empty, DySen will use the symbol instead.
- WKN is optional and used by DySen for providing so-called “External Sentiments” coming from Sharper.de or MoneyBee.



3. Press the OK button.

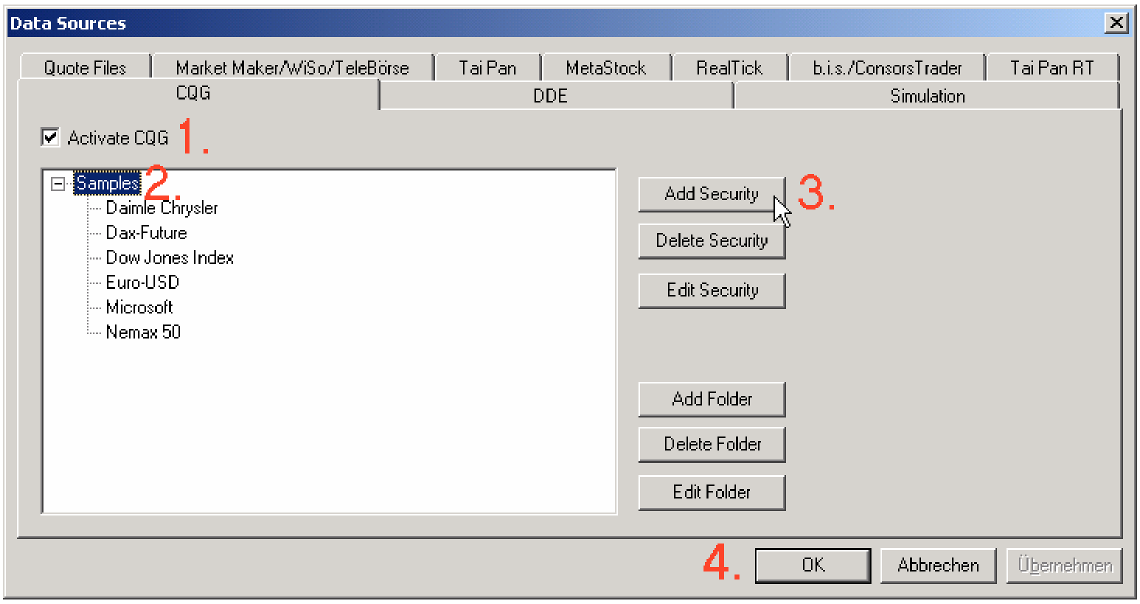
Quit the Data Sources dialog by clicking OK. The WorkspaceBar of *WHS FutureStation* is updated automatically and shows the new settings:



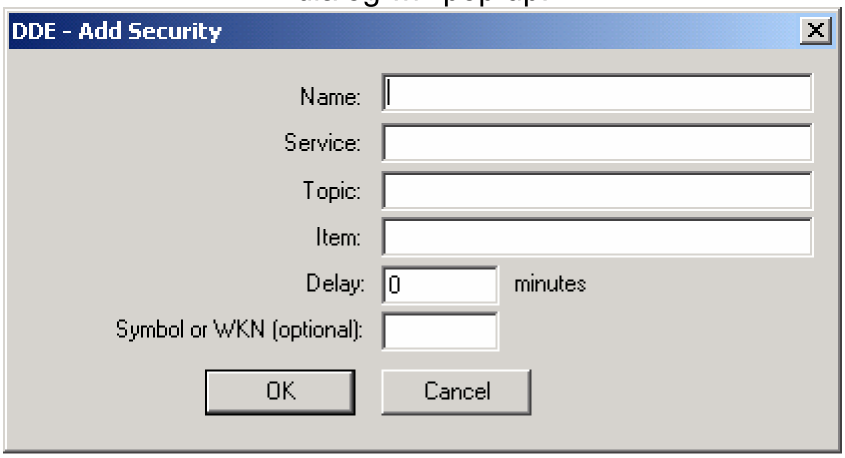
top

26.6 Accessing CQG Data

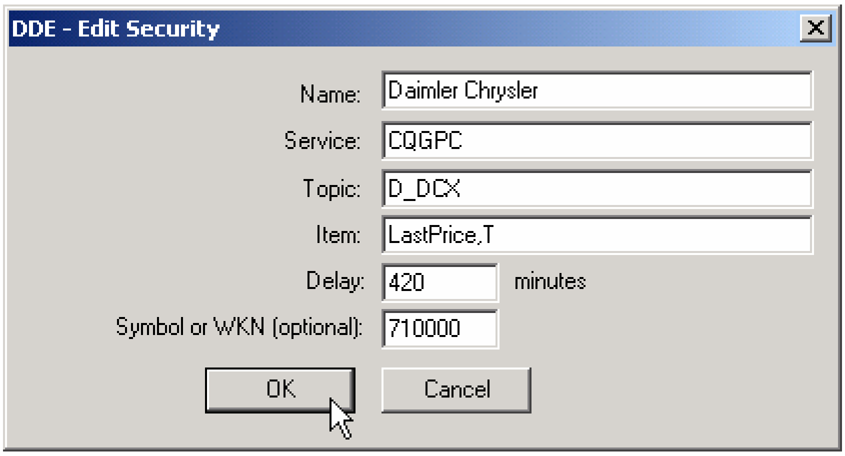
To activate the CQG access choose Extras|Data Sources from the main menu, select the CQG page, and proceed as follows:



1. Activate the DySen access to CQG
2. DySen lets you organize the securities you want to access into folders. A “Samples“-folder is part of the distribution. New securities are added to the highlighted folder.
   b. Click the Add Security Button to define a new security. The following dialog will pop up:

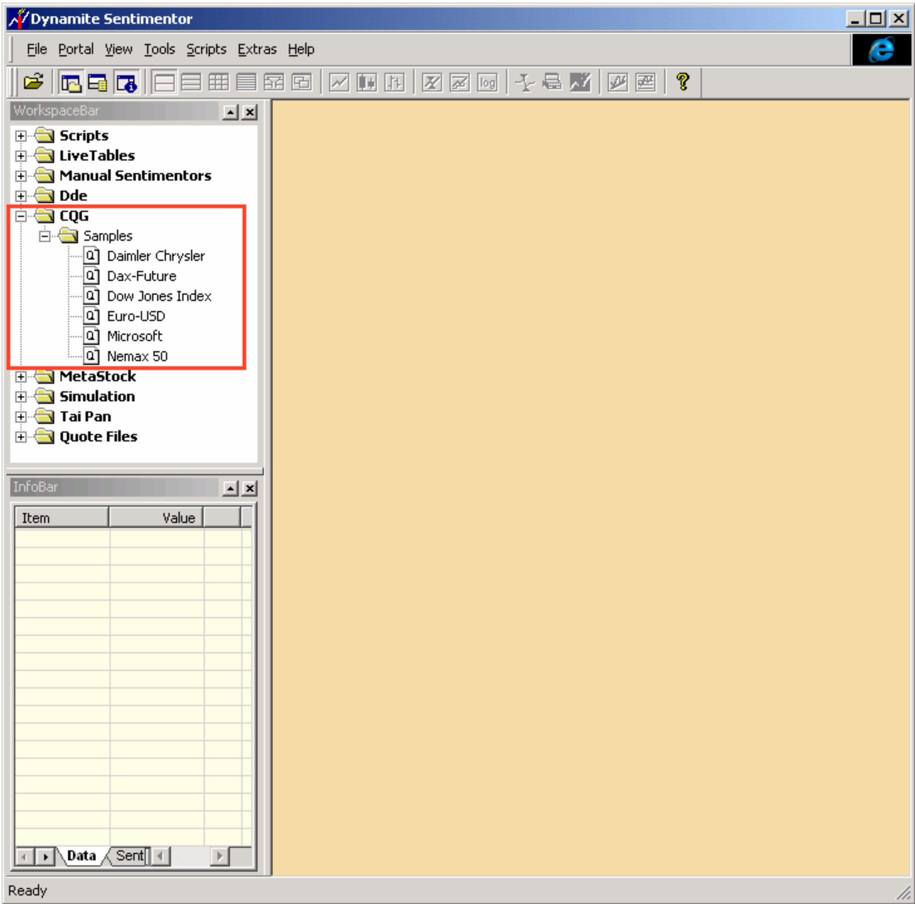


- Name is the symbolic name used for this security inside DySen.
- Service, Topic, Item are the values used by the Windows DDE-protocol to communicate with CQG. Fill out these entries as you would do with any other access to CQG based on Windows DDE.
- Delay is the difference between the “CQG LineTime” and your local time in minutes. For Germany this is 7 hours = 420 minutes
- Symbol or WKN is optional and used by DySen for providing so-called “External Sentiments” coming from Sharper.de or MoneyBee.



3. Press the OK button.
4. When adding a further security, DySen will use the previously used entries to speed up the editing process.

Quit the Data Sources dialog by clicking OK. The WorkspaceBar of *WHS FutureStation* is updated automatically and shows the new settings:



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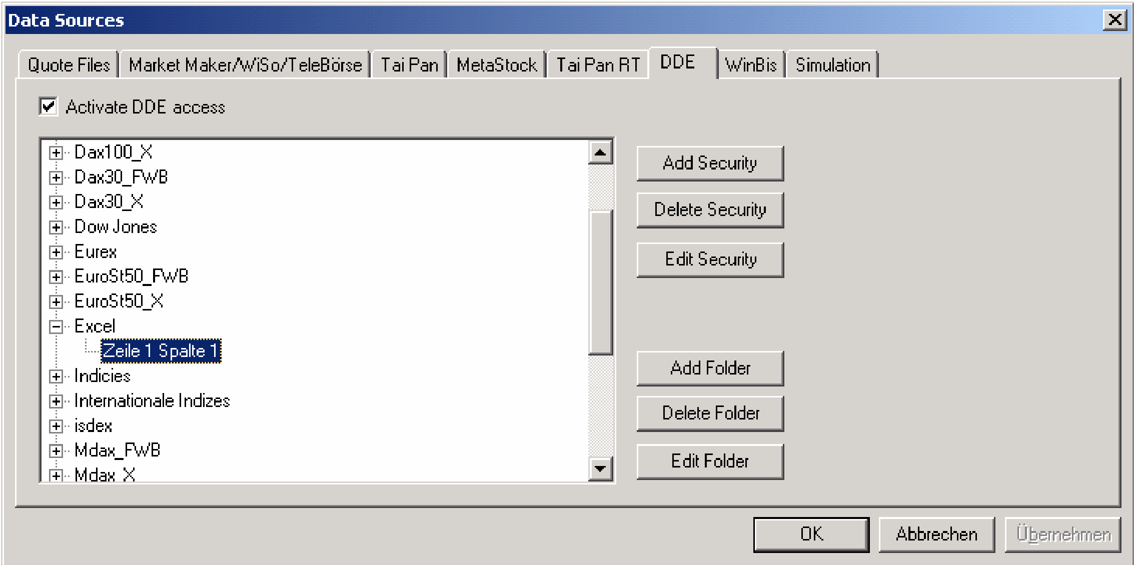
26.7 Using the DDE interface

The DDE interface is a standard Windows mechanism allowing applications to exchange data. Using this mechanism you may connect to the vast majority of price data providers – at least to receive live ticks. To have access to historical ticks, a dedicated interface is required.

To configure the DDE interface, select the corresponding page:



The DDE editor allows to create folders and to add securities.

The settings for a security comprise the following data:

The Name is used to list the security in the WorkspaceBar.

Service, Topic, Item are the necessary settings to create a DDE connection to a different application. Please view the manual of your data source to obtain the respective definitions.

The example above reads the value of the first cell of “Table 1” of a (German) Excel instance.

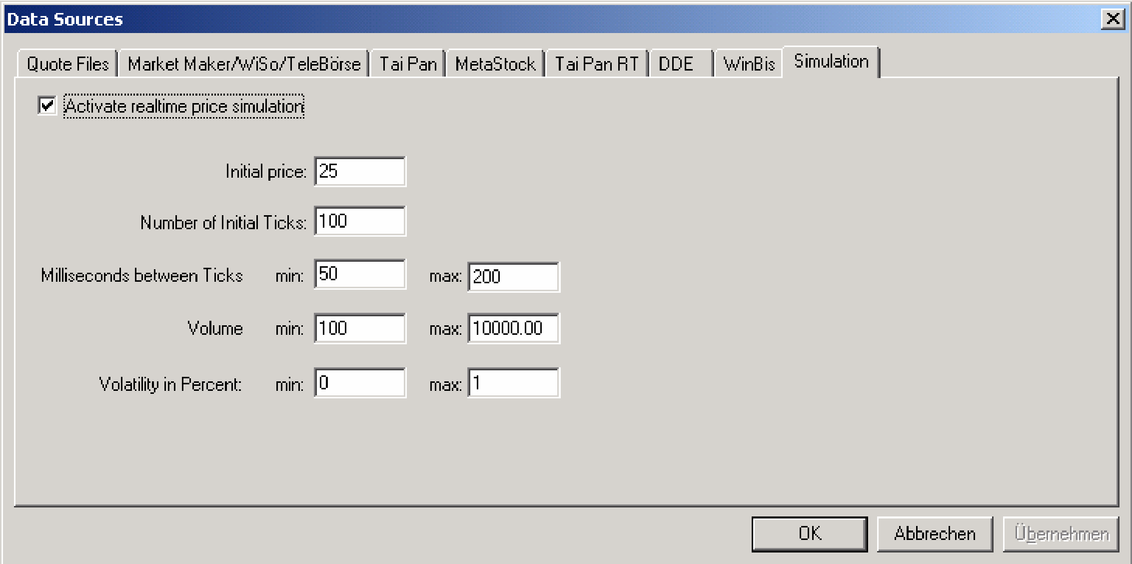
The symbol is optional – it is used to get additional information over the internet using the context menu in the WorkspaceBar.

When starting the DDE-Edit Security dialog the previously entered values are restored. This greatly simplifies the creation of a larger number of records.

top

26.8 Simulation of Realtime Data

For demonstration purposes, *WHS FutureStation* is capable of creating random realtime data:



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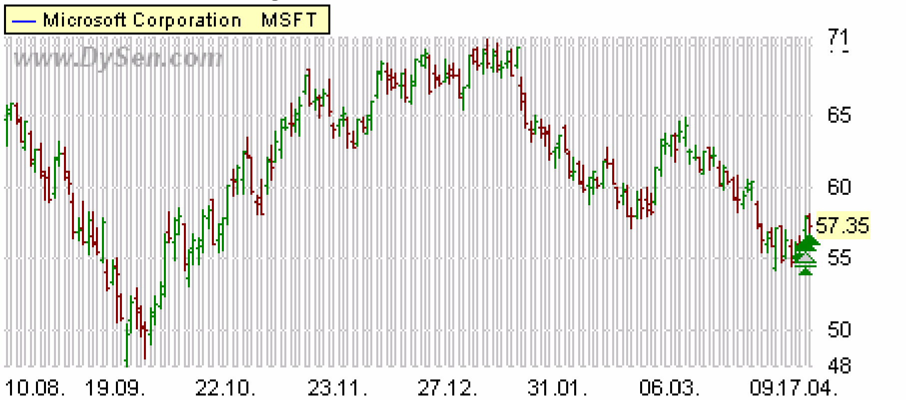
27 Some Specifics when working with realtime data

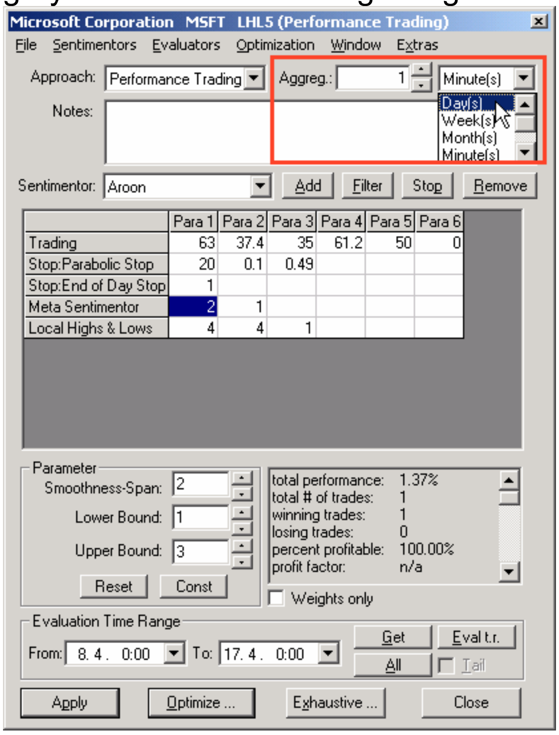
Realtime studies show the following characteristics different from end-of-day based studies:

- Whenever an arriving tick leads to the creation of a new bar, the zoom is changed such that this new bar becomes visible.
- To reduce the loading time for historical ticks, *WHS FutureStation* caches the ticks that have been requested. This caching mechanism continues even if all consuming studies of ticks for a given security are closed. This allows to reopen a study extremely fast, because no data has to be reloaded from the data provider.
- Make sure to use an appropriate aggregation in the study, otherwise you may end up with thousands of periods and the system slows down.

- In case after loading the data the chart looks like this



then simply change the study aggregation of the data to Daily: (A vertical grey line indicates the beginning of a new day in intraday charts.)



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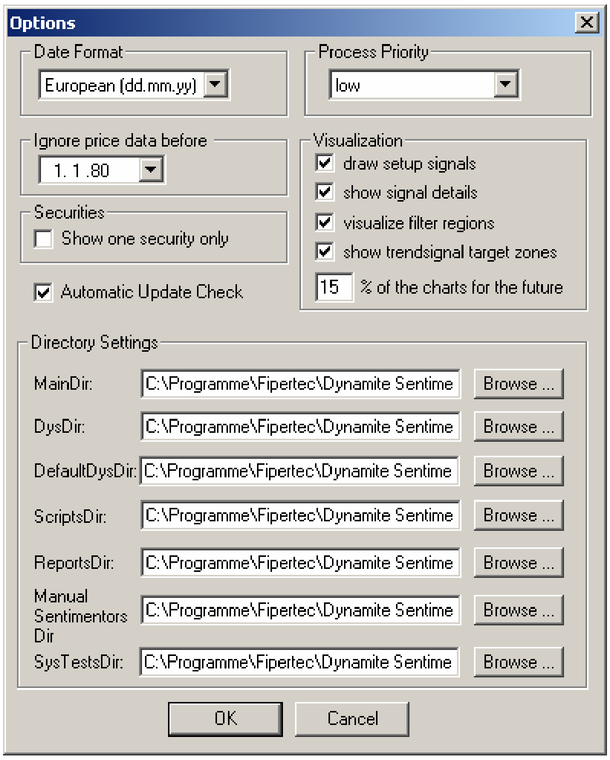
28 Options

Using Extras|Options a number of options can be specified.



28.1 Date Format

The format for displaying dates in *WHS FutureStation* can be defined.

Moreover, all directory settings used by *WHS FutureStation* can be specified.

28.2 Process Priority

WHS FutureStation allows to define its so-called process priority. Especially under Windows NT it is useful to set the priority to “low” or “very low” if you plan to let *WHS FutureStation* do some optimizations while you continue to work with other applications. Otherwise, Windows might pass most of the processor power to *WHS FutureStation* so that other applications might not work smoothly.

28.3 Ignore Data before

This setting is only used for DySen V2.3 studies and earlier that do not carry a data cut date inside the studies. All data preceding the specified date is ignored.

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28.4 Auto closing charts

When checkmarking the ☑ Show one security only box, *WHS FutureStation* makes sure to close all charts before loading a new study.

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28.5 Signals

Check or uncheck the field draw setup signals to toggle the drawing of signals that have to be executed at the next bar.

Check or uncheck the field show signal details to toggle the popup windows explaining the signals of a given bar.

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28.6 Automatic Update Check

Check the field Automatic Update Check to let *WHS FutureStation* check for updates at every program start. In case an update is found the UpdateManager dialog pops up and permits to download and install the upated.

An update check can be triggered manually through the menu entry Extras|Check for Updates.

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29 The SystemTester

29.1 Overview

DySen-SystemTester is a separate module and is targeted at those traders that follow *trading systems*. The main problem with classical trading systems is their rigidity, i.e., they are not capable of “adjusting themselves” to changing market conditions. A once created trading system is kept unchanged until it becomes unprofitable. To tackle this problem, a process is required that adapts a system in a controlled way. This adaptation process itself then becomes an integral part of the trading system.

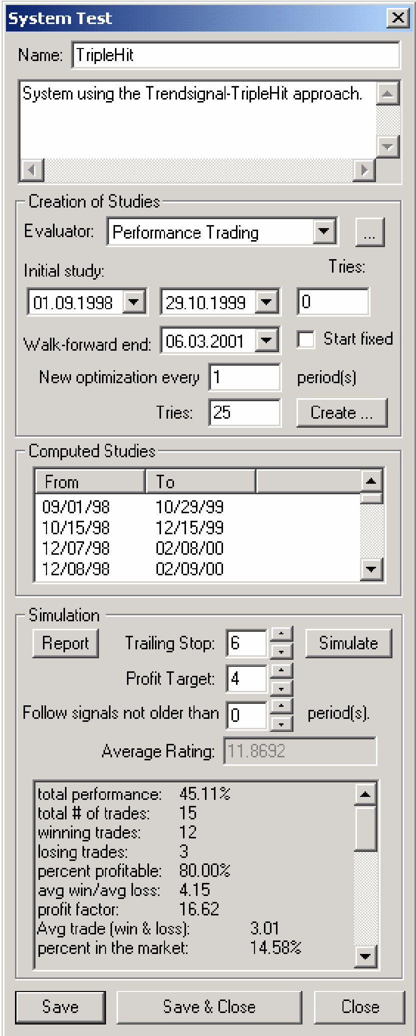
The *DySen-SystemTester* allows to simulate this whole adaptation process. One starts with an initial study for an optimization period in the past. The SystemTester now optimizes the initial study for the chosen period. After this optimization, the computed sentimentor settings are applied on the subsequent *x* periods following the optimization period. Note that these *x* periods were not part of the optimization, hence this data is so-called “out of sample data”. The resulting signals within these *x* periods are executed by the *SystemTester* and the corresponding trades are recorded. Now the optimization period is relocated for *x* periods in direction of the present and the steps optimization & signal execution are performed again.

At the end of this “walk forward” simulation, the resulting trades can be analyzed in terms of the equity curve, performance report, and trading report. The optimized sentimentor settings of the underlying study for the respective optimization periods are stored in a database and can also be analyzed. Thus, the complex process “Usage of a trading system with controlled adaptation” becomes completely transparent and can be optimized itself.

top

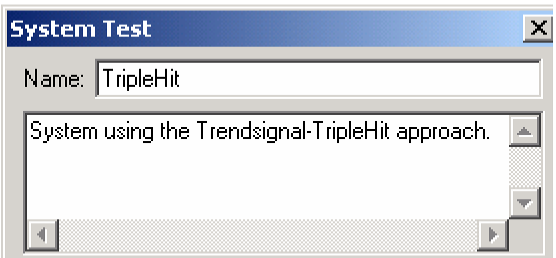
29.2 Starting the SystemTester

The *SystemTester* is started through the menu entry Optimization|SystemTester of the Designer-dialog.

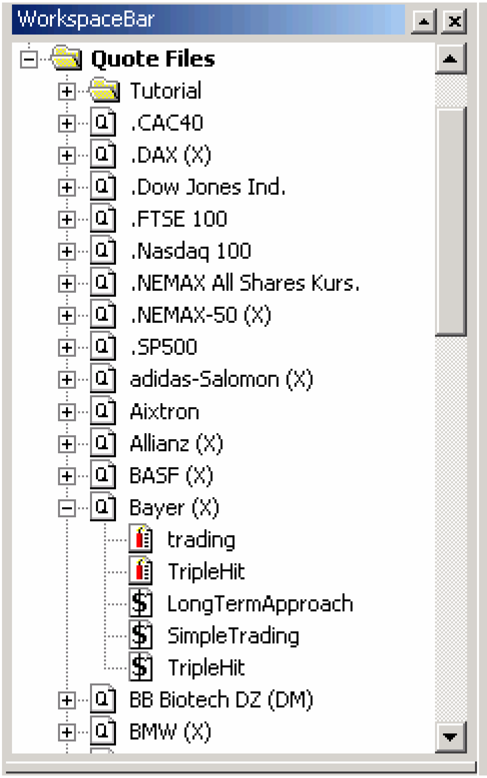


The SystemTest-dialog is divided into four parts that are now discussed successively.

The first two fields are used to specify the name of the SystemTest and to enter notes.



WHS FutureStation shows entries for all created SystemTests for a security using their respective names in the WorkspaceBar. The icon used for SystemTests is $.



To load a SystemTest simply doubleclick the corresponding entry in the WorkspaceBar.

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29.3 Creation of Studies

The way signals of the underlying study have to be executed and rated are determined by an Evaluator. In the given example, the “Performance Trading”-Evaluator is chosen.

The Evaluator chosen in the *SystemTester* may differ from the Evaluator used in the underlying study, e.g., it is completely reasonable to use the Trendsignal-Evaluator in the study and to let the *SystemTester* trade the signals with the “Performance Trading”-Evaluator. In fact, this particular combination corresponds most closely with the overall *DySen*-philosophy.

By clicking the ...-button the Evaluator-Settings-dialog is started.

The fields just below Initial Study are used to specify the initial optimization period as well as the number of tries used for optimizing the study on that period.

If the SystemTest-dialog is started through the menu of the Designer-dialog then the currently selected optimization period of the Designer-dialog is selected automatically. The usual approach to start the *SystemTester* is to load the MasterChart and study in question, select the optimization period with the mouse followed by an intensive optimization. If one is satisfied with the result the SystemTest-dialog is started and the initial optimization period is set automatically. The current sentimentor settings of the Designer-dialog are used as the initial study by the *SystemTester*. As the sentimentors have just been optimized there is no need to perform another optimization by the *SystemTester*. Hence, the default setting of 0 Tries for optimizing the initial study can be left unchanged. In case an additional optimization of the initial study is wanted the optimization effort in terms of Tries has to be specified.

The following settings define how the *SystemTester* adapts the optimization period after each “optimization/signal execution” iteration:

The Walk-forward end defines the date until which the end of the optimization period has to been moved successively.

If the beginning of the optimization period is to be kept unchanged within the whole process, the field Start fixed needs to be checkmarked. This leads to a successive enlargement of the optimization period with each iteration of the walk-forward process. If the beginning of the optimization period is kept unchanged the trades of the underlying study are rarely changed and this finally leads to a reduced number of signal changes in the *SystemTester*.

The setting 

defines that the end of the optimization period is moved forward one period after each iteration. When specifying 5, say, the result of an optimized study would be applied for the subsequent 5 periods *without* an optimization.

The Tries field specifies the optimization effort in terms of tries for each iteration.

Clicking the 

-button starts the creation of the studies. Depending on the settings, this process may take quite a while.

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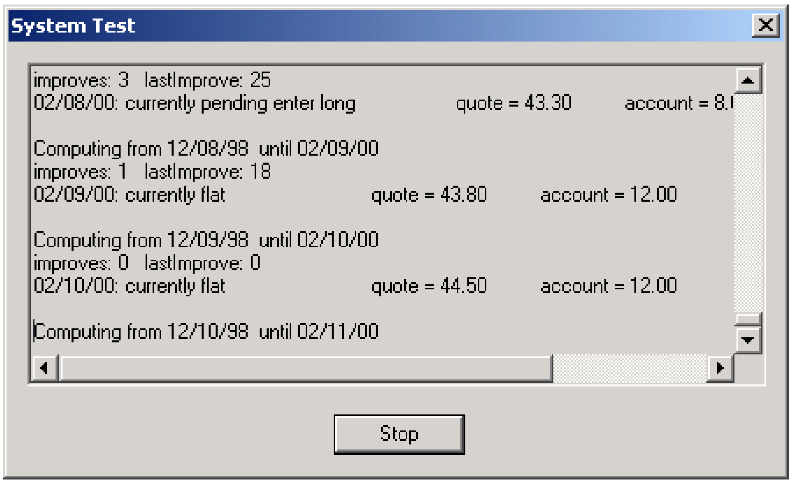
29.4 Visualization within the Study Creation Process

The creation of the studies can be examined in the SystemTest-Monitor. The process can also be aborted by clicking the Stop-button:



In case the optimization is performed at the end of each period (New optimization every 1 period(s)) the actual optimization period, the current position, and the equity at the end of the period are monitored. The X-Ray is used to show the current end of the optimization period in the charts. The MetaSentimentor, the signals and the charts are drawn with respect to the best found setting for the underlying study. In contrast, the Equity-window displays the equity that results from the trades simulated by the *SystemTester*.

In case the New optimization is not performed at the end of each period, the *SystemTester* first creates all studies without updating the charts and without displaying the current position. Only the X-Ray is used to show the end of the current optimization period.

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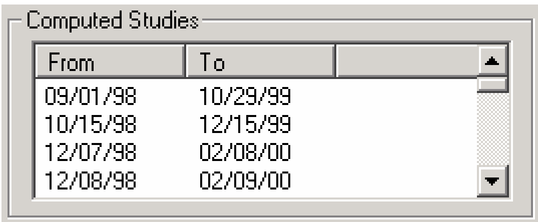
29.5 Viewing the Created Studies

If the *SystemTester* finds an improved parameter setting for the sentimentors of the underlying study, this new setting is stored in the study database:



The From/To-columns denote the optimization period for which an improved study has been computed. In the given example, the first optimization period ended at 10/29/99. The study found for this period has not been improved for the subsequent six weeks.

If a row in the table is clicked with the mouse, the corresponding study becomes *active* and all charts and the signals are drawn with respect to this study. Moreover, the parameters of the study are displayed in the Designer-dialog and the Eval-page of the InfoBar displays the performance report for this study. You may also use the Arrow-Up/Arrow-Down keys on your keyboard to walk through the study database. This allows to visualize all studies step by step and to analyze the changes from study to study.

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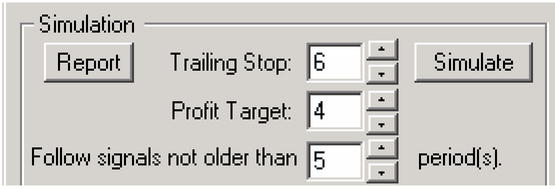
29.6 Executing the Signals of the Underlying Study

As soon as the study creation process has finished the simulated trades of the *SystemTester* are displayed in the MasterChart.

Besides the Evaluator, the execution of signals by the *SystemTester* is controlled by the following settings:



In addition to the signals from the underlying study the stop and the Profit Target control the closing of a position. They have exactly the same signification as the corresponding parameters of the Trading-approach.

The field Follow signals not older than defines how old the last signal of the underlying study may be at maximum in order to be taken into account by the *SystemTester*. In case the last signal of the underlying study is older it will be ignored by the *SystemTester*, otherwise it will be converted into a corresponding opening or closing of a position.

A change of the Simulation-parameters is immediately applied by the *SystemTester* and the resulting trades, the equity curve and the performance report are updated.

Clicking the Simulate-button results in an application of the current Simulation-setting. This should be used to change the displayed signals to the *SystemTester* trades after examining a study from the study database.

To obtain a detailed trade report of the trades simulated by the *SystemTester* click the Report-button.

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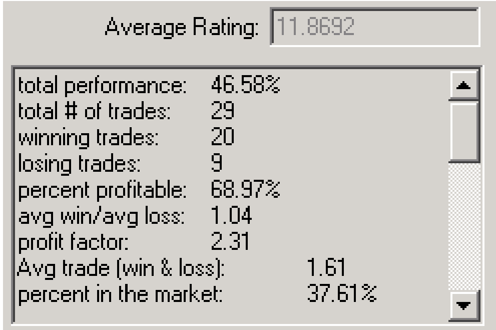
29.7 Performance Report

The lower part of the SystemTest-dialog displays the performance report of the system test:



The Average Rating is the average rating of the underlying study computed over all optimization periods. The list below show the performance report of the trades executed by the *SystemTester.*

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29.8 Saving and Closing the SystemTest-dialog

The current settings of the *SystemTester* including the study database can be saved. The SystemTest-files are automatically displayed in the WorkspaceBar below their corresponding securities. If a SystemTest is stored for the first time, the WorkspaceBar has to be refreshed (F5) to show the new entry.

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29.9 Some Hints for Using the SystemTester

The creation of mechanical trading systems is a very time consuming process and requires that the trader is fully clear concerning the chosen settings and their consequences, e.g., besides the selection of the sentimentors and the restriction of their parameters the signal execution policy as specified in the Evaluator has an enormous influence of the trading result. Likewise, the way the optimization period is moved over the time scale is of great importance.

Future releases of *WHS FutureStation* will add more functionality for creating mechanical trading systems: filter, diverse stop policies, possibility for pyramiding, etc.

The majority of traders do not use mechanical trading systems, but follows the *discretionary* approach where an analysis and the resulting trades are situational. For these traders *WHS FutureStation* plays the role of an decision support system providing ideas and proposals for trades. Even for this kind of usage the *SystemTester* is of great advantage, because the “trade proposals” resulting from a given study and trading approach can be simulated over a long time period and can be adjusted to suit the individual needs of each trader.

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30 Integrating the forecasts of MoneyBee

30.1 MoneyBee – Price Forecasts based on Neural Networks

MoneyBee is a product of the i42 Informationsmanagement GmbH, Germany. With the help of thousands of registered users it computes price forecasts based on Neural Networks by applying the technique of "Distributed Computing". A central server assigns tasks to the users who solve these tasks with the computing power of their local machines. Using this combined computational power, MoneyBee computes forecasts for selected securities and indices for the next day and the next week. Details can be found at www.moneybee.net.

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30.2 What is a MoneyBee forecast?

A MoneyBee forecasts tries to predict the change of today's close with respect to tomorrow's close or the close in one week

A forecast carries two quality indicators with it: A *tendency quality* and a *corridor quality*. The tendency quality is expresses how many of the forecasts of the past 25 trading days in the simple categories "rising" and "falling" were correct. The corridor quality shows how accurate the forecasts are.

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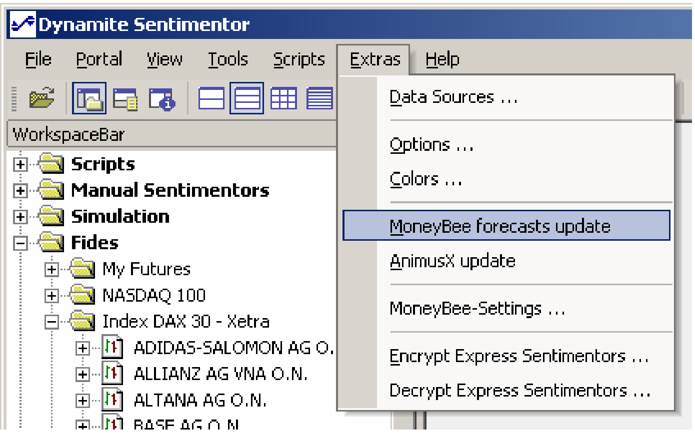
30.3 Updating MoneyBee forecast?

MoneyBee forecasts can be updated over the internet using the menu entry Extras|MoneyBee forecasts update:



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30.4 Integrating MoneyBee Forecasts into a study

WHS FutureStation provides two sentimentors for integrating the MoneyBee forecasts: MoneyBee-1 for the daily forecasts, and MoneyBee-5 for the weekly forecasts.

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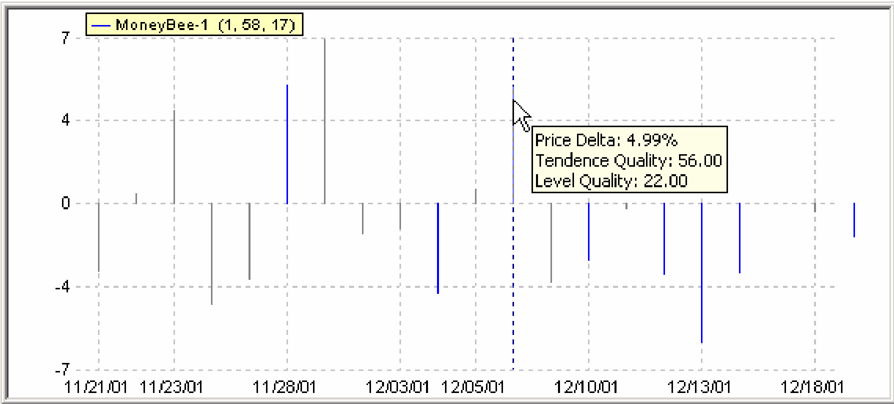
A MoneyBee Sentimentor is drawn as a histogram:



Each line represents the prognosticated price change. The sentimentor can be configured to rule out the forecasts where the quality indicators do not reach the specified level.

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30.5 The Parameters of the MoneyBee Sentimentor

Parameter:
min. Delta %: die required minimal prognosticated price change in percent

min. T-Quality: required minimal tendency quality

min. K-Quality: required minimal corridor quality

Interpretation:
In case the prognosticated change is too small or the quality levels are not reached => sentiment = 50

Else:
positive change prognosticated => sentiment = 100
negative change prognosticated => sentiment = 0

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30.6 Aggregations and Realtime Studies

In case the study uses an aggregation of multiple days, the MoneyBee-Sentimentor chooses the forecast of the last day falling into each respective period. The forecasts of the other days comprising that period are ignored.

When using a MoneyBee-Sentimentor within a realtime study, *WHS FutureStation* chooses the forecast of the previous day.

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30.7 Usage Limitation

The incorporation of MoneyBee forecasts is currently a free service of i42 and Fipertec. As this status might change in the future, the MoneyBee-Sentimentor in its current version has to be regarded as a free add-on and not part as a part of the *WHS FutureStation* product.

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31 Integration animusX Voting Results

31.1 animusX – Enter/Exit Levels for DAX and Bund-Future

Every two weeks animusX queries institutional and private investors for their entry and exit levels in the DAX and Bund-Future. Detailed information on animusX can be found at www.animusx.de.

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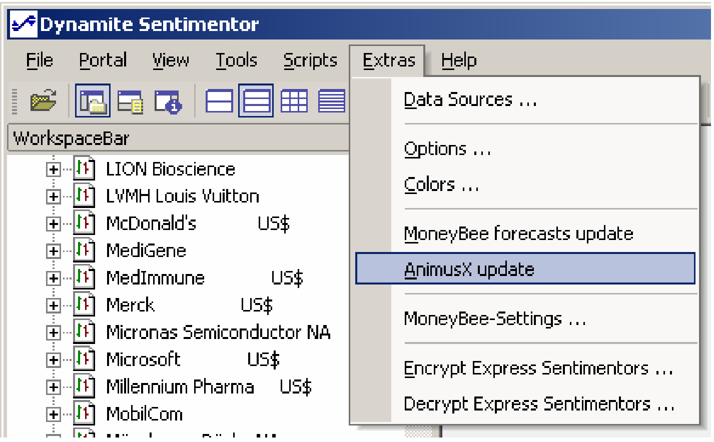
31.2 Updating animusX voting results

The animusX voting results can be updated over the internet using the menu entry Extras|animusX update:



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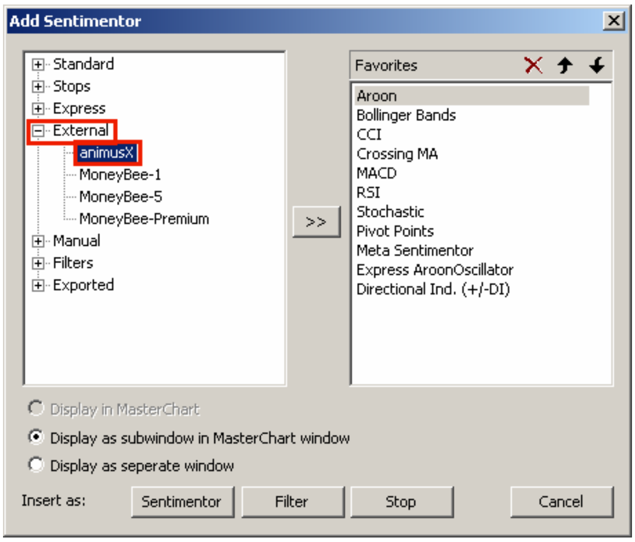
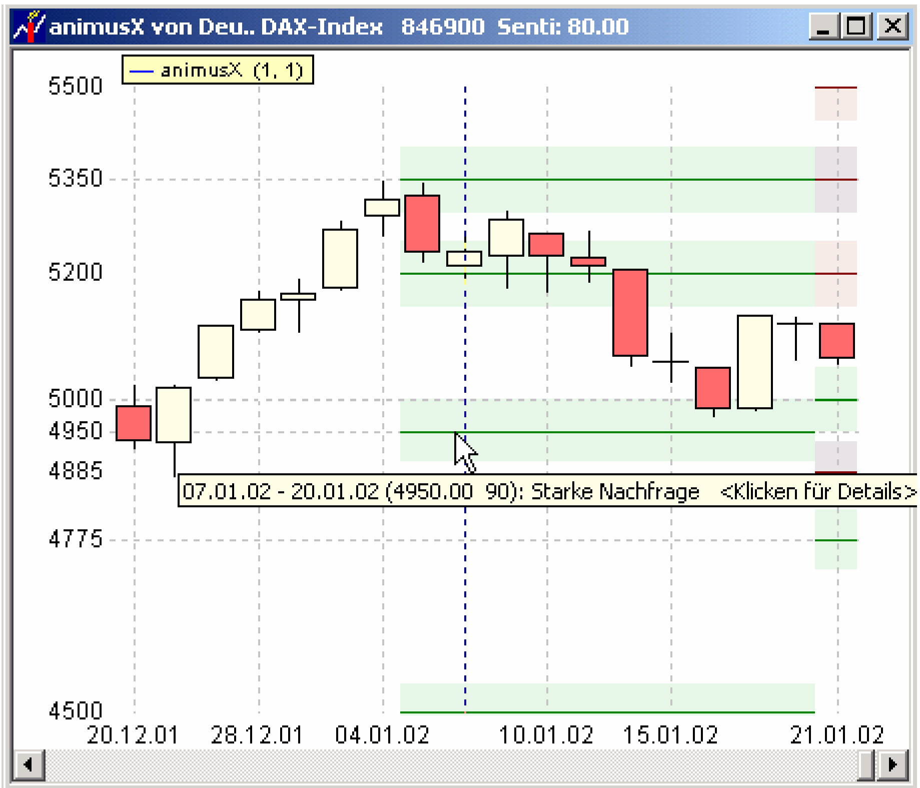
31.3 Integrating animusX results into a Study

The animusX voting results can be integrated into a study using the animusX-Sentimentor:



The animusX-Sentimentor requires a specific file describing the entry/exit levels for a given security. Currently these files are transmitted via updating for the DAX and the Bund-Future. It is possible that the scope of animusX is enlarged in the near future.

The animusX-Sentimentor visualizes the entry/exit levels as follows:



A level with high entry indication is drawn green whereas a level with a high exit indication is drawn red. In case entry and exit levels overlap they are drawn in purple.

A level is defined by a validity period, a price, and a sentiment. The sentimentor allows to define *support* and *resistance* zones for a level. The sentiment of a level varies with its significance.

When clicking on a level *WHS FutureStation* opens a web browser targeted at the written animusX report corresponding to the level with a detailed analysis.

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31.4 The Parameters of the animusX-Sentimentor

Parameter:
Support-Delta %: The support zone around an entry level.

Resist-Delta %: The resistance zone around an exit level.

Interpretation:

If the periods close lies in at least one of the zones:
Sentiment = average of the sentiments of the zones hit by the period's close
Else:
Sentiment = 50

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31.5 Usage Limitation

The incorporation of animusX voting results is currently a free service of animusX and Fipertec. As this status might change in the future, the MoneyBee-Sentimentor in its current version has to be regarded as a free add-on and not part as a part of the *WHS FutureStation* product.

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32 Backup

Depending on your personal trading strategy you should backup periodically the optimized analyses stored in the DysDir. When using the *SystemTester*, the system tests stored in the `SystestsDir`

The same holds for scripts and Manual Sentimentors.

As the mentioned data items are simply small files in the file system, the backup can be performed most easily using the Windows-Explorer, e.g., use drag & drop to save the required directories (DysDir, ScriptsDir, Manual Sentimentors Dir) on a floppy disc.

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33 Cleaning Up

When running scripts or creating reports *WHS FutureStation* writes logfiles into the ReportsDir. As *WHS FutureStation* cannot decide which reports are of importance to you, they will not be deleted automatically.

Hence, once in a while you should visit the ReportsDir with Windows-Explorer and delete the superfluous files.

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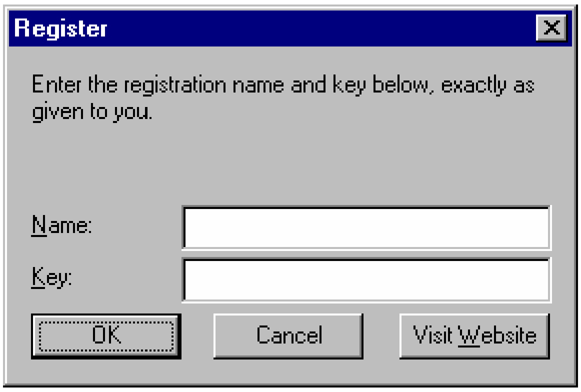
34 Entering the License Key

After purchasing *WHS FutureStation* you will receive a user name and key. To activate your license, choose Extras|About Designer Sentimentor from the main menu. Click the Enter new license key-button and the following dialog will pop up:



Please enter the name and key and click OK. Your license is now activated.

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35 Known Problems

- The upper and lower bounds of the sentimentor parameters can be set to senseless values which lead to internal problems.

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