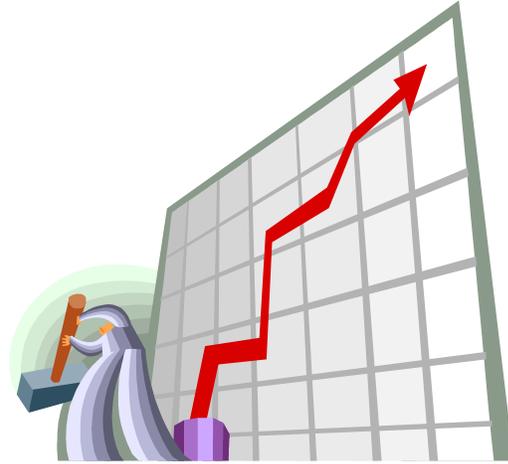


TradeSim®

Advanced Trading Simulator and Back Tester

For position traders using
MetaStock® Versions 7,8,9 and 10.



Advancing the Art of Trading with Science.

Users Guide

Standard, Professional and Enterprise Editions

TradeSim Version 6.4.1 Final Release Version

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Preface to Version 6

Version 6 of TradeSim incorporates a lot of new features, fixes and updates.

A brand new licensing system has been used as the old online licensing system was proving to be unreliable on some user's machines. The new licensing system relies on a registry file to be created and saved in the user's TradeSim directory.

Included in the Enterprise Edition is a Composite Report generator, which can combine multiple reports and charts into the one report for printing, copying and pasting as well as exporting in a variety of popular formats.

Also new to the Enterprise Edition is the ability to dynamically specify the position size model on a trade-by-trade basis.

Two new charts have been added to the closed trade charts and six new charts have been added to the open trade chart.

We have now included Survivorship Bias Free Backtesting, with a Survivorship Bias Filter Utility for the Professional and Enterprise Editions.

We have introduced full Signal Ranking with Provisional Trades and some support for intraday data.

You can also now temporarily load extended data, post trade database creation. This allows you to specify extended data without having to regenerate the trade database again.

Preface

When using any software there is always a learning curve. The length of the learning curve is dependent on your will to learn. Beginning traders usually always start out being impatient wanting to make huge profits right from the word go! Unfortunately for the many impatient, they usually end up among the 90% of traders who get washed out in the markets. Patience and perseverance will always be rewarded.

This manual has been written to assist people in using TradeSim to back test or simulate their trading systems in order to validate or improve their trading methodologies. This manual is detailed enough to give you enough information to thoroughly evaluate your own trading systems using TradeSim. It does not regurgitate existing material from the MetaStock user manual or other references, but augments the information in a way to make the learning process as simple as possible. If the reader is unsure of a topic a reference is usually given so that the reader can explore the topic further. A list of references can be found at the back of this manual.

As a prerequisite to understanding the information contained in this manual we suggest that the reader should be familiar with the operation of MetaStock and concepts such as indicators and explorations. It is not necessary to have a Ph.D. in building indicators; you can draw upon the many examples used in the MetaStock software and manual in order to build your own trading system, however, it is necessary to have some basic experience in writing indicators in order to construct trade database explorations.

There are a lot of traders' forums and websites where you can get examples of trading systems. A list of relevant websites is given in the [reference section](#) at the back of this manual. The success of a trading system is not proportional to how complex you can make an indicator and traders who think this is the case would probably be quite surprised about the simulated trading results of such systems. Sometimes a simple trading system can be more successful than a complex one just by the mere fact that suitable position-sizing and hence money management strategies are employed.

You might ask why TradeSim is primarily aimed at people who own MetaStock and not other charting packages. This is because MetaStock is probably one of the more popular charting packages available. It is a relatively low-cost package, has numerous features and excellent graphics as well as a large support base. It also allows easy interface of third-party packages, of which TradeSim is one. The MetaStock indicator language is flexible enough to allow development of the simplest trading systems as well as the more complex variety. Although TradeSim is primarily aimed at MetaStock owners it is not limited to such. Because TradeSim can read trade databases that are stored in [Universal Text file format](#) its use is not just limited to MetaStock but now can be adapted to other charting packages, which could be used to generate suitable trade data. We will be looking at developing add ons for other charting packages in the future.

What this manual is not about

This manual is not about teaching you how to trade but rather to help you to trade better using TradeSim as a tool, which can objectively be used to improve your trading strategies. TradeSim doesn't care how you trade or your philosophies on trading. If you can express your trading system by a simple framework of entry and exit triggers and prices then TradeSim can back test your trading system and do it in an objective way that is necessary to properly evaluate its worth. If you need to learn more about the concepts of trading then I suggest that you refer to one of the texts in the [Recommended Readings](#) section of this manual.

Author's Comment

Within the last few years the advent of the Internet has revolutionized the way traders place orders into the market place. However the concept of trading has not changed since the days of the South Sea Bubble and the Dutch Tulip mania. During that time some people made a lot of money whilst others lost their life savings. Recently the same pattern repeated itself during the Dot-com market mania just as it did nearly three hundred years ago with the South Sea Bubble. The technology used to trade may have changed during this time but the human mind still possesses the same frailty it did when Sir Isaac Newton was caught in the collapse of the South Sea Bubble. Just as Internet technology has brought trading onto the desktop computer a whole new breed of private traders has emerged along with all of the lack of education and understanding of the true nature of the market place.

One can be sure that the traders who have survived the recent Dot-com market correction are those who implemented a proper trading plan and stuck with it all of the way, whereas those that didn't are probably licking their wounds in disbelief of the market's behaviour. For those that somehow fluked a profit without any trading plan, my suggestion is to get out of the market right now because like a gambler at a casino the market will eventually take all of your money from you. Lastly, for those that have stuck by their trading plan and have broken even, you have been successful in trading because you have achieved the minimum goal of preserving your capital under the worst possible market conditions.

By now you will have realised the importance of having a proper trading plan. A trader without a plan is like a ship without a rudder – you can go forth but you won't necessarily get to your destination. You need a trading plan since trading is essentially a psychological endeavour, and a trading plan is a way of conditioning the mind into behaving in a way that is necessary to survive in the marketplace.

It is usually said that trading is 90% psychological development and 10% system development. However, if you don't get the system development right then the 90% psychological effort will be a lot of hard work and stress for nothing. TradeSim or any other technical analysis software won't make you a good trader by itself. After all it's not the software that ends up doing the trading; it is you! Similarly a screwdriver won't make a good car mechanic; it's how the mechanic uses the screwdriver that counts.

TradeSim is a tool that allows one to objectively develop a successful trading system. After that, it is up to you as a trader to implement this trading system as accurately as possible without any temptation on your own part to modify it whilst you are trading it. Sounds simple, but how many traders have fallen into the same old trap of modifying their system midstream with devastating consequences? If you believe that you have a profitable trading system then why change it? To answer this question you have to look at the way most people have been conditioned to think. If you have problems following your trading plan then the problems could be caused by: -

1. Lack of confidence in your trading system causing a conflict in your own mind. Part of you may try to stay disciplined and follow your trading plan - the other part, which is usually irrational and driven by your emotional state, tries to override your mechanical decision-making process because you may have some scepticism and subconsciously lack confidence in your trading system. Proper back testing will improve confidence in your trading system. Once you have established that you have a historically and statistically profitable system, and you have back tested it on out-of-sample data, only then will your confidence in your trading system be improved.
2. Impatience due to being part of a random process where the result of each trade is statistically insignificant but over a long run a good trading system should be biased towards generating a profitable outcome. Since you cannot control or predict what the markets will do, a fair percentage of your trades will be losers with controlled losses providing that you have employed a suitable money management strategy. Trying to convince your mind that this is acceptable and your reluctance to be part of a mechanical process without any contribution from your emotional state is the reason why people find it difficult to pull the exit trigger when stops are hit. Being conditioned to win all of the time, your subconscious mind has the effect of making you believe that a

losing trade will turn around and eventually be profitable. However what you think has no bearing on what the market will do. The market doesn't care what you think; the market does what the market does irrespective of what you think.

Having said all of this, if your trading system has a positive expectation then trading losses are part and parcel of a statistically random process where over a long period of time your system should be biased towards generating a profitable outcome. If you have problems grasping this concept, then try to think in terms of averages in the long term rather than on a trade-by-trade basis.

Trading requires strict discipline and control of one's emotional state. Hope, greed and fear play no part in trading and these qualities can tend to reduce the efficiency if not completely destroy an otherwise successful trading system. If you have trouble controlling your emotions then quite simply you should not be trading until you get this aspect of yourself under control. This might seem like harsh criticism but is one aspect of trading that usually rears its ugly head somewhere along the way of the inexperienced trader's path to self-destruction. No software will help you if you cannot get this part of yourself in order. Just stick to your trading plan and remember there are no guarantees in this business. Making money requires taking risks! However, risks can always be minimized and profits maximized with good planning. Plan the trade and trade the plan!

TradeSim was developed to meet the needs of system developers who develop trading systems that are statistically sound. When I was developing my own trading systems there were no real tools available at the time to provide a quick and comprehensive analysis of my own trading systems. In other words I usually developed what I considered to be a profitable trading system, did some simple inconclusive tests on it and commenced to trade it without verifying it properly. Without proper system development tools what I was really doing was flying blind and making the assumption that the system was sound without any way of quantitatively measuring it. There were system development tools available, but they were usually expensive and cumbersome to use, and didn't integrate with my existing charting package. As a result of this I began investigating the possibility of developing my own system development tools. What started as a casual affair has turned into a full time project and the resulting effort is TradeSim. I hope that anyone using this software will find it as useful in developing his or her own trading systems as it has been in developing my own.

As this user manual is continually evolving there is always a possibility for errors and omissions to creep in. If you spot any errors or inconsistencies please do not hesitate to contact me at feedback@compuvision.com.au. Also if you have any other suggestions or ideas about the software or the manual please do not hesitate to contact me.

Acknowledgements.

Thanks and acknowledgement must be given to the feedback provided by countless number of TradeSim users for their ideas, suggestions and bug reports. Without your help the product wouldn't have advanced to the level it is today.

Yours Sincerely

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Introduction

The importance of back testing

When trading, what is the question in most traders' minds? To answer this question I shall quote the introduction from Chapter 8 "Back Testing" of Mark Jurik's book *Computerized Trading4* .

Will my trading strategy be profitable? After having gone through the arduous process of crafting a trading strategy, this is the question you must ask yourself. The ability to answer that question is the great promise that back testing holds out for all traders. A successful back testing procedure will greatly reduce the probability that you will begin trading with either an unprofitable strategy or one that does not meet your expectations.

By adopting a sound and rigorous back testing approach, you will: -

- *Pinpoint which approaches to the market that is likely to be successful and which ones are not.*
- *Generate good estimates of future performance for each trading strategy you test.*
- *Create a record of your trading strategy's historical trading performance.*
- *Produce data necessary for other components of your trading approach such as your asset allocation strategy.*

Profitability is not the only criterion by which a trading system should be evaluated. Drawdown and stress should equally be considered as well. Before you open a trading account, are you satisfied that your system is reliably profitable? Will drawdowns wipe out your account? Is your system trading in a way you can tolerate? Can you tolerate long periods of no trading or too much trading? Can you tolerate a large string of losses? The only way to answer these questions is to subject your trading system to extensive back testing.

TradeSim addresses all of these issues whilst exploring new ground in technical analysis and uncovering new issues that have not been addressed by current software technologies. To understand some of these aspects in more detail we need to look at some of the issues of the trader using technical analysis. We shall start with some of the myths that are usually spread throughout the trading community.

Traders' Myths

There are many myths surrounding the subject of trading. You only have to read some of the traders' Internet forums and textbooks on technical analysis to see many of the unsubstantiated comments and claims made about particular trading systems. This is not because people are not informed; quite the contrary as most traders using technical analysis have probably read over a dozen books on the subject. The real reason stems from the fact that there are not many tools around which allow the technical analyst to easily and objectively substantiate and verify the many claims that are made. The result of this is that a lot of unsubstantiated claims are made, and the onus is not on the person making a claim to prove it himself; but rather it is the responsibility of others to disprove a claim before using the advice. With TradeSim, verifying these claims is no longer difficult because TradeSim has comprehensive and in-depth analysis capabilities that go way beyond the capabilities of conventional charting and technical analysis packages.

Just to give you an example of some of the unsubstantiated comments that are usually made, the following are but some of the more common traders' myths and propaganda that are repeated many times over:

"I think I have found the Holy Grail of indicators. These indicators work really well when I overlay them on a chart"

This is a typical comment from new entrants in the Technical Analysis arena. They spend vast amounts of time looking for something that just isn't there. Even worse is the fact that they will spend a vast amount of money on books and magical software solutions that promise the ability to predict and outwit the markets movements. Let me say this and I will quote Van Tharp³⁾, "prediction has nothing to do with good trading". The so-called "Holy Grail" indicators may look good on a single chart when the overall trend of the market is bullish. Remember the saying that a bull market is no substitute for brains! However when it comes to actually trading this system or back testing using a true portfolio trade simulator such as TradeSim a different story usually unfolds because back testing the system over a longer period or simulating it over a portfolio of securities will usually show up its weaknesses due to diversification.

The following myth regarding invalid statistical hypothesis is one that is repeated time and time again, however its implications regarding what is the actual truth is usually not so obvious. Typically you often hear the following comment that goes something like this: -

"I've been trading this system for one year now and I am ahead. I can honestly say that this is a profitable trading system."

Yes you may have traded this system and it may have been profitable for you but one year is hardly enough time to draw any conclusions. Even worse is the fact that someone else could have traded the same system for exactly the same amount of time and just by selecting a different set of securities the result may have yielded a net loss after the same period of time. What conclusion can you possibly draw from these two experiments? Absolutely none, yet some traders will draw conclusions about their trading system from only trading it one time with only twenty or so active trades. The hypothesis of trading a system once and concluding that it is a profitable system is a fallacy without some sort of in-depth quantitative analysis to back up the hypothesis that the trading system is a historically profitable one. To prove a point, we took the following trading system based on a 9-day MACD crossover and simulated it over 5 years using a portfolio containing the ASX top 200 stocks.

```
EntryTrigger := Cross (MACD () , Mov (MACD () , 9 , E ) ) ;
EntryPrice := CLOSE ;
ExitTrigger := Cross ( Mov (MACD () , 9 , E ) , MACD () ) ;
ExitPrice := CLOSE ;
InitialStop := 0 ;           { no initial stop used }
```

We used the "Equal Dollar Units" position size model with \$5000 dollars allocated to each trade and started with an initial capital of \$50,000 and allowed for a total transaction cost of \$20.

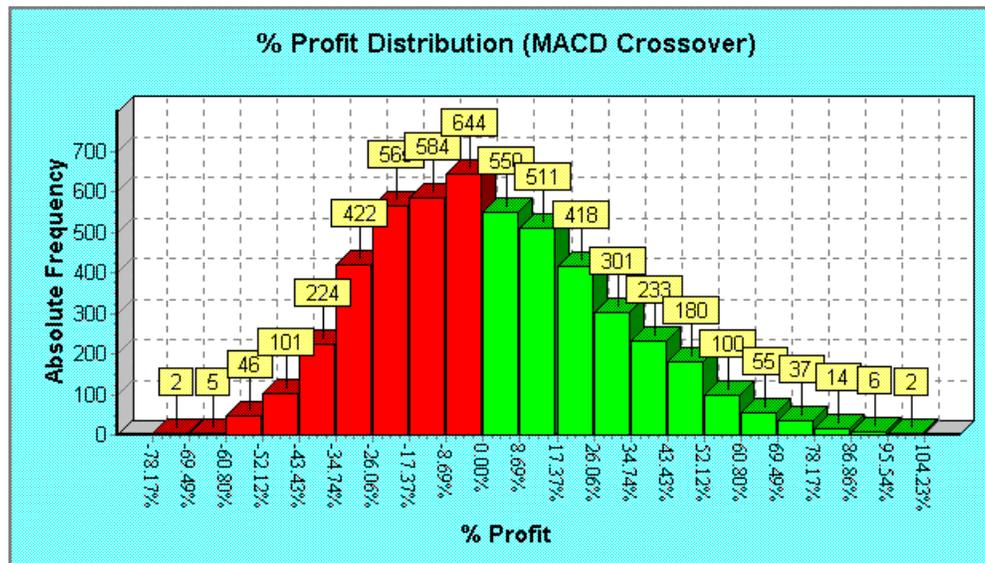
Our first simulation yielded a net profit of 27.93%. Although this is nothing to write home about it is a profit none the less. What conclusions can we make about this trading system? Historically speaking can we conclude that this trading system has always been a profitable one? If we were back testing one security then we could be fairly confident with the single outcome since the outcome would be unique; that is, repeated back testing would always yield the same results.

However, since we are now trading a portfolio of securities, this opens up the possibility of selecting many different permutations and combinations of trades that meet our trading criteria. Thus we are no longer faced with a unique outcome when trading the system across a portfolio. In actual fact the outcome from the first simulation was just one of the many possible outcomes from the many different simulations with each simulation producing a different outcome. What about the other possible outcomes? When trading with a portfolio of securities, most technical analysts don't realize that the trading system no longer produces a unique outcome, or that any other outcomes will yield similar results; this is because they usually back test their trading system with a system tester that is limited to only one security at a time. Is it possible to draw any conclusions about the trading system without some sort of in-depth analysis?

Just to prove a point we ran another simulation on the same trading system but this time with random walking of trade selection with identical entry dates. With this option enabled the simulator randomly selects trades from a group of trades with identical entry dates that meet our trading criteria and enters new trade positions according to the position size model used. After running the simulation the

system displayed an overall loss of 32.4%. Running another simulation came up with a profit of 2.48%. Contrary to what most traders would expect, what we are seeing here is an inconsistency in the outcomes giving weight to the fact that one cannot possibly draw a conclusion from only trading a portfolio once. To thoroughly evaluate this trading system we ran a Monte Carlo simulation using TradeSim (Enterprise Edition) and generated the following net profit distribution chart. A Monte Carlo analysis is used to repeatedly analyse a system with the aim of exhaustively testing it with every possible combination of trade combinations. (See the Chapter on Advanced Statistical Techniques for more information.)

A profit frequency distribution chart for this trading system was produced by running 5000 simulations on the trading system with each simulation generating a unique and random selection of trades that met the entry date and position-sizing requirements. Note how the distribution chart resembles the classic bell-shaped normal probability distribution function. Thus for the first time we can completely characterize a trading system's performance by exhaustively testing every possible trading combination and then analysing and correlating the resulting data. This is something that is impossible to do with standard charting and spreadsheet packages.



Note that for this example more than half of the trade simulations produced a loss, implying that this system has less than a 50% chance of being profitable and is one that would not be recommended for trading. An even worse aspect is the fact that we have not included any trade transaction costs, which would only serve to reduce bottom line profitability and shift the profit distribution curve to the left. With all other things being equal the outcome of a trading system when trading a portfolio of securities depends on the chance selection of securities, which is why one trader will obtain different results compared to another trader trading an identical trading system under the same conditions for the same period of time.

When trading a system using a portfolio of securities the outcome of the trading system can now be considered to be a random event characterised by a discrete probability distribution function. This characteristic of a trading system is always overlooked using conventional charting packages because the system testers built into most charting packages are limited to testing a single security at one time. Therefore the most important information used for deducing and characterising the performance of a trading system is not available and so the true performance of a particular trading system is never fully understood.

The most important issue here is that one could easily have been fooled into believing that the system was quite good if it had only been simulated once and it had produced a reasonable profit outcome that fell in the vicinity of the right tail of the profit distribution chart. This is why we cannot draw a conclusion trading or simulating a system once when we are trading with a portfolio of securities.

The next myth regarding the Holy Grail of entry-strategies is one that can never be emphasized enough.

“I am currently working on a new entry system which should improve my profitability”

There is a common misconception amongst new traders that the entry strategy is the most important aspect of a trading system. A lot of time is spent crafting trading systems by inventing new entry strategies. What is not realized is that the entry strategy has the least effect on system profitability, whereas the exit and position-sizing strategies will have the most profound effect on long-term profitability³). This is where proper back testing would have alerted you to this fact. Substituting your entry system with a random entry such as the outcome of a coin toss will make very little difference in the net profitability of your trading system. In fact using a random entry such as a coin toss will most likely improve system performance providing you have chosen a good position-sizing strategy because more trades will be taken compared with using a deterministic entry strategy. The external MetaStock Plug-In, which comes with TradeSim, includes a random number generator, which makes this procedure relatively simple.

The next myth is usually propagated by promoters of Black-Box trading systems who boast about having better than 80% winning trades from their systems.

“Only systems which have more winning trades than losing trades will be profitable in the long run.”

Without having any understanding of basic probability theory, winning trades are only part of the story when it comes to devising a statistically sound trading system. This is a trap, which many traders fall into. They believe that in order to be profitable in the long run their trading system must yield more winning trades than losing trades. If the average winning amount is the same as the average losing amount then this will be the case. However this will rarely be the case and most successful traders usually trade systems, which have more losing trades than winning trades. How can this be so? In order to understand this better it is necessary to understand the nature of random processes and talk in terms of trade expectation, which is a measure of the average outcome per trade over a large number of trades. This is defined by the following mathematical relationship³);

$$\text{Expectation} = P_W * A_W - P_L * A_L$$

Where;

P_W is the probability of a winning trade

A_W is the average win

P_L is the probability of a losing trade

A_L is the average loss

As an example consider a trading system that has 90% winning trades with an average win of \$270; as well as 10% losing trades with an average loss of \$2700. Plugging these values into the above formula reveals the truth about this system.

$$\begin{aligned} \text{Expectation} &= (0.9 * 270) - (0.1 * 2700) \\ &= -\$27 \text{ per trade} \end{aligned}$$

The negative expectation yields a system that is right 90% of the time, but you eventually lose all of your money trading it! Now consider a system, which has 40% winning trades with an average win of \$400 and 60% losing trades with an average loss of \$200. The trading expectation of this system tells another story contrary to most people's beliefs of what constitutes a winning trading system.

$$\begin{aligned} \text{Expectation} &= (0.4 * 400) - (0.6 * 200) \\ &= +\$40 \text{ per trade} \end{aligned}$$

Although this system only has a success ratio of 40% it is profitable in the long term simply because it has a positive expectation. Although a trading system with two possible outcomes is a rather over simplistic

view of a trading system, Van Tharp in his book *Trade your way to financial freedom3*) explores this concept in much more detail.

Designing a Holy Grail Trading System

Before we talk about Holy Grail Trading systems we should emphasize the following point:

“Nothing and no one can predict the future movements of the markets.”

If anyone tells you otherwise then they are trying to mislead you. It is amazing how many traders using technical analysis think that it is a substitute for crystal ball gazing. Some traders go to great efforts seeking the Holy Grail of indicators in order to outwit the markets:- there are none! At best we can only talk in terms of probabilities and not absolutes. What we are looking for is a way of giving us a market edge so that the balance of probability is in our favour whether or not we are trading in unfavorable market conditions. This does not mean that we need to be concerned about exactly what trades will be profitable and what ones won't be. As long as the losses are constrained with good money management strategies, what we can be assured of is that in the long run we can be trading with a reliably profitable and robust trading system that can be used across a broad market and one that will survive during periods of adverse movements in the market.

Some traders will argue that you need to readapt your trading system to changing market conditions, however these traders never seem to be able to provide any in-depth statistical analysis to substantiate their claims. If you use different trading strategies for different market conditions then you will still need to back test these strategies to see where their strengths and weaknesses lie. TradeSim's in-depth analysis will alert you to which systems are potentially profitable and which ones to stay clear of!

The following fact is more of a rule than a fact and has more to do with devising a successful trading strategy than anything else. It is the foundation of any good money management rules, which is essential to any successful trading system.

“Cut your losses and let your profits run”

Basically this rule tells us that any trading system you devise should have built in protection to minimize losses whilst maximizing profits. If this rule is not adhered to in your trading system then one can be fairly certain that your trading system will be doomed to failure. This is because a successful trading system is not about being profitable on every trade but rather at a minimum it is about preserving your capital, which leads us to the next important fact regarding trading.

Always aim to preserve your capital.

This statement follows on from the previous statement regarding maximizing profits and minimizing losses. The main purpose of any trading system is to preserve capital. This may at first seem like a pointless and futile exercise, because after all, why would you invest all of your time and effort, and risk all of your money for little or no return when you can leave the money in a bank account and earn a measly amount of interest for doing nothing? However what most people don't realise is that trading offers the ability to control losses but not the profits. You cannot predict how much profit you will make but you can at the very least aim to preserve your capital base by limiting your losses. By controlling your losses and preserving your capital base the profits will follow. Don't be concerned with how much profit you will make on any one trade. If you aim to limit your losses on each trade then the profits will follow automatically.

Now that we have covered some of the important and unimportant issues relating to trading philosophies, we shall now concentrate on issues relating to how TradeSim can fit into helping you develop a winning trading strategy rather than trying to guess a winning strategy.

The Trader's Dilemma.

Given a trading system based on a set of indicators that define entry-date/price and exit-date/price with an optional stop loss, how will this trading system perform over a period of time when trading an arbitrary group of securities?

- To truly evaluate the past performance of a trading system we need a trading simulator, which mimics the day-to-day trading activities of a typical trader.
- Trading Simulators based on a single security are fairly limited in their ability to evaluate the performance of a trading system across a multiple security portfolio so we need more powerful analysis tools. Until now this kind of software has been out of the reach of most traders who use technical analysis.

Important facts regarding TradeSim

The following are facts regarding the capability of TradeSim that are important to any prospective trader who uses back testing as part of their system development:

"Back test your trading system the way you would trade it using TradeSim® - the missing link in trading system analysis and simulation!"

TradeSim is the first true realistic trading simulator/analyser for MetaStock that can quickly back-test and evaluate a trading system across a portfolio of securities. With its powerful data processing capabilities TradeSim can evaluate the historic performance of a given trading system within a matter of seconds and do it with a realistic representation of a real life-trading scenario. Whether a single security or a multiple security portfolio, TradeSim answers the simple question: -

"What would have happened if this system had been traded in the past using an arbitrary portfolio of securities?"

Sounds simple - but is extremely complex if not impossible to do with MetaStock as it stands. However, with TradeSim it is just a simple matter of running a MetaStock exploration on a portfolio of securities using your own set of indicators. When the exploration has finished you just simply run TradeSim and analyse the resulting trade data.

"With TradeSim, MetaStock becomes more powerful than it ever was – even rivalling trading packages costing many thousands of dollars!"

You are probably not aware that to approach the functionality and power that TradeSim adds to MetaStock you would need to spend many thousands of dollars more than the combination of both packages put together. Even then, competing packages fall quite short when it comes to analysis power and options as well as simplicity of operation. TradeSim was built right from the ground up with with the professional trader in mind!

"TradeSim dispels the myths of indicator performance!"

Your system may look good with an expert overlayed on a single chart. "But what about its real world trading performance?"

Typically your system will consist of entry and exit triggers and prices, as well as an initial stop loss. These five parameters basically define a framework for a trading system. The trouble with trying to back

test a trading system is that the system tester built into MetaStock is only limited to a single security with only one position size model with a fixed initial capital. As a result this can give a very distorted view of your potential trading system performance, which can be very misleading for a number of reasons, namely:

- Because back testing has only been applied to one trading entity and not across a wide range of trading entities from different industry groups, the result is an unrealistic representation of a typical real life trading system, which is usually traded across a diverse range of securities.
- Limiting of system testing to a single trading entity will result in an inadequate number of trades. Back testing your system using one trading entity may only yield twenty or so active trades. Hardly enough to evaluate its true performance and very misleading from a statistical point of view!
- Insufficient choice of position-sizing models limits evaluating the system using a position-sizing model, which may not be optimal for the trading system under investigation.

Thinking about buying a Black-Box trading System?

You've probably been exposed to the hard sell of a Black box trading system at some time or another either through a free seminar or just passing by a stand at a home show when some salesman somehow got your undivided attention. Yes these software gadgets look and sound pretty impressive and even more impressive is the price tag, which usually starts at around the five-digit mark. You're usually invited to a seminar, which is some introduction to trading on the Stock market with computer assisted trading software - their software of course! Their black box software comes with a number of proprietary trading systems and indicators, none of which they are at liberty to disclose nor can they be reproduced by anyone else using any other software packages such as MetaStock, well so they say! The biggest attraction (illusion) that is promoted with these systems is the ability to make money with very little effort. However, nothing could be further from the truth.

The usual sales spiel is that their black-box trading system is a sure winner, and they back it up with what appears to be a few winning hindsight trading examples that are not realistic of a true trading track record, which would normally include several losing or stopped-out trades – but that is another story. If that hasn't whet your appetite they usually back up their winning trades with the leverage of derivatives. “At ten thousand dollars plus the cost of the data download the package is a bargain and will pay for itself in no time” – or will it? How does one really know? With no past credible trading results to back up their claims, what are you actually paying for when you hand over your hard earned cash or get stitched up to a finance company. I suggest that with no past trading results to back up their claims you don't touch it with a ten-foot barge pole! I'm not saying that these systems don't necessarily work; what I am saying however is that any legitimate and ethical seller of a trading system would back up his sales spiel with a proven trading record over at least five years. However a proven trading track record will no doubt include several losing or stopped-out trades, which goes against the Black-Box sales spiel of being right most of the time even though being right all of the time is not a prerequisite for a successful trading system—nor is it realistic, as it is tantamount to market prediction. Having an infallible trading record makes the black-box system more attractive to the naïve and experienced traders will no doubt be very suspicious of such claims!

The unfortunate aspect of all of this is that most punters expect to make money from the markets for very little investment of their own time and effort which is why they are quite ready to part with their hard earned cash in exchange for the promise of a money making machine that does all of the hard work for them. Unfortunately such a machine does not really exist and the vendors of these packages make more money out of selling the software to unsuspecting punters than they would if they used their own software to trade with. **Successful trading requires strict discipline and a lot of hard work and effort – there are no short cuts!** Anybody telling you different is just lying to you or profiteering from your own ignorance and lack of education.

What is even more unfortunate is the fact that it is not hard to put together a potentially winning trading system using low-cost charting and technical analysis packages such as MetaStock and TradeSim, thereby saving you money that could be used for more important things like trading capital. The choice is entirely

up to you the individual if you want to be lazy and take what appears to be the easy road, and risk buying a white elephant or put on your thinking caps and learn the ropes the hard but sure way.

Using TradeSim

To analyse or back-test a trading system requires a suitable history of trade data. Typically the trading data may have come from real trades, paper trades or computer generated trades such as a set of indicators or an expert overlaid on a chart in MetaStock.

However the downfall of using actual trade data is that usually there is an inadequate number of trades or sample points for a proper valid statistical analysis to be made. Another limitation of using past actual trading data is that the trade data has been tied to a particular trading system which reduces analysis to one trading methodology and may not reveal an optimum trading strategy for the securities of interest. In other words you could only evaluate the trading system for which you have trade data. You could of course paper trade a system but the disadvantage of this is that you would have to wait a long time to generate the trading information. For example to paper trade a system over three years would require you to spend three years of your time executing fictitious trades in order to evaluate your trading system. Even then this may be an entirely pointless exercise because it doesn't take into account all of the other hidden costs such as slippage which can make or break a trading system. A far easier and quicker method would be to let a computer-charting package generate the trade data, based on your trading criteria.

Using MetaStock to generate trading data is very difficult if not impossible to do as it stands. Traditionally a set of indicators or an expert would be overlaid on a chart and the resulting chart would be visually inspected for all of the entry and exit triggers. The dates and prices would be documented or added to a spreadsheet for further analysis. A most tedious and time-consuming task for one security let alone a portfolio of securities. Finally, after struggling to generate a database of trading data we are presented with the problem of how to analyse this data in a way that accurately represents how it would actually be traded in real life. You could of course use the system tester built into MetaStock however it is only limited to analysing one security at a time which is totally unrealistic of a real trader who usually trades many securities at the one time. TradeSim solves these issues as well as a whole lot of other issues.

To use TradeSim to back-test and analyse a trading system the procedure can be broken down into three steps as shown by the following flowchart diagram:



1. Create a trading system in MetaStock that you want to analyse based on a set of entry and exit conditions as well as an optional initial stop. As outlined in the introduction, a framework for a trading system can basically be defined using five parameters. These are Entry-trigger/date, Entry-price, Exit-trigger/date, Exit-price and an optional Initial-stop. The optional initial-stop—or money management stop as it is sometimes referred to—can be used with position-size models that use the initial stop when calculating the position size for the trade. If an initial stop is not used it should be set to zero.
2. Generate trade data using the trading criteria outlined in step 1 using a special MetaStock Plug-In that comes with the TradeSim package. A special external formula Plug-In for MetaStock has been written that allows this trade data to be written to a proprietary trade database file where it can be used by TradeSim for further analysis. This external Plug-In can be used in one of two ways. First, it can be combined with an indicator and then overlaying it on a single chart where it will generate trade data for that chart. Second, it can be used as part of a MetaStock Exploration to generate trade data for multiple securities. In either case its syntax use is similar to the syntax use for a normal indicator except that it is called using the ExtFml() function that is built into the MetaStock indicator language starting with Version 7.0 and above.

3. Finally analyse the acquired trade data by running TradeSim and using its powerful data processing analysis capabilities.

Code examples

Numerous code examples are given throughout this manual to illustrate the concepts described. Code examples are written in mono-spaced `Courier` type on a grey background frame, an example of which is shown below.

```
EntryTrigger := Cross (MACD () , Mov (MACD () , 9 , E) ) ;
EntryPrice := CLOSE;
ExitTrigger := Cross (Mov (MACD () , 9 , E) , MACD () ) ;
ExitPrice := CLOSE;
InitialStop := 0;                { optional initial stop }
```

To save time retyping these examples you can easily copy and paste these examples into MetaStock by first highlighting and copying the code into the clipboard followed by pasting the code directly into a MetaStock Indicator or Exploration. Once the code has been exported into MetaStock it can easily be changed to suit your needs or application. Feel free to use the examples as they are or experiment by modifying the examples.

Important: You can save time re-typing in formulas from the TradeSim User manual by copying and pasting formulas from the TradeSim User manual. To do this you have to click on the "Text Select Tool" on the Adobe Acrobat Reader Toolbar (i.e., the one with the 'T' and square lasso next to it). Alternatively just press the v key once you are in the Adobe reader. Once this is enabled you can copy and paste formulas from the manual as you would in a word processor or text editor.

Feature Comparison and Version Support

The following table compares the feature set between different versions of the software. The higher software version always contains a superset of the lower versions (e.g., the Professional Edition of TradeSim contains all of the features of the Standard Edition). This manual describes all features whether or not they are supported by the current version that you have purchased. Unless otherwise specified a description in this manual applies to all versions Standard, Professional, and Enterprise editions. If a feature pertains to a higher version of the software such as the Professional or Enterprise editions then a suffix will be added enclosed in braces after the item heading. For example,

Single Simulation - is supported in all versions.

Exporting the Trade Database {P,E} - is only supported in the Professional and Enterprise editions.

Monte Carlo Analysis {E} - is only supported in the Enterprise Edition.

The following table summarizes what features are supported in each version of the software. A tick ✓ in any box indicates that the feature described at the left of the table is included in the software version listed at the top of the column. A cross ✗ indicates that the feature described at the left of the table is not available in the software version listed at the top of the column.

Feature	Standard	Professional	Enterprise
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Trading Simulator	Standard Edition	Professional Edition	Enterprise Edition
True Portfolio Trading Engine	✓	✓	✓
Stocks	✓	✓	✓
Commodities	✓	✓	✓
CFD's	✓	✓	✓
Multiple Position Size models	✓	✓	✓
Full specification of Trading Parameters and Rules	✓	✓	✓
Dynamic Money Management	✓	✓	✓
Dynamic Trade Management	✗	✗	✓
Modelling of Slippage	✗	✓	✓
Multiple Security Portfolio Testing	✓	✓	✓
Simultaneous Testing of multiple Trading Systems.	✓	✓	✓
Simultaneous Testing of multiple Position Size models.	✗	✗	✓
Number of trading entities	Unlimited	Unlimited	Unlimited
Random security selection	✗	✓	✓
Basket Tester	✓	✓	✓
Fully automated Monte Carlo analysis	✗	✗	✓
Simulation of Trade Pyramid Strategies	✓	✓	✓
Trading on Margin, CFD's	✓	✓	✓
Trade by Trade specification of the Point Value, Initial Margin, Transaction Cost, Rank, Margin Requirement.	✓	✓	✓
MAE and MFE analysis	✗	✓	✓
Multiple Periodicity Trade Database Generation	✓	✓	✓
Trade Simulation Reports	Standard Edition	Professional Edition	Enterprise Edition
Detailed Report	✓	✓	✓
Performance Summary	✗	✓	✓
Trade Statistics Table	✓	✓	✓
Trade Statistics Chart	✓	✓	✓

Security Profit Chart	✓	✓	✓
Monte Carlo Report	✗	✗	✓
Full Color Printable Reports	✓	✓	✓
Rich Text Format	✓	✓	✓
Export Capability	Copy and Paste	✓	✓
Composite Report Generator	✗	✗	✓
Trade Database Manager	Standard Edition	Professional Edition	Enterprise Edition
Functionality	Basic	Advanced	Advanced
Export Capability	✗	✓	✓
Trade Log	Standard Edition	Professional Edition	Enterprise Edition
Reporting	Basic	Advanced	Advanced
Export Capability	✗	✓	✓
Dynamic Link to Charts	✗	✓	✓
Dynamic Link to the Trade Database	✗	✓	✓
Highlight Open Trades	✗	✓	✓
Charting Capability	Standard Edition	Professional Edition	Enterprise Edition
Dynamic Panning and Zooming	✓	✓	✓
Trade Inspector	✗	✓	✓
Open Trade Inspector	✗	✓	✓
Dynamic Link to the Trade Log	✗	✓	✓
Export Capability	✗	✓	✓
Stack/Link Multiple Charts	✗	✗	✓
Compressed Time Scale Charts	✓	✓	✓
Linear Time Scale Charts	✓	✓	✓
Close Trade Charts	Standard Edition	Professional Edition	Enterprise Edition
Equity Chart (\$)	✓	✓	✓
Equity Chart (%)	✓	✓	✓
Weekly Net Profit Chart	✓	✓	✓

Weekly Return Chart	x	✓	✓
Monthly Net Profit Chart	x	✓	✓
Monthly Return Chart	x	✓	✓
Yearly Net Profit Chart	✓	✓	✓
Yearly Return Chart	x	✓	✓
Capital In Trades Chart	x	✓	✓
Drawdown Chart	x	✓	✓
Underwater Equity	x	✓	✓
Reward/Risk Ratio (R-multiple) Chart	x	✓	✓
Winning Trades (%) Chart	x	✓	✓
Losing Trades (%) Chart	x	✓	✓
Portfolio Heat (\$)	x	✓	✓
Portfolio Heat (%)	x	✓	✓
Open Trades	x	✓	✓
Trade Profit Distribution	✓	✓	✓
R-multiple Distribution	x	✓	✓
Open Trade Charts	Standard Edition	Professional Edition	Enterprise Edition
Bar by Bar Open-trade equity	x	x	✓
Bar by Bar Closed-trade equity	x	x	✓
Bar by Bar Drawdown	x	x	✓
Bar by Bar Underwater Equity	x	x	✓
Weekly Profit	x	x	✓
Weekly Return	x	x	✓
Monthly Profit	x	x	✓
Monthly Return	x	x	✓
Yearly Profit	x	x	✓

Yearly Return	x	x	✓
Other Charts	Standard Edition	Professional Edition	Enterprise Edition
Security Bar Charts	x	x	✓
Advanced Statistical Analysis	Standard Edition	Professional Edition	Enterprise Edition
Fully automated Monte Carlo analysis	x	x	✓
Advanced statistical analysis	x	x	✓
MetaStock Interface	Standard Edition	Professional Edition	Enterprise Edition
Simple interface to MetaStock	✓	✓	✓
Trade Database generator	✓	✓	✓
ToolBox	✓	✓	✓
MetaStock Formula Extension Library	✓	✓	✓
Portfolio security list generator	✓	✓	✓
Random number generator	✓	✓	✓
Fast Trailing Stop Function	✓	✓	✓
Symbol length filter function	✓	✓	✓
Support for Trade Pyramid Strategies	✓	✓	✓
Miscellaneous	Standard Edition	Professional Edition	Enterprise Edition
User Manual	Online/PDF format	Online/PDF format	Online/PDF format
Sample Trade Database Files	✓	✓	✓
License Period	Unlimited	Unlimited	Unlimited
Import/Export Text Trade Database and CSV files	x	✓	✓

Software Requirements

To generate trade data for use with TradeSim you will need MetaStock Version 7.0 or above. If you are using an earlier version of MetaStock you will need to contact Equis (www.equis.com) or the vendor you purchased your software from in order to upgrade to a later version. The following information suggests configurations for using TradeSim:

Minimum Configuration

Microsoft Windows Windows 2000, Windows XP
Pentium III or Equivalent running at 800MHz
256 Megabytes (256 Mb for XP and 2000) of RAM or greater
20 Megabytes of free hard disk space
Screen Resolution of 1024x768 or better with 256 colors or better.

Software Installation

The installation of TradeSim is fairly straightforward and should not present any problems provided that the following instructions are carried out. After downloading the *SetupTradeSim.exe* file into a temporary folder on your hard disk run the *SetupTradeSim.exe* program by either double clicking it using the Windows Explorer or selecting **Run** from the **Start** menu and select the *SetupTradeSim.exe* program that you downloaded. You should be greeted with the following screen:



You can view any last minute additions as well as the modification history by clicking on the **More Information** button.

Warning Do not change the default installation directories from the Advanced Options dialogue box. These have been automatically determined and should not be altered. At the very least both TradeSim and Metastock should be installed on the same drive and in the default Windows “Program Files” directory.

You can select which components you want to install by clicking on the **Select Components** button, however new users should not need to worry about this and simply proceed with the installation by clicking on the **No-Questions-Asked Installation** button.



After TradeSim has been successfully set up, the TradeSim icon will be placed on the desktop. TradeSim can be run by double clicking the TradeSim icon on the desktop. Alternatively it can be run from the TradeSim program menu, ie. [Start → Programs → TradeSim → TradeSim]

Installing the MetaStock® Formula Library and Examples.

During installation the Metastock Formula Setup program 'FOSetup.exe' will be copied across to the TradeSim program directory. The Formula Setup program contains all of the support programs needed by Metastock in order to work with TradeSim. It also contains some example indicators, explorations and experts.

Warning: The formula setup program will attempt to overwrite any existing indicators and explorations that were installed using a previous TradeSim setup program, so if you have modified the formulas in any way it would be advisable to either make a copy or to rename them.

If Metastock is already installed on the system the Formula Setup program will automatically be run at the end of the installation. However if Metastock is installed and the Formula Setup program is not run (i.e., the system had to be rebooted) you can install it at anytime by running it from the TradeSim program directory.

If you need to reinstall or update the library you will need to run the formula set-up program *FOsetup.exe*, which is installed in the TradeSim program directory. To run *FOsetup.exe* just run *FOsetup.exe* from the TradeSim program menu, i.e., [Start → Programs → TradeSim → MetaStock Add-ons → MetaStock Formula Setup] then follow the setup instructions.



Manually installing the TradeSim.DLL Plugin

If you can't get the formula setup to work you can still manually install the plugin by following the instructions below.

Make sure Metastock is not running. Open up file explorer and copy Tradesim.DLL from

C:\Program Files\TradeSim\Plugins

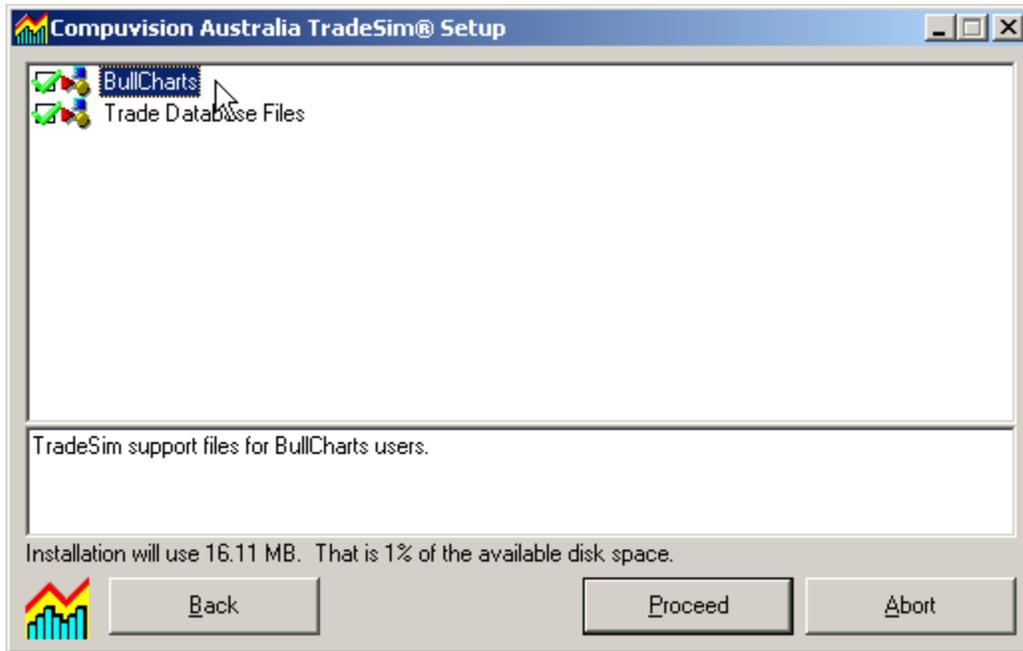
To :-

C:\Program Files\Equis\MetaStock\External Function DLLs

Note: The actual location of the files may differ depending on how you have installed the software.

Installation for BullCharts® Users

BullCharts® users can install the TradeSim support files for use with BullCharts. The setup installation program will automatically detect if BullCharts is installed and automatically configure the installer to install the necessary support files to use BullCharts with TradeSim. If necessary you can enable or disable installation of the TradeSim support files for BullCharts from the installer itself by clicking on the 'Select Components and Install' button from the main installation window. If you already have BullCharts installed it is advisable to check to see if this option has been enabled as shown in the example screen grab below.



At the end of the installation and if support for BullCharts has been enabled the 'TradeSim.dll' DLL file should have been installed in the BullCharts directory i.e., [C:\Program Files\BullSystems\BullCharts\External Function DLLs]

Registering the Software

Warning: TradeSim uses an advanced copy protection scheme to thwart software piracy. The protection software is transparent to the operation of the underlying software so it should impose no problems to the user. Our policy regarding Copyright is that we don't believe people who genuinely purchase our products should be underwriting those who don't. As a business we cannot possibly survive if our product is being stolen and resold at a discount thus depriving us of valuable revenue needed to keep our business in operation and to provide genuine purchasers with a service for which they have genuinely paid for. In exchange for the minor inconvenience we offer a 12-month free upgrade period.

If you have been sent unsolicited emails regarding pirate-trading software do not be tempted to purchase anything from these unscrupulous operators. These operators are usually run by scam artists under the guise of a single person being the front-runner for organized crime syndicates. The software they offer does not work correctly, and usually contains viruses and Trojans. Also you won't be eligible to receive updates that are free if you were to purchase directly from any authorized TradeSim resellers.

NOTE: The previous versions(4 & 5) of TradeSim used an online activation registration scheme. Due to incompatibilities on some users machines we have changed to a new file registration scheme.

Requesting a License Key

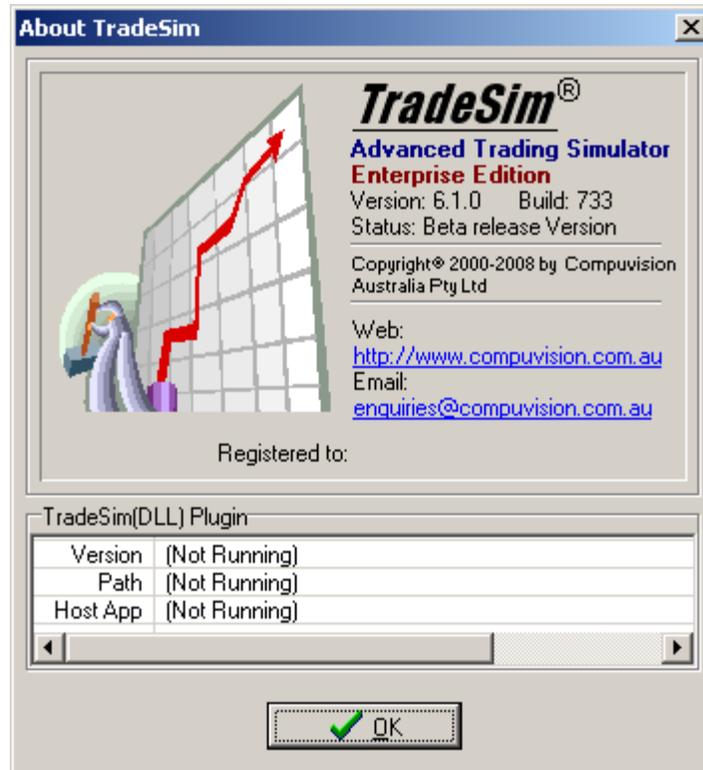
When TradeSim is first installed and run it will operate in Trial mode for so many days with all of the features of the Standard Edition. When TradeSim is run in Trial mode or the trial has expired it will always

ask you whether or not you want to register the software in which case you should click 'Yes' if you have purchased a valid license. Then follow the on screen instructions to request a license key.

Once you have been sent the license key, enter the details into the registration box and activate your software.

The current License Status.

The current status of your TradeSim License can be found from the Help menu ie go Help → About.



Uninstalling the Software

Uninstalling TradeSim

TradeSim can be uninstalled one of two ways. TradeSim can be uninstalled by clicking on the “Add or Remove Programs” software icon from the Control Panel and selecting TradeSim from the list. Alternatively, TradeSim can directly be removed by running the uninstaller from the TradeSim Program menu. Either way, just follow the instructions of the uninstaller to uninstall TradeSim.

Note: Uninstalling TradeSim will not remove the plugin from either or both of the Metastock or BullChart’s directories. This will have to be done manually as explained in the next section.

Removing the TradeSim Plugin

Removing the TradeSim Plugin from Metastock

Note: It is recommended that you remove the plugin if TradeSim has been uninstalled otherwise every time Metastock is run the plugin will attempt to run TradeSim

Make sure Metastock is not running and delete TradeSim.dll from the external plugin directory. It is usually installed in the following directory on your drive:-

C:\Program Files\Equis\MetaStock\External Function DLLs

Note: The actual directory where the plugin is installed may vary depending on how you have installed Metastock on your PC.

Removing the TradeSim Plugin from BullCharts

Make sure BullCharts is not running and delete TradeSim.dll from the external plugin directory. It is usually installed in the following directory on your drive:-

C:\Program Files\BullSystems\BullCharts\External Function Dlls

Note: The actual directory where the plugin is installed may vary depending on how you have installed BullCharts on your PC.

Installing WinHelp for Windows Vista

TradeSim uses WinHelp to display some context sensitive help. Windows Help (WinHlp32.exe) is a Help program that has been included with Microsoft Windows versions starting with the Microsoft Windows 3.1 operating system. However, the Windows Help program has not had a major update for many releases and no longer meets Microsoft's standards. Therefore, starting with the release of Windows Vista, the Windows Help program will not ship as a feature of Windows. If you want to view 32-bit .hlp files, you must download and install the program (WinHlp32.exe) from the Microsoft Download Center.

Click here to install WinHelp for Windows Vista

<http://www.microsoft.com/downloads/details.aspx?FamilyId=6EBCFAD9-D3F5-4365-8070-334CD175D4BB&displaylang=en>

Quick Start

Before you do anything we suggest that you read the introductory chapter of this manual and familiarize yourself with the concept of TradeSim.

You can run TradeSim straight away and familiarize yourself with its operation by using some of the example trade database file examples that were installed during the setup procedure. At this stage it is not necessary to understand the mechanics of generating trade database files to use the example database files with TradeSim. For a rundown on the operation of TradeSim you should read the chapter [Quick Start Tutorial](#). After you have familiarized yourself with the operation of TradeSim then you should reread this manual from the start.

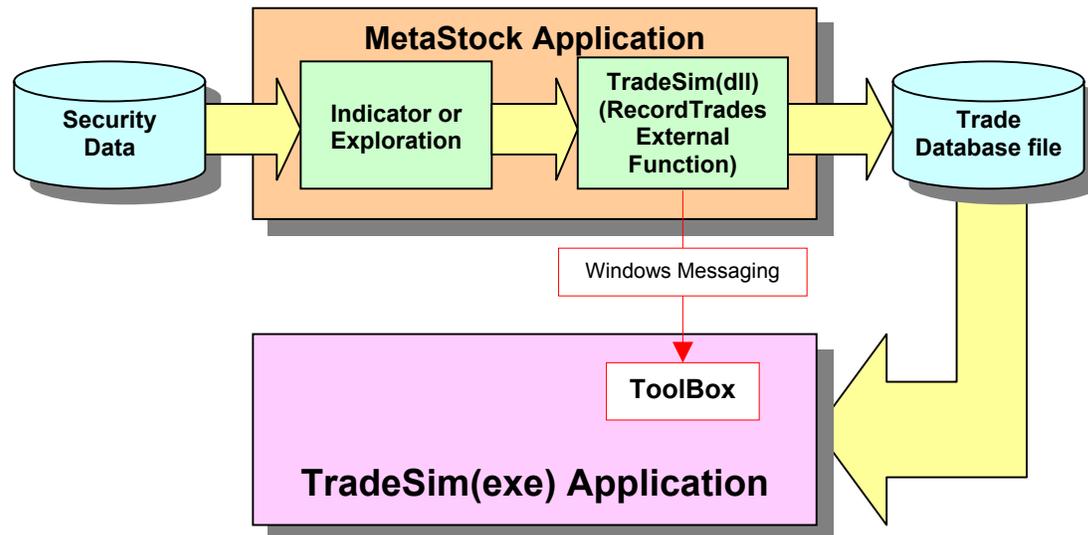
Quick Start Tutorial

This chapter has been moved into a separate document called [“Quick Start Tutorial”](#). This document will have been installed in the TradeSim Program directory and can be viewed by accessing the TradeSim Program menu or via the Help menu in TradeSim.

Generating Trade Data

Note: It is strongly recommended that you always rebuild your trade database files with the latest Metastock/TradeSim Plug-In before simulating them with TradeSim. Small changes to the trade database produced by later versions of the Plug-In can sometimes have dramatic effects on the simulation results. The current Version of TradeSim.dll Metastock Plugin is Version **8.0.0**. Please check the Readme file installed with TradeSim for the revision list of the current Plug-In.

To analyse a trading system using TradeSim requires a source of trade data. This should not be confused with security data that is used by the charting program itself. The key to generating the trade data from MetaStock lies in a custom external function called RecordTrades(...) which is part of an external DLL Plug-In that was installed when TradeSim was installed on your computer. By incorporating this function into your indicators or explorations this external function can be used to generate a trade database for a single security or for multiple securities. A flow diagram of the whole process is shown in the following diagram.



Security data is read into MetaStock either by loading up a chart or running an Exploration. MetaStock then calls the *RecordTrades* external formula, which writes the trade data to a trade database file, which can be later read and used by TradeSim for analysis.

Note that this aspect of the whole process is probably the most difficult and tedious of all since MetaStock does not provide us with the most streamlined interface to the outside world. However we have taken the drudgery out of creating a trade database so a bit of perseverance, patience and some elbow grease will go a long way. The rewards to the user being that things start getting easier after you have mastered this aspect of the whole process.

The TradeSim External DLL MetaStock Plug-In.

Typically a trading system will consist of entry and exit triggers and prices, as well as an optional initial stop-loss parameter. These five parameters basically define a framework for a trading system. The function used to record the trade data is contained in an external DLL function called 'TRADESIM.DLL' and is

stored in the MetaStock external function directory after it has been installed. The syntax of the RecordTrades function is shown below.

```
ExtFml ( "TradeSim.RecordTrades", { 1. Name of external function }
    "TRADE_FILENAME",           { 2. Trade Data Filename }
    TRADE_POSITION,            { 3. Trade Position Type }
    EntryTrigger,              { 4. Entry Trigger }
    EntryPrice,                { 5. Entry Price }
    InitialStop,               { 6. Initial Stop }
    ExitTrigger,               { 7. Exit Trigger }
    ExitPrice,                 { 8. Exit Price }
    START);                    { 9. Trade Recorder Control }
```

Note that because we are calling an external formula we need to use the ExtFml() function that is part of the MetaStock indicator language for Version 7 and above. (If you are using an earlier version of MetaStock before Version 7 then you will need to contact Equis or the vendor you purchased the software from in order to upgrade to a later version.) A detailed description of the parameters for the RecordTrades external function is given in the table below.

Parameter	Description	Allowable Values
1	The name of the external function along with the name of the external DLL that contains it	"TradeSim.RecordTrades"
2	The Trade database filename in quotes. If this file does not exist it will be created when the RecordTrades function is called.	Any file name e.g., "My Trades", "MACD Long" Note: When specifying a trade database filename do not use any characters that are not permitted in normal file naming convention such as \/:*?<>|. Do not specify a path and filename extension. All trade database files are automatically appended with a .trb extension and are stored in the "c:\tradesimdata" directory.
3	The Trade Position parameter, which specifies whether the trade is on the long or short side.	LONG or SHORT to record long or short trades respectively.
4	The Entry Trigger parameter is used to specify when to enter a trade. It can be any formula, which gives a binary result.	Any formula which gives a binary result e.g., Cross(MACD(),Mov(MACD(),9,E))
5	The Entry Price parameter is the price of the underlying security when the Entry Trigger is true. It can be any formula or predefined data array.	Any formula or predefined data array such as CLOSE, OPEN, HIGH, LOW, (H+L)/2 etc.
6	The optional Initial Stop parameter is used for trading systems, which rely an initial stop when calculating the position size for a trade. It can be any formula or predefined data array.	If the Initial Stop is not used it should be set to zero, otherwise it can be any formula or predefined data array e.g., CLOSE-3*ATR(10)
7	The Exit Trigger parameter is used to specify when to exit a trade. It can be any formula, which gives a binary result.	Any formula that gives a binary result e.g., C < Ref(H,-1)
8	The Exit Price parameter is the price of the underlying security when the Exit Triqger is true. It can be any formula or	Any formula or predefined data array such as CLOSE, OPEN, HIGH, LOW (H+L)/2 etc.

	predefined data array.	
9	The Trade Recorder control parameter is used to control the trade recording process. It is always set to START for the first reference to the Trade Recorder function call in an indicator or exploration. In subsequent calls to the Trade Recorder function it is set to CONTINUE.	START, CONTINUE

Problems using the TradeSim Plug-In

We digress at this point to remind users that it is important to understand the limitations and problems that can arise when using the MetaStock plugin. These issues are covered in detail at the end of this chapter in 'Problems using the TradeSim Plug-In', and we suggest that you come back to it after you have familiarized yourself with all of the concepts in the remaining sections of this chapter.

RecordTrades function limitations

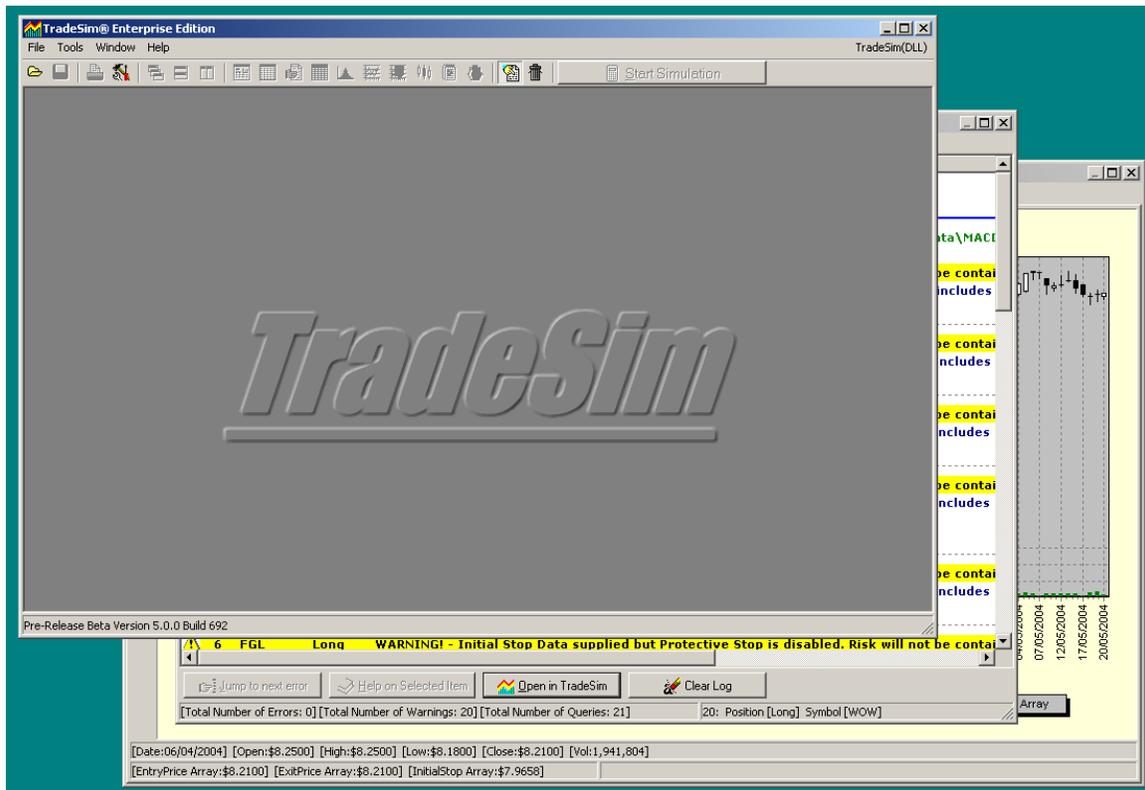
Due to the limitations of the TradeSim/MetaStock external DLL interface there can be a problem when you try and rerun the same exploration with different portfolios, particularly when the first security is different in each of the portfolios. The external Plug-In contains a number of variables that keep track of the database name along with the first security symbol. If you rerun a record trades exploration with a different portfolio, which has a different first security symbol name, the trade database file may not be reset or rewritten correctly. Please keep this in mind when you are using MetaStock to create a trade database file. These issues are covered in detail at the end of this chapter in 'Problems using the TradeSim Plug-In'. Essentially the symptoms of this problem are that the database may contain duplicate trades or exclude some trades. There are three ways around this problem:

1. First, use different explorations with different trade database filenames when creating trade databases using the same trading system but with different portfolios (e.g., "My Trades ASX100", "My Trades ASX200" etc.) The idea being that you always use the same portfolio list with the same trade database file and don't use the same trade database file name with different portfolio lists.
2. Run a different trade database exploration with a different trade database filename before you rerun the same trade database exploration.
3. Alternatively, delete the trade database (.trb) file before regenerating it. Trade database files are stored in the c:\tradesimdata directory. This will force the RecordTrades function to reset any internal variables and regenerate the trade database file correctly.

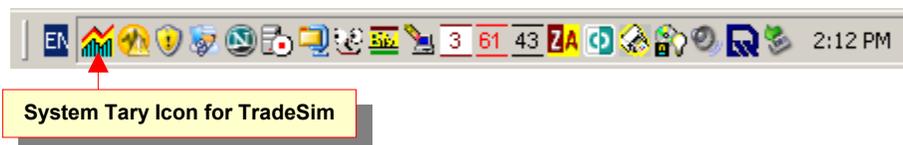
The ToolBox

The ToolBox is an aid, which assists the user when creating a trade database. Although the ToolBox components are built into the TradeSim application itself the TradeSim plugin (TradeSim.dll) communicates with it using a messaging scheme. This allows seamless integration within the Metastock environment even though the functionality of the ToolBox is built into the TradeSim application itself.

The ToolBox contains a new [Report Log Tool window](#), which replaces the previous ErrorLog.txt file. In addition there is also a [Signal Chart Tool window](#), which can be brought up for a given Symbol when a trade database exploration or indicator is invoked with the appropriate symbol. This can assist in debugging a trading system by carefully inspecting the trade signals it produces for a given security.



The ToolBox is accessible when TradeSim is started. If TradeSim is not already running when Metastock is started it will automatically be run so that it is immediately available. When TradeSim is invoked by running Metastock, TradeSim is run in a minimized state and an icon is automatically placed in the system tray, which is also used for denoting the current status of the Report Log.



This icon can change depending on the status of a trade database exploration. When a trade database exploration is run the appropriate icons are displayed according to the table below.

System Tray Icon	Trade Database Exploration Status
	When Metastock is first run the plugin automatically runs TradeSim in a minimized state. Clicking on this icon will restore TradeSim to its normal size.
	When this icon is flashing a Trade Database exploration has been run from within Metastock and informational messages have been written to the Report Log. The Report Log will automatically be displayed.
	When this icon is flashing a Trade Database exploration has been run from within Metastock and information as well as warning messages have been written to the Report Log. The Report Log will automatically be displayed.
	When this icon is flashing a Trade Database exploration has been run from within Metastock and information, warning as well as error messages has been written to the Report Log. The Report Log will automatically be displayed.

Clicking with the right mouse button on the TradeSim Icon will popup a menu.



This menu can also be accessed from the TradeSim menu bar. However unlike all of the other menus it is located at the right hand side of the menu bar.

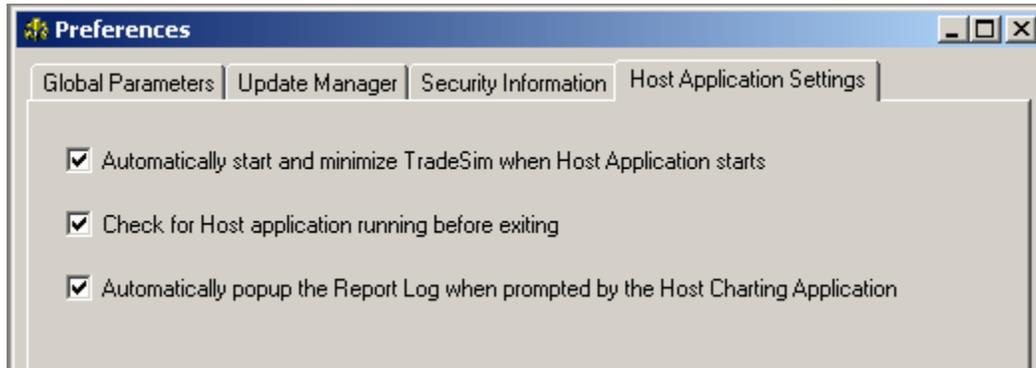


The Tool Box Task Bar Menu

- ❑ **Open Report Log**
Displays the Report Log Window if available and the host charting application is currently displayed. If the Report Log Window is already open then selecting this option will bring this window to the foreground.
- ❑ **Open Signal Chart**
Displays the Signal Chart Window if available and the host charting application is currently displayed. If the Signal Chart Window is already open then selecting this option will bring this window to the foreground.
- ❑ **Lock Windows**
When enabled the Report Log and Signal Chart Windows are locked to the TradeSim Main Form even though individually they can be resized and moved independently.
- ❑ **Automatically Popup the Report Log**
When enabled the Report Log window will be shown and brought to the front when a trade database exploration is run in Metastock and messages are being sent to TradeSim to alert the user. By turning off this option the Report Log will not automatically popup but the balloon hint will still be displayed from the system tray alerting the user of impending messages.
- ❑ **Quit TradeSim**
Quits the TradeSim application.

Host Control Options

You can control the way that TradeSim interacts with the Host program. The Host application is one that directly uses the tradesim.dll plugin, which includes ether Metastock or BullCharts. All of the host controls are accessible from the global preferences.



- ❑ **Automatically start and minimize TradeSim when Host Application starts**

This option allows TradeSim to start in a minimized state when the host charting application starts. The default option is enabled. This can be switched off so that TradeSim is only started when a trade database is run. It is preferable to have TradeSim running in the background when the host application starts because there can be some side effects if it is not running and the functions required by the plugin are not available.
- ❑ **Check for Host application running before exiting**

This check is done when TradeSim is exited so that the user is alerted to the fact that the host application is still running and would still require TradeSim to be active if a trade database exploration is being run and the appropriate messages are sent to the report log from the host application. In some cases this check can take a longer amount of time than usual.
- ❑ **Automatically popup the Report Log when prompted by the Host Charting Application**

Any time the host application sends a message to TradeSim to be displayed in the report log the report log automatically pops up to the foreground. This can slow down the system if there are many messages being sent to TradeSim. You may want to disable this option so this feature can be turned off. Even if this feature is disabled the balloon hint will still be activated thus alerting the user to any new messages that maybe sent to the report log.

Report Log Tool Window

The Report Log Window is updated when the RecordTrades function is called from within Metastock and provides feedback pertaining to many types of messages.

#	Symbol	Position	Description
Report Created on: 27/01/2006 2:50:19 PM Trade Database File: [C:\tradesimdata\MTLCFD1 4ATR50 in3 trail14.trb]			
1	AMP	Long	Opening trade database file and Writing Trade Database Header for [C:\tradesimdata\MTLCFD1 4ATR50 in3 trail14.trb] Trade Database Version 8
1	AMP	Long	ERROR! - Trade rejected because error found in trade for [AMP] on 17-Jan-2006 caused by Invalid Exit Price Data. CAUSE: [Exit Price(6.438193)] is less than [Exit Bar Low Price(7.880000)] HINT: To see the rejected trade details call the ShowRejectedTradeDetails function in your exploration code.
1	AMP	Long	ERROR! - Trade rejected because error found in trade for [AMP] on 17-Jan-2006 caused by Invalid Exit Price Data. CAUSE: [Exit Price(6.438193)] is less than [Exit Bar Low Price(7.880000)] HINT: To see the rejected trade details call the ShowRejectedTradeDetails function in your exploration code.
1	AMP	Long	ERROR! - Trade rejected because error found in trade for [AMP] on 17-Jan-2006 caused by Invalid Exit Price Data. CAUSE: [Exit Price(6.438193)] is less than [Exit Bar Low Price(7.880000)] HINT: To see the rejected trade details call the ShowRejectedTradeDetails function in your exploration code.
1	AMP	Long	Total Number of Long Trades written to the trade database for [AMP] is 5, (which includes 0 open trades) (3 trades were re First date scanned [29-Jan-2003] - Last date scanned [17-Jan-2006]
1	AMP	Long	Signal Chart Displayed.
2	ANZ	Long	Total Number of Long Trades written to the trade database for [ANZ] is 0, (which includes 0 open trades) (0 trades were re First date scanned [31-Jan-2003] - Last date scanned [17-Jan-2006]
2	ANZ	Long	WARNING! - No trades written to the trade database for [ANZ].
3	BHP	Long	Total Number of Long Trades written to the trade database for [BHP] is 1, (which includes 0 open trades) (0 trades were re First date scanned [31-Jan-2003] - Last date scanned [17-Jan-2006]
4	CML	Long	Total Number of Long Trades written to the trade database for [CML] is 0, (which includes 0 open trades) (0 trades were re First date scanned [31-Jan-2003] - Last date scanned [17-Jan-2006]
4	CML	Long	WARNING! - No trades written to the trade database for [CML].
5	CBA	Long	Total Number of Long Trades written to the trade database for [CBA] is 0, (which includes 0 open trades) (0 trades were re First date scanned [31-Jan-2003] - Last date scanned [17-Jan-2006]
5	CBA	Long	WARNING! - No trades written to the trade database for [CBA].
6	ECI	Long	Total Number of Long Trades written to the trade database for [ECI] is 0, (which includes 0 open trades) (0 trades were re

Jump to next error | Help on Selected Item | Open in TradeSim | Clear Log

[Total Number of Errors: 16] [Total Number of Warnings: 13] [Total Number of Queries: 21] | 20: Position [Long] Symbol [WOW]

The report log is divided up into a number of columns. The first column displays an icon, which provides visual feedback for the type of message reported. The second column displays the current call iteration to the RecordTrades function. Where there is more than one call to the RecordTrades function within the exploration code the iteration will increment in accordance with the number of calls for each pass of the exploration code. The third column displays the security symbol. If a trade database exploration is being run then the symbol will change from one security to another. The fourth column displays the trade positions which can be either Long or Short trades that correspond to the position parameter passed to the RecordTrades function.

Note. If rerunning a trade database does not reset the security counter back to '1' and if you have not instructed the RecordTrades function to append trades to an existing trade database then you will need to delete the trade database and rerun your trade database exploration again. This can be done from the File menu in the Report Log.

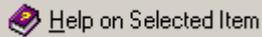
Report Messages

The messages can be broken down into the following categories:-

-  **Error Messages**
Error messages are reported when serious errors occur and attention is required.
-  **Warning Messages**
Warning messages are reported when the user needs to be alerted to issues, which may cause the results to depart from what is expected.

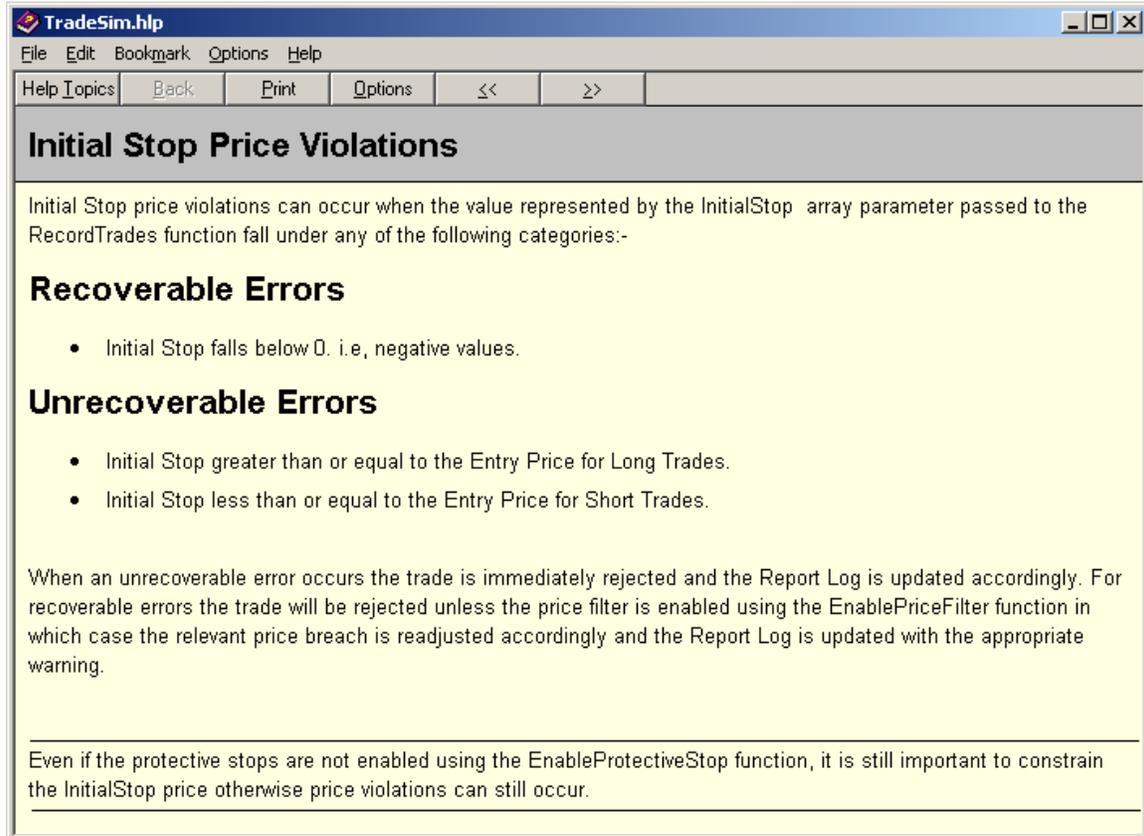
-  **Informational Messages**
Informational messages are reported to inform the user of the internal status of the plugin.
-  **Disk processing messages**
Disk processing messages are reported when some internal disk functions are carried out from within the plugin as a result of calling the RecordTrades function.
- **General purpose informational Messages**
General-purpose informational messages do not display an icon, symbol, or trade position. These messages usually precede and provide additional information for an iconic message.

Context Sensitive Help



Context sensitive help is available for some messages. When the mouse is moved over a message for which

help is available the mouse cursor will change to the following shape . Double clicking on the item will bring up the relevant help page. Alternatively if you click on any of the messages in the report log, for which help is available the “Help on Selected Item” button will be enabled and clicking on this button will bring up the relevant help page as shown in the example below.



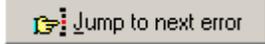
Note: Windows Help (WinHlp32.exe) is a Help program that has been included with Microsoft Windows versions starting with the Microsoft Windows 3.1 operating system. However, the Windows Help program has not had a major update for many releases and no longer meets Microsoft's standards. Therefore, starting with the release of Windows Vista, the Windows Help program will not ship as a feature of Windows. If you want to view 32-bit .hlp files, you must download and install the program (WinHlp32.exe) from the Microsoft Download Center. Please visit <http://www.compuvision.com.au/Vista.htm> for more information on how to install WinHelp on your Vista machine.

Launch TradeSim



If this button has been enabled you can load the current trade database into TradeSim. This is a lot easier than having to access the trade database from the trade database directory.

Jumping to Errors



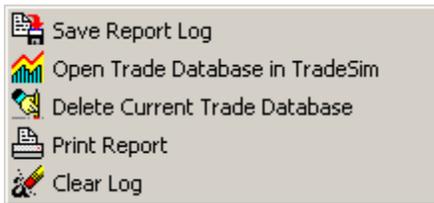
You can jump from one error to another using the "Jump to next error button". This is useful if the report is quite large and the errors may be sparsely located.

Clear Log



Use to clear the Report Log. The Report Log automatically clears when a new trade database exploration is run and the trade database file is created.

File Menu



- Save Report Log**
Saves the Report Log as text file.
- Launch TradeSim**
See above.
- Delete Current Trade Database**
Use this to delete the currently generated trade database so that it can be regenerated from scratch.
- Print Report**
Prints the current report.
- Clear Log**
See above.

The Status Bar

The status bar at the bottom of the Report Log Tool Window is divided into two sections and is updated dynamically as a trade database exploration is run. The left section displays the total number of errors, warnings and informational. The right section displays the current trade position (Long or Short), the current Symbol and the current security name.

[Total Number of Errors: 336] [Total Number of Warnings: 0] [Total Number of Queries: 41] Position [Short] Symbol [WOW] Security Name [WOOLWORTHS LIMITED ORDINARY]

Signal Chart Tool Window

The signal chart is used to aid in debugging your indicators or trade database explorations. To bring up the signal chart you need to include the following external function call in your code.

```
ExtFml ("TradeSim.ShowChart", SYMBOL);
```

See the [function library](#) for more information on this function.

When this function is called with the appropriate symbol it brings up a window, which displays a variety of signals in both graphical, tabular and tree form. This information is a useful aid for debugging trade database exploration code.

Note that the symbol of interest must be included with the security list of your trade database exploration otherwise the chart will not appear.

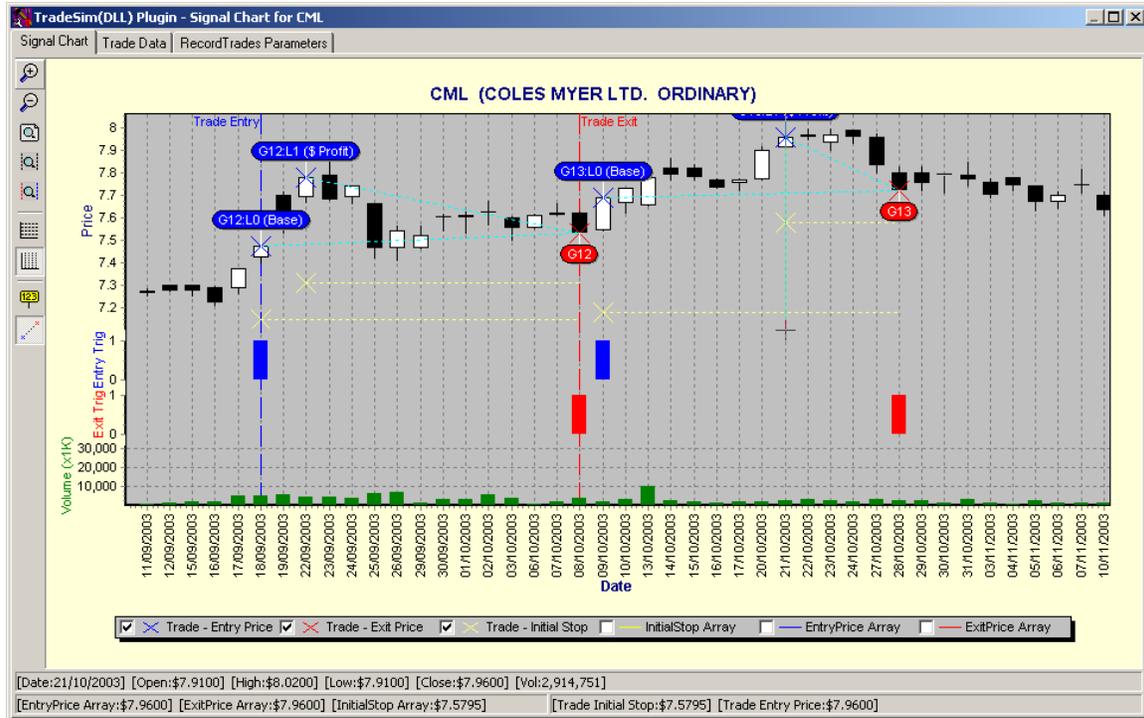
The signal chart displays the following information.

- **Price Candle Stick Data**

Displays all of the security data in candle stick format. Optionally the following data can be overlaid on the price chart by enabling the respective checkbox on the chart legend below the chart:-

- 
- **Entry Price for each trade as written to the trade database file and displayed as a blue cross-overlaid on the price chart.**
 - **Exit Price for each trade as written to the trade database file and displayed as a red cross overlaid on the price chart..**
 - **Initial Stop Price for each trade as written to the trade database file and displayed as a yellow cross-overlaid on the price chart. A yellow dashed horizontal line spans from the stop point to the trade exit point thus clearly indicating the Initial stop level.**
 - **InitialStop array as passed to the RecordTrades function.**
 - **EntryPrice array as passed to the RecordTrades function.**
 - **ExitPrice array as passed to the RecordTrades function.**
- **Raw EntryTrigger Data as passed to the RecordTrades function.**
Displayed as a series of narrow blue spikes on a separate axis. Each spike represents a value in the EntryTrigger array passed to the RecordTrades function.
 - **Raw ExitTrigger Data as passed to the RecordTrades function.**
Displayed as a series of narrow red spikes on a separate axis. Each spike represents a value in the ExitTrigger array passed to the RecordTrades function.
 - **Volume Data**
Displayed as a separate axis on the bottom of the signal chart.

When the chart cursor (thin vertical dotted green line) hovers over any trade, double clicking the left mouse button will display two thin vertical dashed lines which represent the actual trade entry(blue) and trade exit(red) bars. At the same time the relevant trade is marked in the Trade Data window.



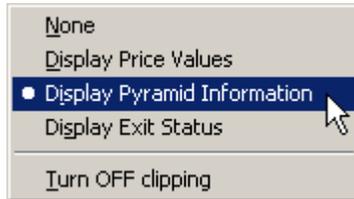
Tool Bar Buttons

The toolbar appears along the left side of the chart. Except for the tag button  all other buttons are toggled up or down.

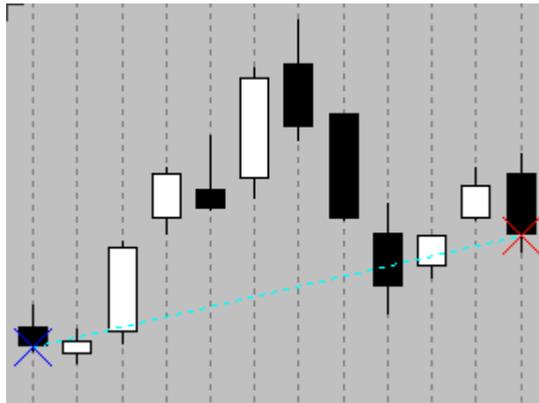
-  **Zoom In**
When this button is clicked down the contents of the chart windowpane are zoomed in a horizontal direction by a fixed amount.
-  **Zoom Out**
When this button is clicked down the contents of the chart windowpane are zoomed out in a horizontal direction by a fixed amount.
-  **Zoom All**
When this button is clicked down the contents of the chart windowpane are zoomed out so that all of the chart data is displayed within the chart window.
-  **Zoom Entry Dates**
When this button is clicked the chart is zoomed to display only the chart information which fits between the start and stop entry dates as specified by the StartEntryDate and StopEntryDate functions. If these functions have not been called the start and stop entry dates will correspond to the first and last bar of the security data respectively.
-  **Zoom Trade Dates**
When this button is clicked the chart is zoomed to display only the chart information, which fits between the entry and exit dates of the selected trade. To select a trade first double click on any of the price bars, which display a valid trade price marker. Alternatively you can select a trade by double clicking on any of the trades in the Trade Data tab, in which case the chart tab will be displayed and the chart automatically zoomed to the trade extents.
-  **Display Horizontal Price Grid**

When this button clicked down a horizontal grid is displayed on the price chart in accordance with the left hand price scale.

-  **Display Vertical Date Grid**
When this button clicked down a vertical grid is displayed on the whole chart in accordance with the bottom date scale.
-  **Toggle Tags**
This button enables and disables chart tags. When this button is clicked a popup menu displays all of the options.



- **None**
Turn off tags.
 - **Display Price Values**
Displays a tag, which indicates the price at each trade Entry, Exit and Initial Stop point if appropriate.
 - **Display Pyramid Information**
Displays a tag, which indicates pyramid information such as re-entry status, pyramid group and pyramid level for each trade in the pyramid.
 - **Display Exit Status**
Displays a tag, which indicates the exit status for each trade at the trade exit point.
 - **Turn off Clipping**
By default the tags are clipped to the chart border, so that if tags overlap the border they are hidden. If you turn off clipping then you can see the whole tag even if it overlaps the chart border.
-  **Show Trade Vectors**
This button enables and disables trade vectors. Trade Vectors are use to clearly identify the entry and exit points of a trade when there are several trade pairs on the chart at the one time.



The Status Bar

The status bar is divided up into the two rows.

[Date:20-Apr-2001] [Open:\$13.3332] [High:\$13.3332] [Low:\$13.1505] [Close:\$13.1983] [Vol:7,829,201]

The top row displays the current price and volume data for its respective bar.

[EntryPrice Array:\$13.1983] [ExitPrice Array:\$13.1983] [InitialStop Array:\$1.3796] [Trade Initial Stop:\$1.3796] [Trade Entry Price:\$13.1983]

The bottom row is divided into two columns. The left column displays additional information such as the user EntryPrice, ExitPrice and InitialStop price arrays as passed to the RecordTrades function. The right column displays the appropriate trade data when applicable. ie., when there is a cross on the price chart which signifies a trade entry or exit condition. ([see above](#))

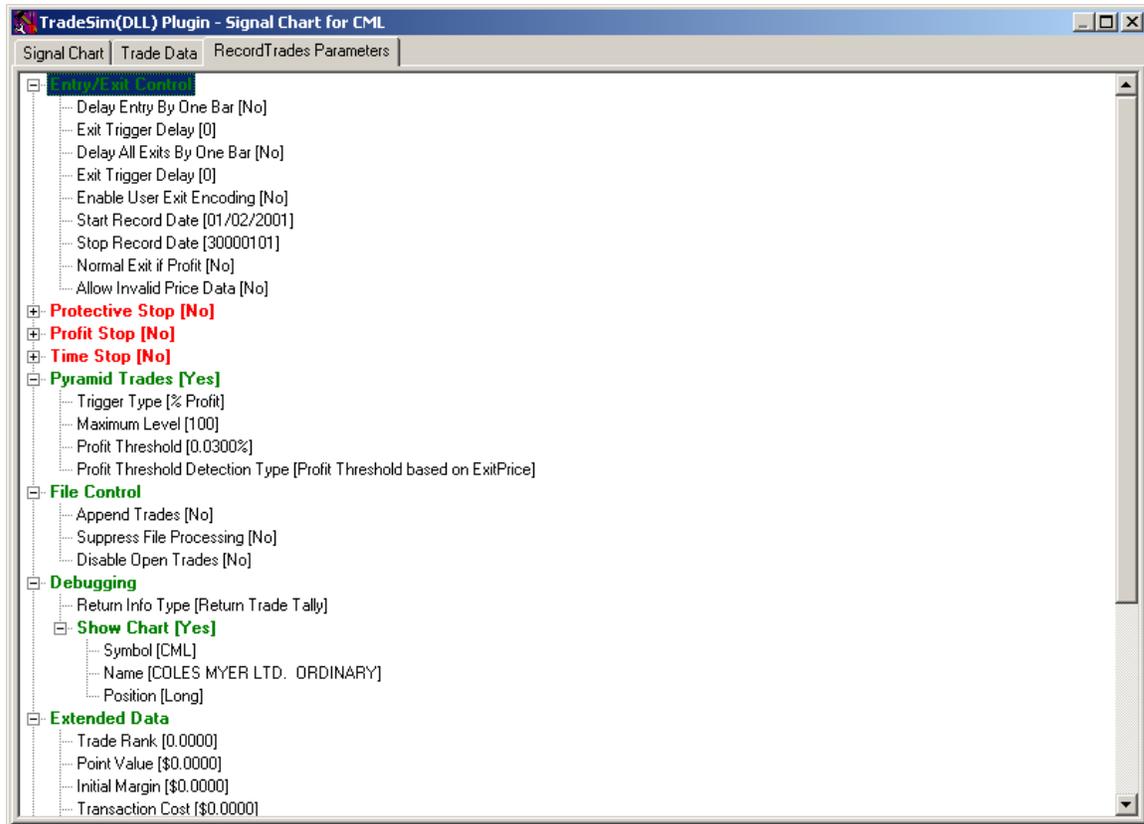
□ Tab 2: Trade Data Window

Displays details of all of the trade data written to the trade database file for the relevant security. Double clicking on any entry in this table will highlight the relevant trade details on the chart.

Trade...	Symbol	Sys ID	Pos	Perio...	Entry Date	Entry Price	Exit Date	Exit Price	P-Group	P-Level	Re-entry Type	Bars	Initial Stop
1	CML	0	Long	Daily	17-Apr-2002	\$8.3900	24-Apr-2002	\$7.9100	1	0	Base	5	\$7.885143
2	CML	0	Long	Daily	20-May-2002	\$6.6700	24-Jul-2002	\$6.4300	2	0	Base	46	\$6.147410
3	CML	0	Long	Daily	03-Oct-2002	\$6.4300	23-Oct-2002	\$6.4100	3	1	\$ Profit	14	\$5.761232
4	CML	0	Long	Daily	20-Aug-2002	\$5.9800	23-Oct-2002	\$6.4100	3	0	Base	46	\$5.613256
5	CML	0	Long	Daily	27-Nov-2002	\$6.4200	09-Dec-2002	\$6.3500	4	0	Base	8	\$5.883530
6	CML	0	Long	Daily	06-Jan-2003	\$6.4900	22-Jan-2003	\$6.3600	5	0	Base	12	\$6.08612
7	CML	0	Long	Daily	06-Mar-2003	\$5.6300	07-Mar-2003	\$5.5200	6	0	Base	1	\$5.128261
8	CML	0	Long	Daily	08-Apr-2003	\$6.4700	15-Apr-2003	\$6.3600	7	3	\$ Profit	5	\$6.031560
9	CML	0	Long	Daily	27-Mar-2003	\$6.2500	15-Apr-2003	\$6.3600	7	2	\$ Profit	13	\$5.642129
10	CML	0	Long	Daily	17-Mar-2003	\$6.0400	15-Apr-2003	\$6.3600	7	1	\$ Profit	21	\$5.175015
11	CML	0	Long	Daily	14-Mar-2003	\$5.5600	15-Apr-2003	\$6.3600	7	0	Base	22	\$5.074462
12	CML	0	Long	Daily	30-Apr-2003	\$6.8800	06-May-2003	\$6.5500	8	1	\$ Profit	4	\$6.308216
13	CML	0	Long	Daily	17-Apr-2003	\$6.4800	06-May-2003	\$6.5500	8	0	Base	10	\$6.055758
14	CML	0	Long	Daily	12-Jun-2003	\$7.1600	24-Jun-2003	\$7.0800	9	2	\$ Profit	8	\$6.645840
15	CML	0	Long	Daily	05-Jun-2003	\$6.9500	24-Jun-2003	\$7.0800	9	1	\$ Profit	12	\$6.482296
16	CML	0	Long	Daily	27-May-2003	\$6.7300	24-Jun-2003	\$7.0800	9	0	Base	19	\$6.331480
17	CML	0	Long	Daily	16-Jul-2003	\$7.3000	23-Jul-2003	\$7.2200	10	0	Base	5	\$6.947215
18	CML	0	Long	Daily	15-Aug-2003	\$7.4600	18-Aug-2003	\$7.3700	11	0	Base	1	\$7.083935
19	CML	0	Long	Daily	22-Sep-2003	\$7.7800	08-Oct-2003	\$7.5300	12	1	\$ Profit	12	\$7.310933
20	CML	0	Long	Daily	18-Sep-2003	\$7.4700	08-Oct-2003	\$7.5300	12	0	Base	14	\$7.146460
21	CML	0	Long	Daily	21-Oct-2003	\$7.9600	28-Oct-2003	\$7.7200	13	1	\$ Profit	5	\$7.579504
22	CML	0	Long	Daily	09-Oct-2003	\$7.6900	28-Oct-2003	\$7.7200	13	0	Base	13	\$7.174607
23	CML	0	Long	Daily	06-Jan-2004	\$7.6400	14-Jan-2004	\$7.4000	14	1	\$ Profit	6	\$7.347323
24	CML	0	Long	Daily	11-Dec-2003	\$7.4100	14-Jan-2004	\$7.4000	14	0	Base	21	\$7.139126
25	CML	0	Long	Daily	20-Feb-2004	\$7.7800	03-Mar-2004	\$7.7100	15	1	\$ Profit	8	\$7.437902
26	CML	0	Long	Daily	03-Feb-2004	\$7.5300	03-Mar-2004	\$7.7100	15	0	Base	21	\$7.198304
27	CML	0	Long	Daily	11-Mar-2004	\$8.2100	22-Mar-2004	\$7.9900	16	1	\$ Profit	7	\$7.688123
28	CML	0	Long	Daily	05-Mar-2004	\$7.8400	22-Mar-2004	\$7.9900	16	0	Base	11	\$7.435403
29	CML	0	Long	Daily	07-Apr-2004	\$8.2600	08-Apr-2004	\$8.0700	17	0	Base	1	\$7.956223

□ Tab 3: RecordTrades Parameters Window

Displays a tree view of all of the RecordTrades parameters that have been set prior to calling the RecordTrades function.

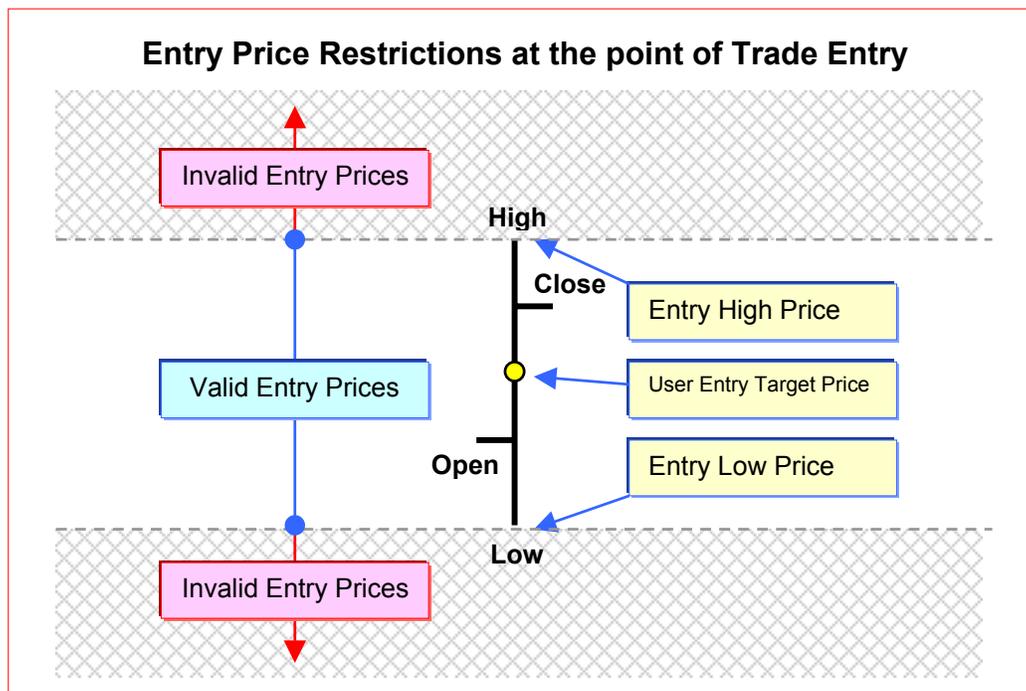


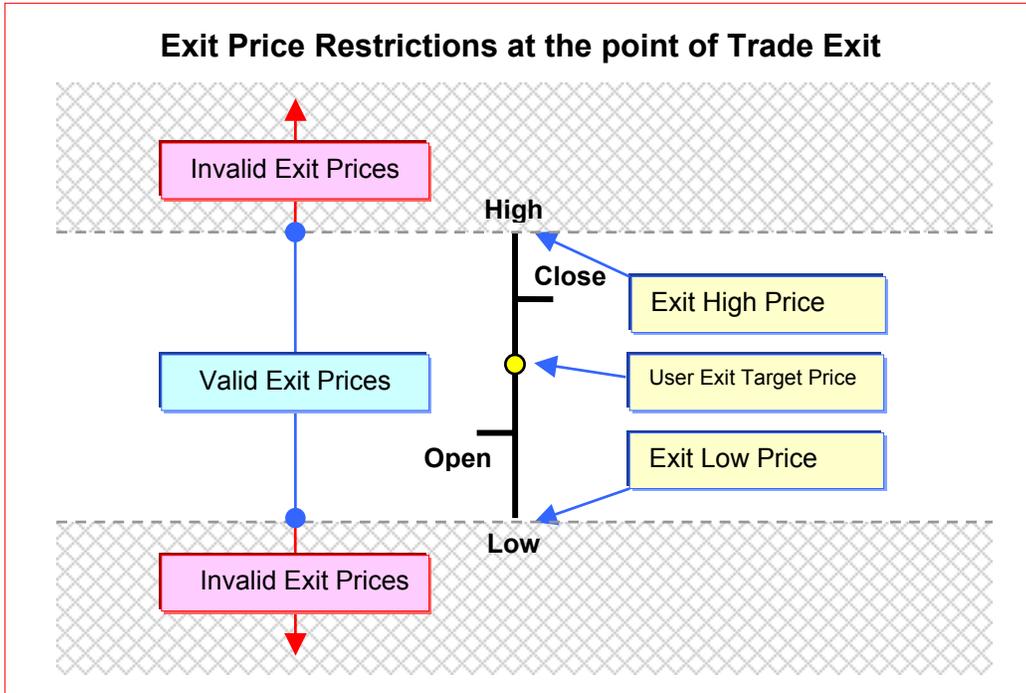
A plus(+) sign indicates that the tree can be expanded by clicking on it. A minus(-) sign indicates that the tree can be contracted by clicking on it. A green bold heading indicates that the top-level parameter has been enabled and by expanding the tree will reveal additional parameters, which are used by the RecordTrades function. A red bold heading indicates that the parameter has not been enabled and that the additional parameters revealed by expanding the tree will also not be used by the RecordTrades function.

Entry and Exit Price Restrictions

The following diagrams illustrate the limitations and restrictions on the Entry and Exit prices. Bear in mind that it is desirable to restrict prices to the ranges indicated by the diagrams. If the entry or exit price breaches its respective range the RecordTrades function will deal with the trade in one of two ways depending on whether or not the internal price filter has been enabled.

1. By default the internal price filter is switched on so that price checking and adjusting is automatically done so that all trades will always be accepted. If a price violation is detected then a warning will be issued to the report log and the prices will be constrained.
2. If the price filter is switched off using [DisablePriceFilter](#) then price checking is still done but any price violations will cause the respective trade to be rejected and an error message will be reported to the report log.





Generating trade data for a single security

To get a feel for the simplicity of acquiring the trade data we shall start with a simple example. For this example we shall use a trading system based on the Equis-MACD Expert, which is packaged as one of the MetaStock Experts. To keep things simple we will only be interested in taking trades on the long side and for a single security that has been opened up and displayed as a chart in Metastock. Also we won't worry about using an initial stop and will limit the trade analysis to position-size models that do not require an initial-stop in order to calculate the position size for the trades. Later on when we use TradeSim we will incorporate a suitable initial-stop into the analysis and explore its effect on position-size models that require it.

```

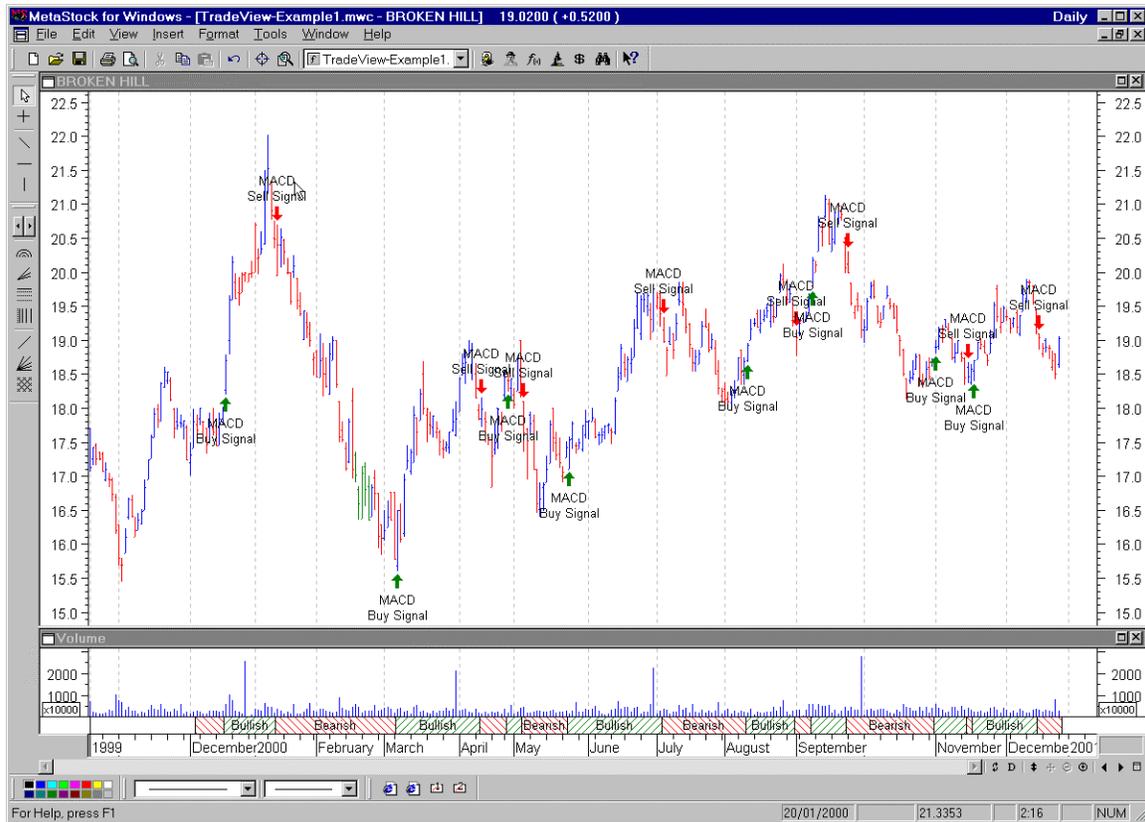
EntryTrigger := Cross (MACD () ,Mov (MACD () ,9,E) );
EntryPrice := CLOSE;
ExitTrigger := Cross (Mov (MACD () ,9,E) ,MACD () );
ExitPrice := CLOSE;
InitialStop := 0;           { optional initial stop }

ExtFml ( "TradeSim.Initialize" ); { Initialize internal variables }
ExtFml ( "TradeSim.RecordTrades" ,
    "MACD Long Example" ,      { Trade Data Filename }
    LONG ,                     { Trade Position Type }
    EntryTrigger ,             { Entry Trigger }
    EntryPrice ,               { Entry Price }
    InitialStop ,              { Initial Stop }
    ExitTrigger ,              { Exit Trigger }
    ExitPrice ,                { Exit Price }
    START );                   { Trade Recorder Control }

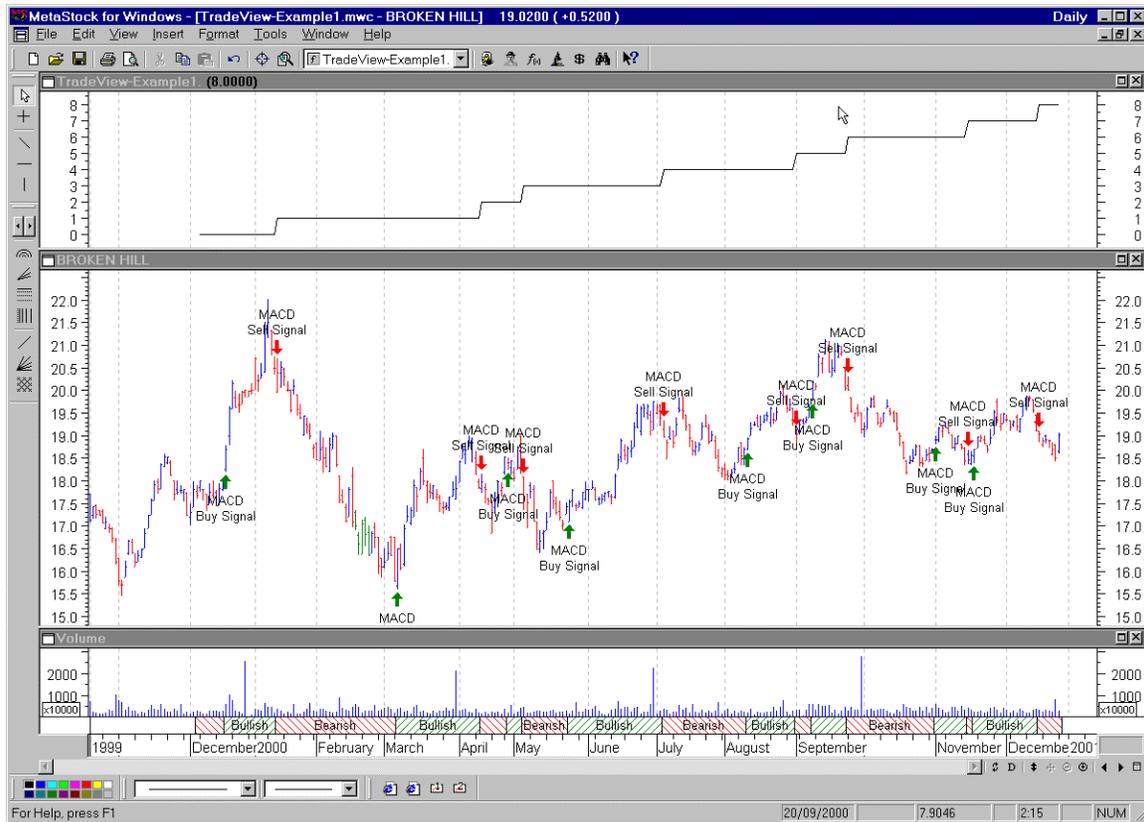
```

Note that the framework for the trading system consists of five basic parameters of which we are only concerned with four of them in this example. To use this indicator in MetaStock make a new indicator using the **Indicator Builder** in MetaStock and call it TradeSim-Example1. Cut and paste the above example into the new indicator. If you are unfamiliar with doing this, refer to the user manual that came with your MetaStock software ¹⁾.

Now load up a chart with at least 300 bars' worth of data. Shown below is the chart of BHP with the Equis-MACD Expert overlaid on top of it just so we can see the trade signals.



As can be seen from the expert there are a number of trading candidates. Now we need to record these trading candidates so we can analyse them later using TradeSim. We do this by using the RecordTrades indicator that we have just created and overlaying it in a separate window above the main chart. As we overlay this indicator an internal process writes all of the trading data to a file called "MACD Long Example.trb" which is located in the default data directory. The ".trb" file uses a compact binary database format that is used by TradeSim.



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When overlaying the RecordTrades indicator onto a chart it always looks like an upward staircase with each step corresponding to a trade exit condition. This is because the RecordTrades function returns the trade tally as it finds new trades. In the above example you will note that the trade tally only increases when an exit-trigger has been detected on the long side as in this example. This is because incomplete trades will not be logged if an entry condition is not subsequently matched by an exit condition. The RecordTrades function will also filter out multiple entry conditions that occur before the exit condition has been reached.

Closing and Recording Open Trades

By default the RecordTrades function closes and records open trades. Typically these trades represent currently open positions that have not been closed by a valid exit condition. When using the RecordTrades function to generate trading data, and the last entry trigger has not subsequently been matched by a valid exit trigger before the end of the data is reached, the RecordTrades function will subsequently close the trade and write the trading data out to the trade database file as though a valid exit signal was generated on the last bar of security data. To distinguish open trades from trades that are closed normally by the defined exit trigger, an internal data field is used to record the trade exit status. Please refer to the next chapter on TradeSim regarding a description of the *Exit Status*.

Normally you would not allow open trades to be recorded because forcing a trade to terminate prematurely at some arbitrary point that has nothing to do with the actual exit trigger would introduce erroneous data into the test. Remember that what we are trying to test is the effectiveness of a trading system over a period of time, which means that the tests will only be accurate providing the trade data mirrors our trading system accurately.

However in some testing scenarios it is necessary to include open trade data as part of the test, irrespective of whether the trades are terminated normally or not. When a trade database is loaded into TradeSim®, all data is loaded including any open trades; however, by default open trades are excluded

from any trade simulations. Deselecting the *Ignore Open Trades* checkbox in the *Trade Preferences* tab of TradeSim can quickly enable the use of open trades in trade simulations.

Viewing the trade data

The only way to view the trade data file is to load the resulting database file into TradeSim. Whilst we will describe the operation and use of TradeSim in a later chapter we have reproduced a snapshot of the database screen in TradeSim with the resulting trade data file that we have just generated.

The RecordTrades function uses a proprietary file format to store trade data. This results in compact database files that take up a minimum amount of disk space. Every trade database file generated with the RecordTrades function always has a “trb” file extension and its prefixed name is the name specified by the file name parameter in the RecordTrades function.

When the RecordTrades function generates a trade database file it writes the information to a file with its name specified by the file name parameter in the RecordTrades function appended with “trb” file extension. These files are always stored in the predefined *TradeSimData* directory on your local “C:” drive. For the example above, the RecordTrades function would have generated a file called “MACD Long Example.trb” and saved it in the *c:\TradeSimData* directory.

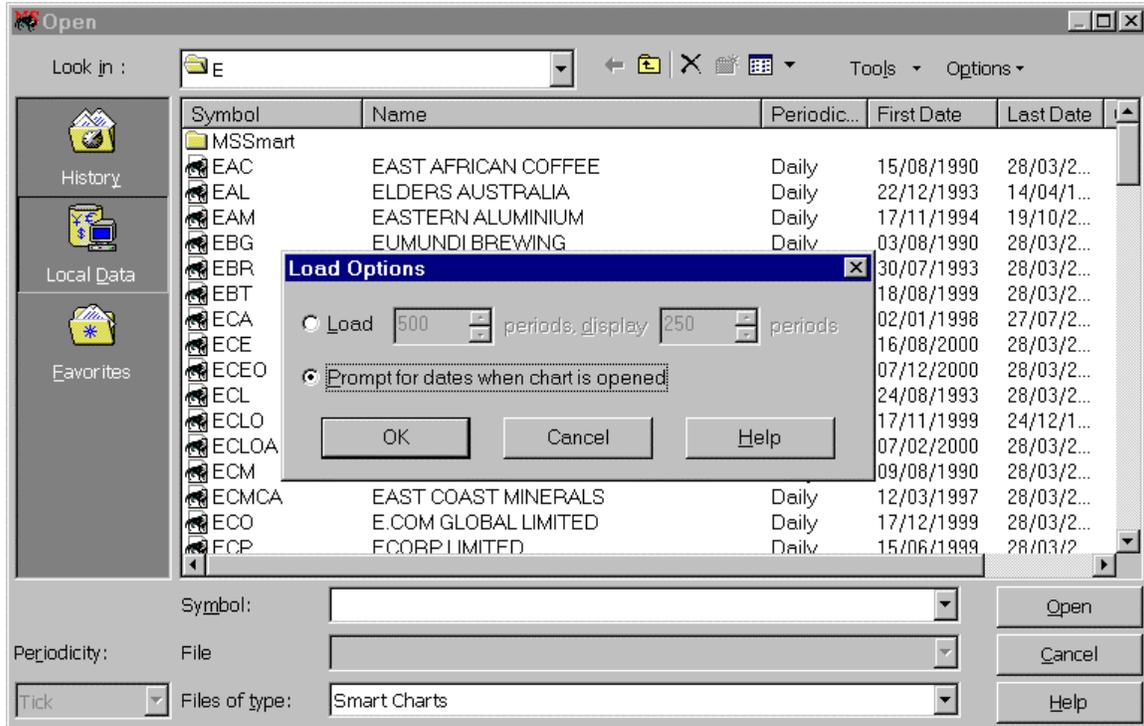
T...	Pos	Symbol	Entry Date	Exit Date	Initial Stop	Entry Price	Exit Price	% Change	Exit Status
<input checked="" type="checkbox"/> 2983	Long	COH	05-12-01	12-12-01	\$44.2708	\$47.3400	\$43.5700	-7.96%	Stopped Out
<input checked="" type="checkbox"/> 2984	Long	SGP	10-12-01	14-01-02	\$4.1657	\$4.3620	\$4.1720	-4.36%	Stopped Out
<input checked="" type="checkbox"/> 2985	Long	BIL	10-12-01	18-01-02	\$9.2657	\$9.9500	\$10.1600	2.11%	Open Trade
<input checked="" type="checkbox"/> 2986	Long	OTT	10-12-01	18-01-02	\$0.0477	\$0.0740	\$0.0740	0.00%	Open Trade
<input checked="" type="checkbox"/> 2987	Long	SWS	11-12-01	04-01-02	\$2.0829	\$2.2000	\$2.4600	11.82%	Normal
<input checked="" type="checkbox"/> 2988	Long	HLY	12-12-01	18-01-02	\$4.6218	\$4.9500	\$5.0000	1.01%	Open Trade
<input checked="" type="checkbox"/> 2989	Long	TAB	13-12-01	18-01-02	\$2.5870	\$2.7300	\$2.8640	4.91%	Normal
<input checked="" type="checkbox"/> 2990	Long	CBA	14-12-01	10-01-02	\$26.8958	\$28.2070	\$29.5280	4.68%	Normal
<input checked="" type="checkbox"/> 2991	Long	PHY	14-12-01	18-01-02	\$3.7487	\$4.0600	\$4.1600	2.46%	Open Trade
<input checked="" type="checkbox"/> 2992	Long	IOF	18-12-01	18-01-02	\$1.1211	\$1.1800	\$1.1700	-0.85%	Open Trade
<input checked="" type="checkbox"/> 2993	Long	ENE	20-12-01	18-01-02	\$5.4788	\$6.3100	\$6.6920	6.05%	Open Trade

Controlling how much data to trade with

When we insert the RecordTrades Indicator onto our chart, it only uses the data that has been loaded into the chart to trade with and no more, even though the particular security that we are interested in may contain much more data than this.

When we load a data file, MetaStock allows us to control how much data is loaded. By default this is set to 300 days so that when we run a Trade Recording over the chart we only generate trades for the most recent 300 days' worth of trade data. If we want to change the period of trading we need to change how much data that is loaded. This can be done from the *Load Options* dialogue box in MetaStock, which is accessed via the Options menu in the Open dialogue box as shown below. You can either specify the exact number of periods of data that you want loaded each time you load a chart or you can get MetaStock to prompt you every time you open a chart.

Note: If you have security with missing data then the number of bars loaded and the actual number of bars in the trade may be different. It is important to bear this in mind when setting the *Load Options* in MetaStock.



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Using the TradeSim Plug-In function library

An alternative and more accurate way of controlling the range of trade data produced is to only include trades with entry dates that fall within a certain range. This can be done with the aid of two functions from the TradeSim Plug-In Function Library.

The **SetStartRecordDate** function is used to set the earliest date at which trades can be taken and recorded using the **RecordTrades** function. Any trades with entry dates before this date will be ignored and excluded from the trade database. For more information see the section on [SetStartRecordDate](#) function.

The **SetStopRecordDate** function is used to set the latest date at which trades can be entered and recorded using the **RecordTrades** function. Any entry dates after this date will be ignored and excluded from the trade database. For more information see the section on [SetStopRecordDate](#).

Note: When using these functions you still have to adjust the amount of data that MetaStock loads for each security such that the amount of data loaded overlaps the range of dates of interest otherwise some trades, which fall within the range, will not be included in the trade database.

□ Example

Inserting the following code prior to a call to the **RecordTrades** function only allows trades that fall between 21-April-1998 and 5-June-2000 to be recorded to the trade database.

```
ExtFml ("TradeSim.Initialize");
ExtFml ("TradeSim.SetStartRecordDate", 21, 4, 1998);
ExtFml ("TradeSim.SetStopRecordDate", 5, 6, 2000);
```

Entry and exit conditions

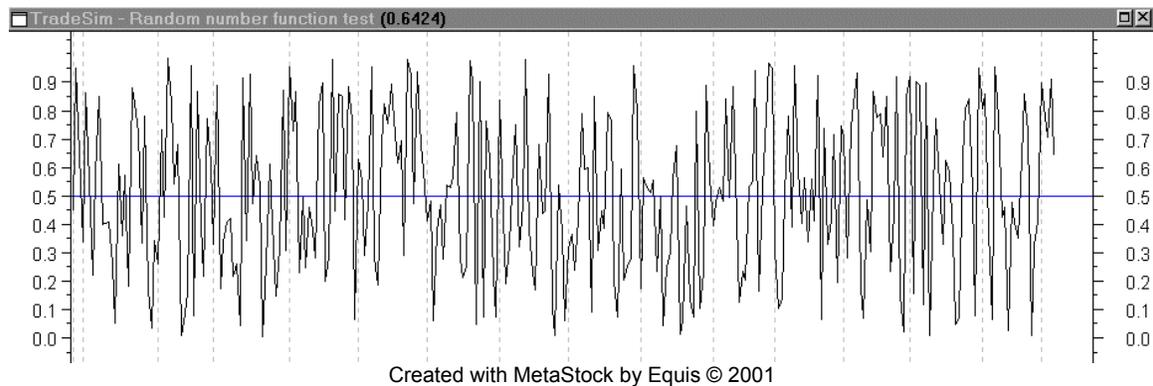
Random entry

It is sometimes useful to use a random entry strategy. Using a random entry strategy allows one to objectively compare and evaluate a trading system by comparing the performance between a random and deterministic entry strategy. Thus the effectiveness of the deterministic entry strategy can be gauged. If the deterministic entry strategy does not result in a better performing trading system compared to the random entry then the performance of the trading system is most likely due to the exit and the position-sizing strategies. If this is the case then changing the entry strategy will have the least effect on performance. If there are significant differences between the two strategies then one might want to investigate the exit and position-sizing strategies to see whether this aspect of the system can be improved. Basically speaking, a good trading system that uses a good position-sizing strategy should be invariant to the entry strategy used.

The TradeSim external MetaStock Plug-In facilitates developing a random entry strategy by providing a random number generator function. This function generates a random number between 0 and 1 (but not including 1). The random number generator generates numbers between 0 and 1 with a normal distribution and a mean value of 0.5. The syntax usage of the random number generator is:

```
ExtFml ("TradeSim.Rand") ;
```

If we insert this function into an indicator and add the indicator to a blank chart you will get something that looks like the following:



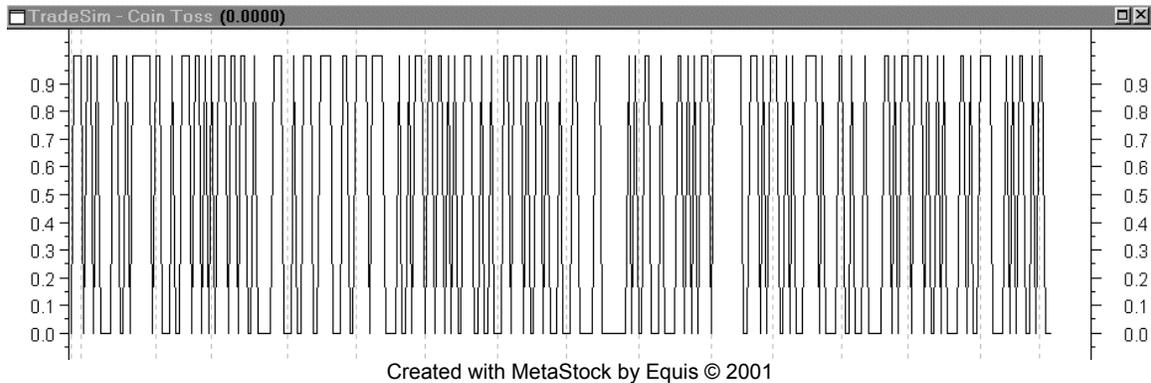
Note that we have drawn a line through the chart above, which represents the mean or average value of 0.5.

A Coin Toss Random-Entry Strategy

To be of any practical use as a random entry you would most likely want a process that mimics the tossing of a coin. That is a random event that has two possible outcomes with equal probabilities. To do this we assign a head or tail based on the outcome of the random number generator. For example we could assign a head when the random number generated is less than 0.5 and greater than 0 and assign a tail to all other outcomes. This can be written as an indicator as follows: -

```
CoinTossEntry = ExtFml ("TradeSim.Rand") < 0.5 ;
```

The coin toss entry indicator above is a binary indicator with only two possible outcomes of one and zero corresponding to a head and a tail respectively. Note that the probability for either outcome is the same value of 0.5. A plot of the indicator is shown below.



A realistic Random Entry Strategy

The Coin Toss random-entry strategy has a 1 in 2 chance of a favorable outcome, which means that as soon as we exit a trade and follow it with a Coin Toss random entry trigger there will be a 1 in 2 chance of entering on the next bar after the exit trigger. This means that our entry trigger will follow our exit trigger within a few bars of the point of exit and thus not really provide the truly random entry trigger that we desire. To alleviate this problem we need to make the random entry less dependent on the exit trigger. We can do this simply by changing the balance of probability so that instead of a 1 in 2 chance we have a 1 in 10 or even a 1 in 100 probability of a favorable outcome.

For example a random entry trigger with a 1 in 10 chance of entering on a given bar can be expressed as follows.

```
EntryTrigger = ExtFml("TradeSim.Rand")<0.1;
```

A random-entry example

The following is an example of using random entry with the MACD crossover system with a 1 in 10 chance of entry on any bar.

```
EntryTrigger:=ExtFml("TradeSim.Rand")<0.1;
EntryPrice:=CLOSE;
ExitTrigger:= Cross(Mov(MACD(),9,E),MACD());
ExitPrice:=CLOSE;
InitialStop:=0;

ExtFml("TradeSim.Initialize"); { Initialize internal variables }
ExtFml("TradeSim.RecordTrades",
      "Rand Entry + MACD Long Example",
      LONG, { Trade Data Filename }
      EntryTrigger, { Trade Position Type }
      EntryPrice, { Entry Price }
      InitialStop, { Initial Stop }
      ExitTrigger, { Exit Trigger }
      ExitPrice, { Exit Price }
      START); { Trade Recorder Control }
```

Refining the entry and exit conditions

So far in all of the previous examples we have executed the trade transactions at the close of the market. This is okay in theory but in practice this is not really practical since the closing price is not known until the market is closed in which case we cannot place a trade until the next trading day. Also our securities database will not have today's trading information until the market has closed and we have updated our securities database in which case the data is usually only available several hours after the markets have closed. Once we have a signal to enter the market we can make the simulation more realistic by entering the market on the next trading day. There are two ways of achieving this. One is to insert a delay using the REF() function; the other is to use two newly introduced functions in the TradeSim plug-in function library.

1. Using the MetaStock REF() function.

You can delay your entry condition until the next day by using the REF() function to look back at the previous day to see whether you have an entry trigger and take the trade at the opening price on the next trading day. Similarly when your trading system produces an exit trigger you want to exit the trade on the next day at the opening price. Taking our previous example of the MACD crossover on the long side we can rewrite the formula as follows:-

```

EntryPrice := CLOSE;
EntryTrigger := Cross(MACD(), Mov(MACD(), 9, E));
ExitPrice := CLOSE;
ExitTrigger := Cross(Mov(MACD(), 9, E), MACD());
InitialStop := 0;           { optional initial stop }

NewEntryPrice := OPEN;     { entry price at next days open }
NewEntryTrigger := REF(EntryTrigger, -1);
NewExitPrice := OPEN;     { exit price at next days open }
NewExitTrigger := REF(ExitTrigger, -1);

ExtFml("TradeSim.Initialize"); { Initialize internal variables }
ExtFml("TradeSim.RecordTrades",
      "MACD Long example",    { Trade Data Filename }
      LONG,                  { Trade Position Type }
      NewEntryTrigger        { Entry Trigger }
      NewEntryPrice,         { Entry Price }
      InitialStop,           { Initial Stop }
      NewExitTrigger         { Exit Trigger }
      NewExitPrice           { Exit Price }
      START);                { Trade Recorder Control }

```

2. Using the TradeSim Plug-In function library

You can use the *EnableDelayOfEntryByOneBar* and *EnableDelayOfAllExitsByOneBar* external functions to delay the entry and exit triggers by one bar. This is preferable and less confusing than using the MetaStock REF() function as the delay is done automatically for you. All you have to do is specify what the entry and exit prices are to be on the following day, which is usually the opening price.

```

EntryPrice := OPEN;
EntryTrigger := Cross(MACD(), Mov(MACD(), 9, E));
ExitPrice := OPEN;
ExitTrigger := Cross(Mov(MACD(), 9, E), MACD());
InitialStop := 0;           { optional initial stop }

ExtFml("TradeSim.Initialize"); { Initialize internal variables }
ExtFml("TradeSim.EnableDelayOfEntryByOneBar"); { delay entry trigger by one
bar}
ExtFml("TradeSim.EnableDelayOfAllExitsByOneBar"); { delay all
internal/external exit triggers by one bar }
ExtFml("TradeSim.RecordTrades",
      "MACD Long example",    { Trade Data Filename }
      LONG,                   { Trade Position Type }
      EntryTrigger            { Entry Trigger }
      EntryPrice,             { Entry Price }
      InitialStop,           { Initial Stop }
      ExitTrigger             { Exit Trigger }
      ExitPrice               { Exit Price }
      START);                { Trade Recorder Control }

```

Other Entry variations

Other variations of entry and exit conditions are possible. You can use the MetaStock indicator language to redefine your entry or exit conditions to better match your actual trading conditions. For example you may only want to enter the market if you have an entry trigger, and the price at the opening on the next day matches or betters the previous day's entry trigger price. We can modify the above example and rewrite a *NewEntryTrigger* formula as follows: -

```
NewEntryTrigger := REF(EntryTrigger, -1) AND OPEN <= REF(EntryPrice, -1);
```

Note that the Entry trigger is now qualified with the opening price so that the trade is not taken unless the opening price is less than or equal to the previous day's closing price. This will have the effect of reducing the total number of trades, however it is a means of more accurately modelling your entry conditions and thus producing a more accurate trade simulation.

Order Type and Slippage

TradeSim includes the ability to model slippage through order control. Four types of orders are available with each type affecting the amount of slippage generated during ordering. These can be selected from the *Option* tab of the Trade Parameters Window. See the next chapter on TradeSim for more details.

Adding an Initial Stop

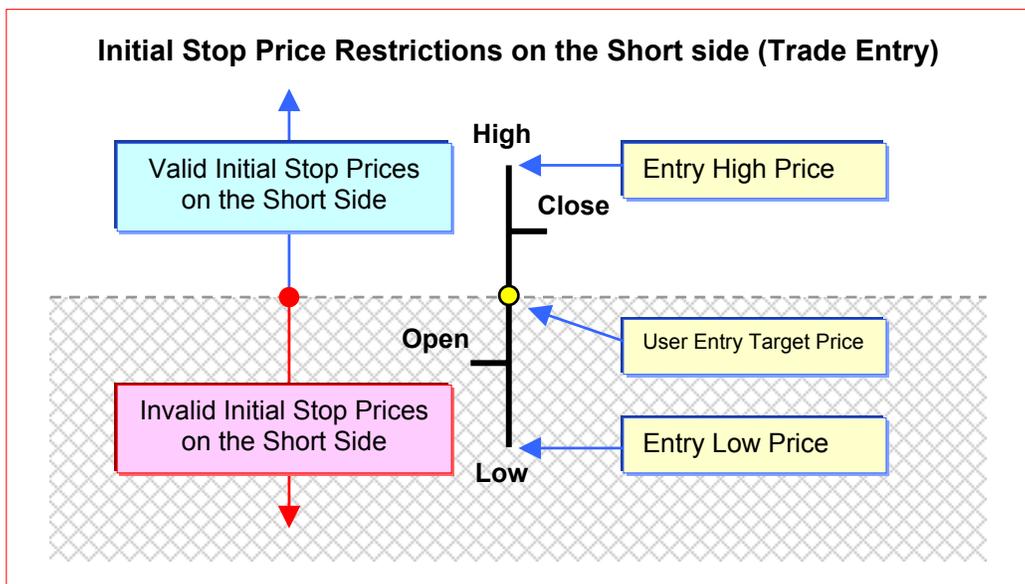
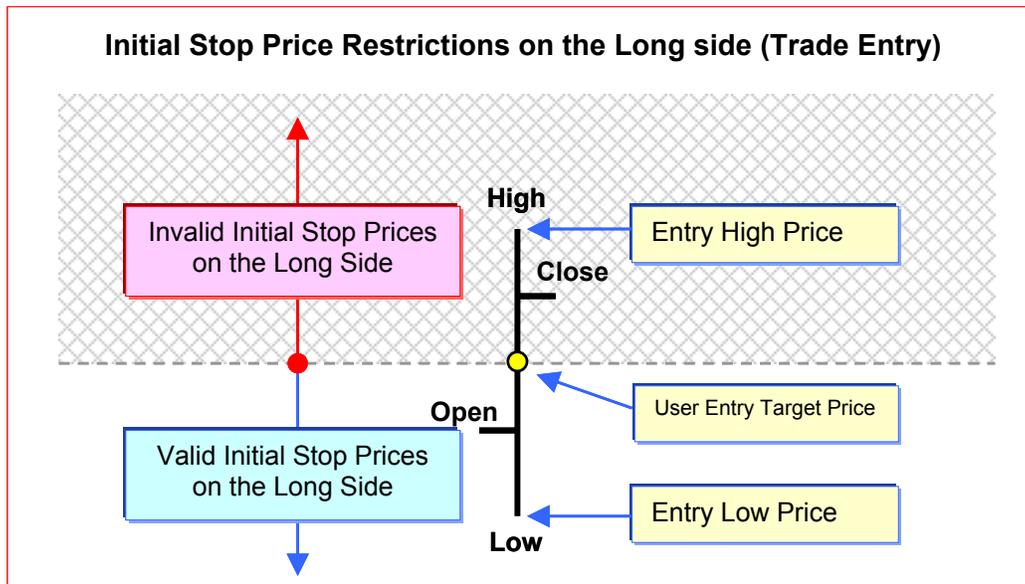
The previous examples that we have used did not use an initial stop and this parameter was set to zero. This is fine as long as we do not wish to do trade simulations that use position size models that depend on the initial stop in order to calculate the position size for each trade. Just like the entry and exit conditions there are an infinite number of possible initial stop formulas that could be used. A description of all of the popular stops is beyond the scope of this manual; some examples include moving averages, but the more

popular ones are usually based on volatility. One stop that is fairly popular is a volatility stop based on Wilder's average true range. Its formula is given by the following:

```
ARC:=3;                                     { Average Range Constant }
Period:=10;                                 { ATR period }
LongInitialStop:=OPEN-ARC*ref(ATR(Period),-1); { used on the long side }
ShortInitialStop:=OPEN+ARC*ref(ATR(Period),-1); { used on the short side }
```

Initial Stop Price Restrictions

The following diagrams illustrate the limitations and restrictions on the InitialStop prices. Bear in mind that it is necessary to restrict prices to the ranges indicated by the diagrams otherwise the RecordTrades function will reject the security from the point the error was detected and report an error condition.



Using the Initial Stop as a Protective (Money Management) Stop

Specification of the Initial Stop by itself in the trade data will not act as a protective stop and the trade will only exit when there is an exit trigger condition as specified by the exit trigger parameter. This ExitTrigger may have nothing to do with an exit based on the Initial Stop parameter that you specified. This is okay as long as you are only concerned with using the Initial Stop to size trades and not control risk. However when we talk about risk-based position-size models we need to add extra rules into our trading strategies that force us to exit a trade if the price of the security goes below (or above) the Initial Stop regardless of our exit trigger. This type of rule is called a protective stop.

Implementing a protective stop in MetaStock can be very difficult at times due to the way the MetaStock formula language works which makes it very difficult to reference previous values at a specific date, namely your point of entry into a trade. However the TradeSim MetaStock external Plug-In has an additional set of functions that can be used to switch on additional features, that are built into the **RecordTrades** function. This allows simple implementation of money management or protective stops without having to worry about the intricacies of the MetaStock language.

Note: The previous implementation of Protective Stops by negating the InitialStop parameter to force the RecordTrades function to use the InitialStop as a money management or protective stop is no longer supported. If you are still using the previous method you will have to change it by using the new function calls otherwise negative Initial Stop values will cause an exception to occur in the RecordTrades function and flag an error.

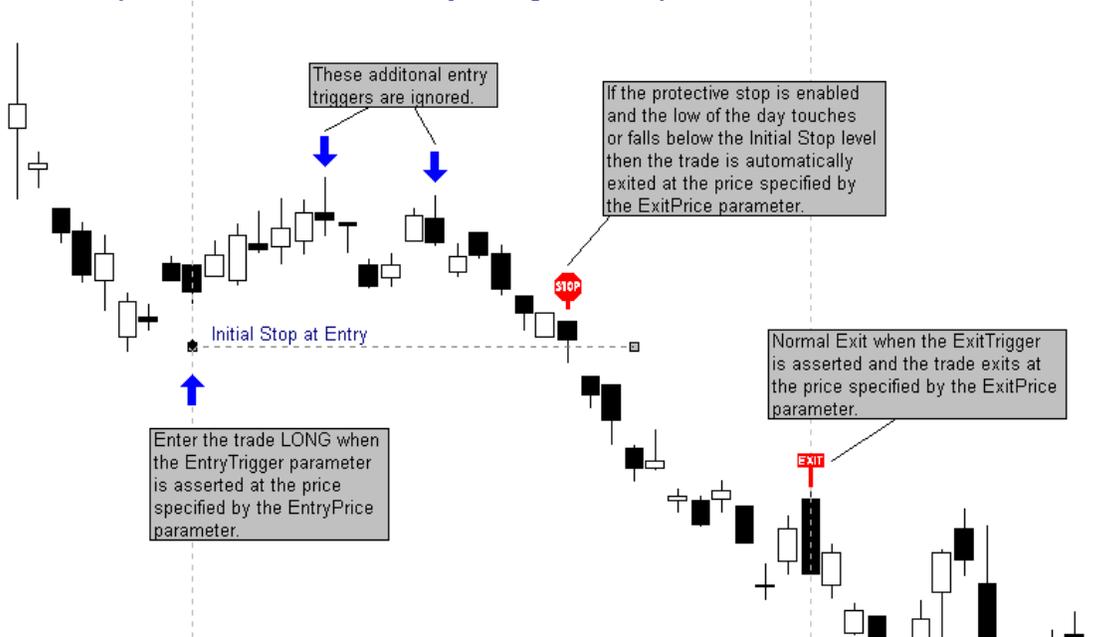
To implement a protective stop based on the initial stop parameter at the time of the entry trigger, use the following function calls before the **RecordTrades** function is called.

```
ExtFml ( "TradeSim.Initialize" ); { Initialize internal variables }
ExtFml ( "TradeSim.EnableProtectiveStop", INACTIVITY_DELAY );
ExtFml ( "TradeSim.RecordTrades", , , , , , );
```

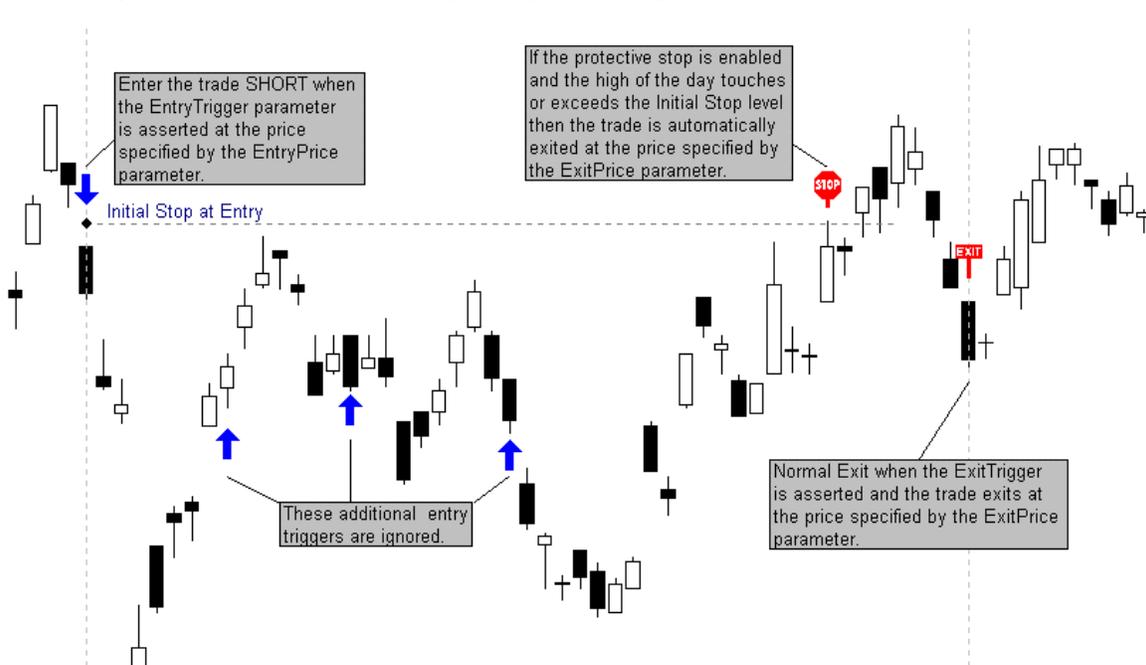
- Where INACTIVITY_DELAY is the number of bars from the entry point where the stop condition is ignored.

The **EnableProtectiveStop** function tells the **RecordTrades** function to use the initial stop as a protective stop. For trades on the long side a protective stop is generated when the low of the day's trade is less than or equal to the initial stop. For trades on the short side a protective stop is generated when the high of the day's trade is greater than or equal to the initial stop. The inactivity delay specified by the **INACTIVITY_DELAY** parameter is used to delay the point at which the stop comparison is made. If the DELAY parameter is set to 0 then the protective stop will be active on the day of entry and thus a trade can be stopped out on the day it was entered.

□ Example of how a Protective Money Management Stop works on the LONG side



□ Example of how a Protective Money Management Stop works on the SHORT side



In the following example we shall force the initial stop to behave as a protective stop that is only active after the third bar of the trade.

```
ExtFml ( "TradeSim.Initialize" ); { Initialize internal variables }
ExtFml ( "TradeSim.EnableProtectiveStop", 3 );

ExtFml ( "TradeSim.RecordTrades",
```

```

"MACD Long example",      { Trade Data Filename }
LONG,                     { Trade Position Type }
EntryTrigger              { Entry Trigger }
EntryPrice,               { Entry Price }
InitialStop,              { Initial Stop }
ExitTrigger               { Exit Trigger }
ExitPrice                 { Exit Price }
START);                   { Trade Recorder Control }

```

Volatility Trailing Stops

Volatility trailing stops are useful in developing trading systems that adhere to strict money management and position-sizing guidelines. The main benefits of a trailing stop is that it moves in favour of the trade whilst minimising risk and maximising profits. A detailed discussion of this type of stop can be found in Appendix C.

Generating Multiple System Trade Data

Note: Prior to TradeSim Version 5.3.0 plugin some users were experiencing problems when running multiple system trade database exploration. Previously if an unrecoverable error occurred in a call to the RecordTrades function this would stop Metastock running any proceeding code including further calls to additional RecordTrades functions. If there were price errors or anything that would cause the RecordTrades function to report an error back to Metastock, this would halt any further Metastock formula language processing until a new security was read in. The new reporting system overcomes most of these issues by correctly identifying any errors that may cease the processing of any proceeding formula. However unrecoverable file errors will still cause Metastock to stop any further processing. The user will be alerted to this via the new Report Log.

The *RecordTrades* function is not limited to generating trading data for only one trading system at a time. You can use it to generate trading data for many systems at the same time. For example say that we have four trading systems called System1, System2, System3 and System4 – each system having its own set of entry and exit conditions as well as an optional initial stop. To generate trade data for all four systems at one time requires us to correctly specify the Trade Recorder Control parameter for each reference to the *RecordTrades* external function. Using a four-trading-system as an example and leaving out the details for each of the parameters, the *RecordTrades* indicators would be written as follows:

```

ExtFml( "TradeSim.Initialize");      { Initialize internal variables }
{----- Trading System 1 -----}
EntryTrigger1:=??;                  { Entry Trigger }
EntryPrice1:=??;                    { Entry Price }
InitialStop1:=??;                   { Initial Stop }
ExitTrigger1:=??;                   { Exit Trigger }
ExitPrice1:=??;                     { Exit Price }
Tally:=ExtFml( "TradeSim.RecordTrades",
    "Multiple System Example",      { Trade Data Filename }
    LONG,                           { Trade Position Type }
    EntryTrigger1,                   { Entry Trigger }

```

```

EntryPrice1,           { Entry Price }
InitialStop1,         { Initial Stop }
ExitTrigger1,        { Exit Trigger }
ExitPrice1,          { Exit Price }
START);              { Trade Recorder Control }

{----- Trading System 2 -----}
EntryTrigger2:=??;   { Entry Trigger }
EntryPrice2:=??;    { Entry Price }
InitialStop2:=??;   { Initial Stop }
ExitTrigger2:=??;   { Exit Trigger }
ExitPrice2:=??;     { Exit Price }
Tally:=Tally + ExtFml( "TradeSim.RecordTrades",
    "",              { Trade Data Filename }
    LONG,            { Trade Position Type }
    EntryTrigger2,   { Entry Trigger }
    EntryPrice2,     { Entry Price }
    InitialStop2,    { Initial Stop }
    ExitTrigger2,    { Exit Trigger }
    ExitPrice2,      { Exit Price }
    CONTINUE);       { Trade Recorder Control }

{----- Trading System 3 -----}
EntryTrigger3:=??;   { Entry Trigger }
EntryPrice3:=??;    { Entry Price }
InitialStop3:=??;   { Initial Stop }
ExitTrigger3:=??;   { Exit Trigger }
ExitPrice3:=??;     { Exit Price }
Tally:=Tally + ExtFml( "TradeSim.RecordTrades",
    "",              { Trade Data Filename }
    SHORT,           { Trade Position Type }
    EntryTrigger3,   { Entry Trigger }
    EntryPrice3,     { Entry Price }
    InitialStop3,    { Initial Stop }
    ExitTrigger3,    { Exit Trigger }
    ExitPrice3,      { Exit Price }
    CONTINUE);       { Trade Recorder Control }

{----- Trading System 4 -----}
EntryTrigger4:=??;   { Entry Trigger }
EntryPrice4:=??;    { Entry Price }
InitialStop4:=??;   { Initial Stop }
ExitTrigger4:=??;   { Exit Trigger }

```

```

ExitPrice4:=??;                                { Exit Price }
Tally:=Tally + ExtFml( "TradeSim.RecordTrades",
    "",                                          { Trade Data Filename }
    LONG,                                       { Trade Position Type }
    EntryTrigger4,                             { Entry Trigger }

    InitialStop4,                              { Initial Stop }
    ExitTrigger4,                              { Exit Trigger }
    ExitPrice4,                                { Exit Price }
    CONTINUE);                                 { Trade Recorder Control }

Tally;    { adding this line will display the correct number of trades
written to the trade database }

```

Note that only the first reference to the RecordTrades external function has the Trade Recorder Control parameter set to **START**. In subsequent calls to the RecordTrades function the Trade Recorder Control parameter should always be set to **CONTINUE**. This allows additional trade data to be appended to the existing trade database file without overwriting existing data. The first reference to the RecordTrades function opens or creates a trade data file and generates the first set of trading data.

Generating Multiple Security Trade Data

To generate trade data for multiple securities at one time we can easily adapt the same techniques that allowed us to generate trade data by applying a trade recorder indicator to a chart. In this instance the MetaStock Explorer comes to the rescue. Normally the MetaStock Explorer is used to allow us to search for securities that meet certain requirements defined by a combination of indicators. However we can change its functionality as an explorer to one that generates trade data for a range of securities by inserting the trade recorder indicators that we created previously into one of the Column tabs in the Exploration editor in MetaStock. An example of this is shown in the following indicator which we can insert into **Column A** tab of the Exploration editor in MetaStock.

```

ExtFml( "TradeSim.Initialize"); { Initialize internal variables }
ExtFml( "TradeSim.RecordTrades",
    "MACD Long example",      { Trade Data Filename }

    EntryTrigger,            { Entry Trigger }
    EntryPrice,              { Entry Price }
    InitialStop,             { Initial Stop }
    ExitTrigger,             { Exit Trigger }
    ExitPrice,               { Exit Price }
    START);                  { Trade Recorder Control }

```

When an exploration is run, MetaStock calls the above function for each security in the security list. Subsequently trade data is written to a trade database file specified by the Trade Data Filename parameter in the RecordTrades function.

Setting up a MetaStock Exploration with the RecordTrades function

We are now in a position to set-up up a MetaStock Exploration to generate a multiple security trade database. If you are not familiar with running a MetaStock Exploration then we suggest that you consult the user manual that came with your MetaStock software for more information on how to use the MetaStock Explorer.

Using our MACD crossover example the MetaStock code for the exploration can be written as shown below: -

```

EntryTrigger := Cross (MACD () ,Mov (MACD () ,9,E) ) ;
EntryPrice := CLOSE;
ExitTrigger := Cross (Mov (MACD () ,9,E) ,MACD () ) ;
ExitPrice := CLOSE;
InitialStop := 0;           { optional initial stop }

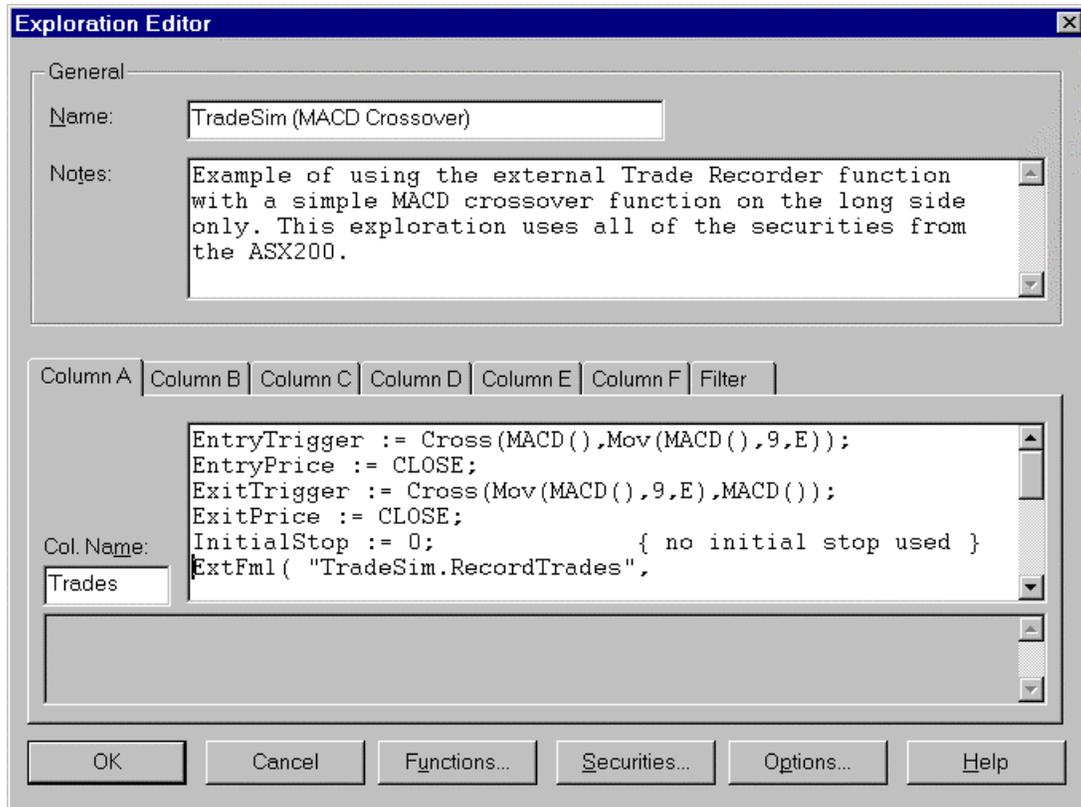
ExtFml ( "TradeSim.RecordTrades" ,
        "MACD Long example" ,      { Trade Data Filename }
        LONG ,                     { Trade Position Type }
        EntryTrigger ,             { Entry Trigger }
        EntryPrice ,               { Entry Price }
        InitialStop ,              { Initial Stop }
        ExitTrigger ,              { Exit Trigger }
        ExitPrice ,                { Exit Price }
        START) ;                  { Trade Recorder Control }

```

Bring up the Explorer editor and add the code above into 'Column A'.

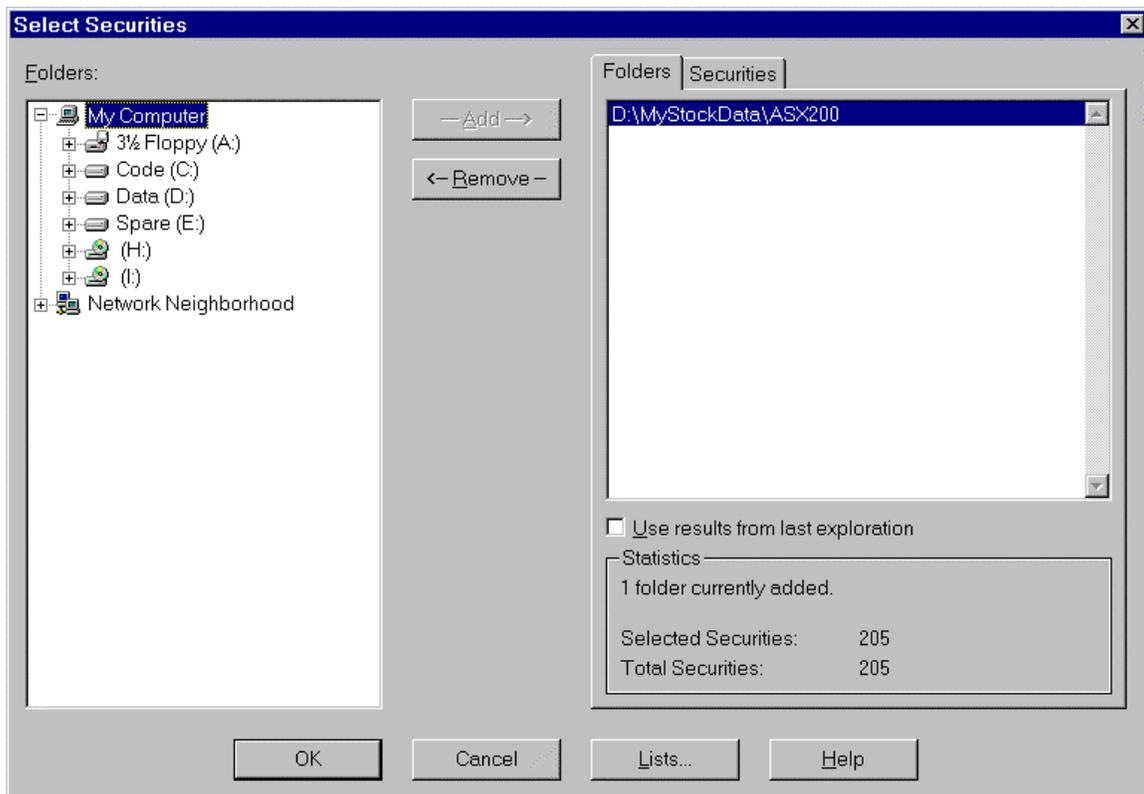
Note: No other Columns or the Filter are used in the exploration.

The resulting Exploration Editor window should look similar to the one below.

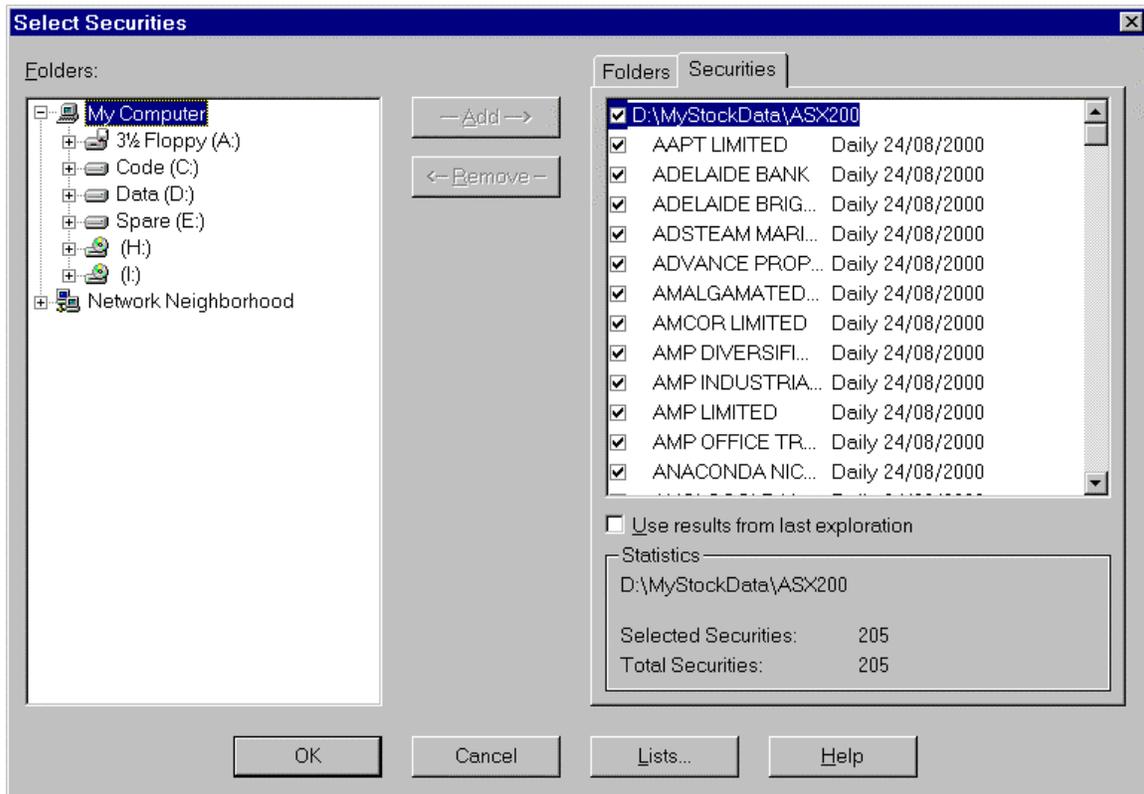


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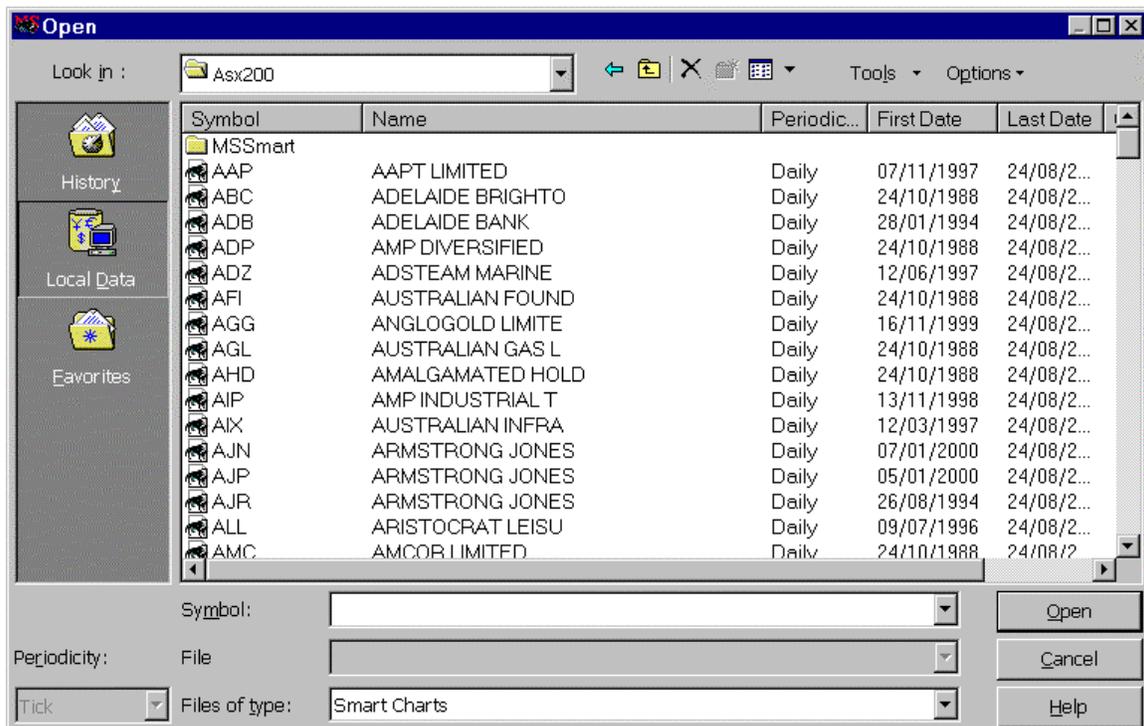
Now click on the Securities button. You should get a dialogue box that looks similar to that below.



Note that selecting the securities tab will reveal all of the securities in the database.

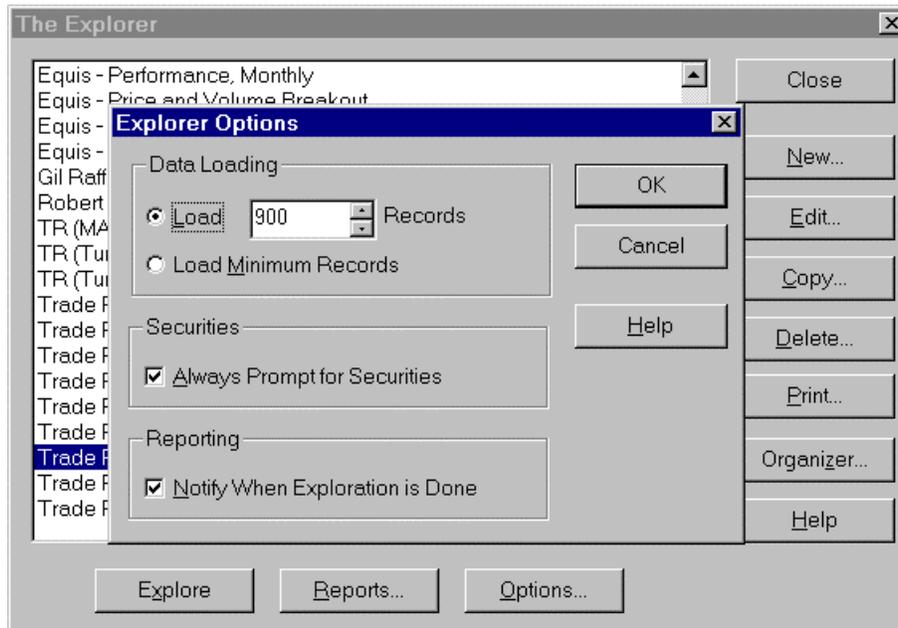


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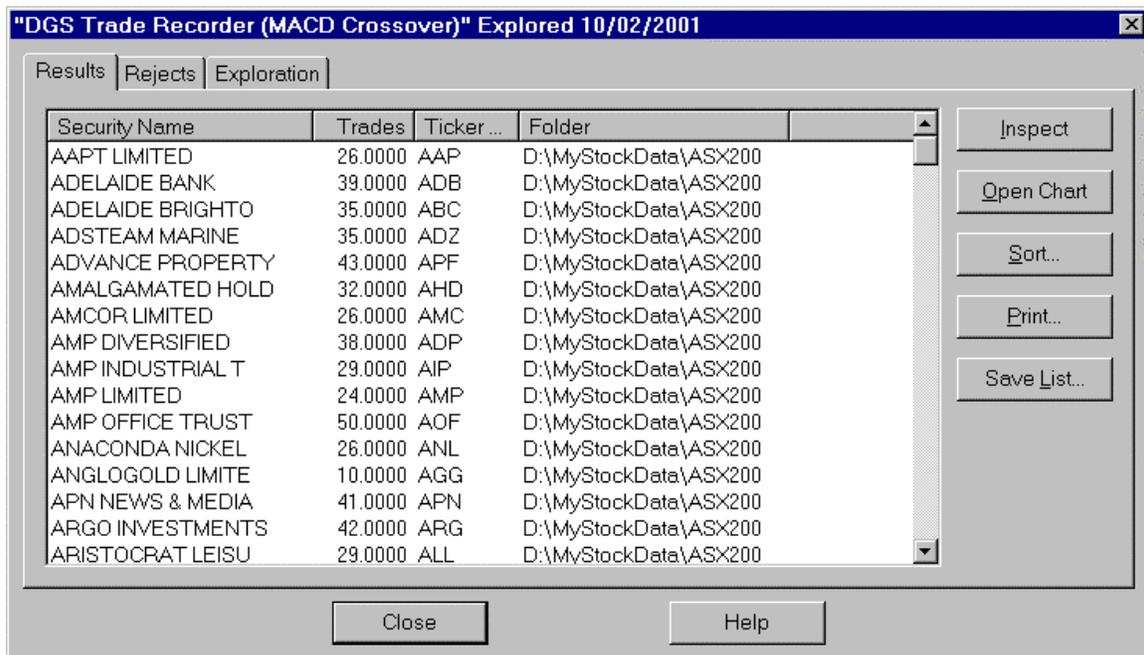
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Before we run the exploration we need to specify how many records of data we are going to analyse for each security that is scanned by the Explorer. We can change this by going into the Explorer Options dialogue box where we change the **Data Loading** parameter from the default of 300 days to a much larger value. If our security database file does not contain much information beyond 300 days worth of data then there is not much point increasing this parameter. Note that there are only about 250 actual trading days in each year so that if we are interested in the last two years of trade data then we need to explore over 500 records.



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Once we have set-up the exploration we can run it like we would with any other exploration. Refer to your MetaStock manual for more details on how to do this. The results of the exploration are shown below.

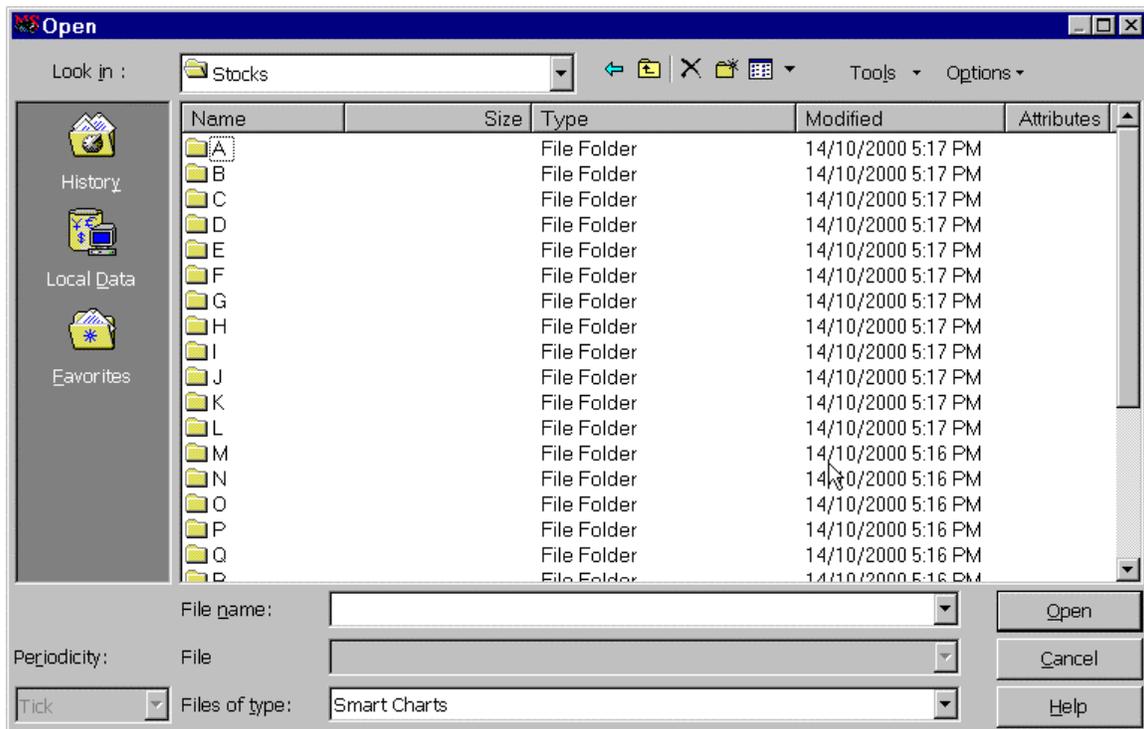


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Note that in *Column A* which we labelled “Trades” there is a number which represents the actual number of trades that was written to the trade database file for each of the securities in the exploration list.

Using a subset of the securities in a RecordTrades exploration.

In the previous example we used all of the securities in the database since this database only contained the securities that we were interested in. Typically, security data is not grouped and stored according to a particular index such as the NASDAQ, DOW, Australian All-Ords, rather it is usually stored in alphabetical ordering as shown in the layout below.



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When running an exploration we would normally include the securities from all of the folders from A to Z in our exploration. This may amount to many thousands of securities that we have to explore. However we may only be interested in using a subset of these securities. For example we may only be interested in trading the top 200 stocks because they are the most liquid stocks and give more reliable trading information.

MetaStock provides a solution to this problem by allowing us to selectively enable and disable securities from the securities list. You could then make up a portfolio of securities by checking and unchecking the relevant securities from each folder. For example you could make up a portfolio of the equivalent of the ASX top 200 stocks by selectively enabling the requisite securities. However there is a much quicker and simpler way of doing this without having to sift through thousands of securities and the next section describes this procedure in detail.

Generating a portfolio security list the ‘Easy Way’

This article has now been moved to the reference library folder in your TradeSim installation folder. [Please click here to view this document.](#)

Note: If this article is missing it can be downloaded from the following website location
<http://www.compuvision.com.au/DownloadTradeSim.htm>

The TradeSim Function Library

The TradeSim.DLL Plug-In contains a number of internal variables, which can alter the behaviour of the **RecordTrades** function. These variables can be changed by calling a number of external functions from within the MetaStock environment. We have already talked about one of these functions, which is used to enable a protective money management stop when using the **RecordTrades** function.

When called, these functions act like 'switches' to change the internal variables which remain active at their changed state throughout a MetaStock session unless the function is called again with a different set of parameters (if any) or the Initialization function is called, in which case all of the TradeSim internal variables will return to their default state which is the state when MetaStock is executed. When using the **RecordTrades** function you should always proceed its use with a call to the initialization function otherwise any internal variables previously set will still remain active at the last state they were altered and may cause the trade database to produce incorrect trade data. To Initialize the **RecordTrades** function to a default state, insert the following code prior to the call to the RecordTrades function.

```
ExtFml("TradeSim.Initialize");
```

The function library can be grouped into following sections.

Function Category	Function
General Control Functions	Initialize
Entry and Exit Control Functions	DisableDelayOfAllExitsByOneBar DisableDelayOfEntryByOneBar EnableDelayOfAllExitsByOneBar EnableDelayOfEntryByOneBar SetExitTriggerDelay SetStartRecordDate SetStopRecordDate SetTimeStop SetExitPriceToProfitStop NormalExitIfProfit
Initial Stop Control Functions	DisableProtectiveStop EnableProtectiveStop SetExitPriceToInitialStop SetStopGapPriceToOpen (Obsolete) UseClosingPriceAsStopThreshold DisableClosingStopDelay
Profit Stop Control Functions	SetProfitStop SetProfitStopInactivityDelay SetExitPriceToProfitStop SetVariableProfitStop
Trade Pyramid Functions	EnableTradePyramiding DisableTradePyramiding SetPyramidProfitThresholdDetection
Debugging Functions and Aids	ShowTrades (formerly ShowChart) SuppressFileProcessing (Obsolete) SetReturnInfoType
Miscellaneous Functions	GetSymbolLength SetCurrencyMultiplier SetVolumeInfoType SetVariableVolume SetVolumeMultiplier

	AllowInvalidPriceData EnablePriceFilter DisablePriceFilter DisableOpenTrades TrailingStop AppendTrades SetTriggerAtDate EnableUserExitEncoding Security UseSecurityName
Extended Data Value Functions	InitializeValues SetValue AssignValue
Provisional Trades and Signal Ranking functions. NEW	IncludeAllSignals Provisional Trades SetVariableTradeRank

General Control Functions

Initialize

```
ExtFml("TradeSim.Initialize");
```

Initializes the TradeSim external DLL to a default state. It should be called when the internal variables need to be set to a default state and it is good practice to call it once for every call to the **RecordTrades** function.

The call to the Initialize function sets the internal variables to the following state:-

Internal Variable	Default State
ReturnInfoType	RETURN_TRADE_TALLY
DelayAllExitsByOneBar	False
DelayEntryByOneBar	False
NormalExitIfProfit	False
ProtectiveStop.Enable	False
ProtectiveStop.ExitAtStop	False
ProtectiveStop.UseClosingPriceAsThreshold	False
ProtectiveStop.DisableClosingStopDelay	False
ProtectiveStop.Delay	0
TimeStop.Enable	False
TimeStop.Duration	0
ExitTriggerDelay	0
ProfitStop.Enable	False
ProfitStop.UseVariableThreshold	False
ProfitStop.Threshold	0
ProfitStop.ExitAtStop	False
ProfitStop.Delay	0
TradeRank.Value	0
TradeRank.UseVariableRank	False
StartRecordDate	0
StopRecordDate	1/Jan/3000
CurrencyMultiplier	1.0
Volume.Multiplier	1.0
Pyramid.Enable	False
Pyramid.ProfitThreshold	0
Pyramid.MaxLevel	100
Pyramid.ProfitThresholdDetection	PYRAMID_PROFIT_THRESHOLD_EXIT_PRICE
Volume.InfoType	VOLUME_LOWEST
AppendTrades	False
SuppressFileProcessing	False
EnablePriceFilter	True
DisableOpenTrades	False
EnableUserExitEncoding	False
UseSecurityName	False
ShowChart.Symbol	""
ShowChart.Enable	False
AllowInvalidPriceData	False
ShowRejectedTradeDetails	False

□ Example

The following example shows the typical usage of the Initialize function in conjunction with the RecordTrades function and other switch functions.

```
ExtFml ("TradeSim.Initialize");
{ call to other functions and switches before the call to the RecordTrades
function}
ExtFml ("TradeSim.....");
ExtFml ("TradeSim.....");
ExtFml ("TradeSim.....");
{ final call to the RecordTrades function }
ExtFml ("TradeSim.RecordTrades",,,,,,,,,);
```

Entry and Exit Control Functions

The Entry and Exit control functions are used to modify the way the RecordTrades function treats the Entry and Exit triggers. They can be used to give more control over the way that trades are entered or exited than can be obtained using the MetaStock formula language.

EnableDelayOfEntryByOneBar

```
ExtFml ("TradeSim.EnableDelayOfEntryByOneBar");
```

This function call is used to delay all entry triggers defined by the *EntryTrigger* array by one bar. A typical use of this function is when an entry trigger is generated at the end of day but it is not practical to enter a trade until the next day. A call to the *Initialize* or the *DisableDelayOfEntryByOneBar* function disables the effects of a call to this function.

DisableDelayOfEntryByOneBar

```
ExtFml ("TradeSim.DisableDelayOfEntryByOneBar");
```

This function call is used to disable the delay of entry caused by the call to the *EnableDelayOfEntryByOneBar* function. A call to the *Initialize* function also achieves the same result.

DisableDelayOfAllExitsByOneBar

```
ExtFml ("TradeSim.DisableDelayOfAllExitsByOneBar");
```

This function call is used to disable the delay of all exits caused by the call to the *EnableDelayOfAllExitsByOneBar* function. A call to the *Initialize* function also achieves the same result.

EnableDelayOfAllExitsByOneBar

```
ExtFml ("TradeSim.EnableDelayOfAllExitsByOneBar");
```

This function call is used to delay all exit triggers by one bar. This includes all external exit triggers defined by ExitTrigger array and all internal exit trigger mechanisms. A typical use of this function is when an exit trigger is generated at the end of day but it is not practical to exit a trade until the next day. A call to the *Initialize* or the *DisableDelayOfAllExitsByOneBar* function disables the effects of a call to this function.

There are situations when the one-bar delay is forced on or off irrespective whether or not the delay has been activated or not.

These are (in order of precedence):-

1. When *EnableProtectiveStop* and *UseClosingPriceAsThreshold* have been called and a protective stop has been breached then the trade will exit on the next bar at the opening price.

2. When *EnableProtectiveStop* and *SetExitPriceToInitialStop* have been called and a protective stop has been breached then the trade will exit on the current bar at the InitialStop price.
3. When *SetProfitStop* and *SetExitPriceToProfitStop* have been called and the profit threshold has been exceeded then the trade will exit on the current bar at the profit threshold price.

SetExitTriggerDelay

```
ExtFml ("TradeSim.SetExitTriggerDelay", DELAY) ;
```

This function is used to ignore any ExitTriggers a *DELAY* number of bars from the point of entry into a trade. A call to the *Initialize* function disables the effects of a call to this function.

□ Example

The following example sets up the RecordTrades function to ignore the ExitTrigger signal for 3 bars from the point of entry into a trade.

```
ExtFml ("TradeSim.SetExitTriggerDelay", 3) ;
```

SetTimeStop

```
ExtFml ("TradeSim.SetTimeStop", NBARS) ;
```

This function is used to limit the maximum number of bars before the *RecordTrades* function is forced to exit a trade irrespective of the condition of the *ExitTrigger*. When a trade is entered and a valid exit trigger has not been detected after *NBARS* have been counted the trade will automatically be terminated on the next bar. If *NBARS* is set to zero then the time stop will be disabled. A call to the *Initialize* function disables the effects of a call to this function. You can also specify the time stop in terms of days. This can be done by using a negative time value.i.e, -10 specifies a time stop of 10 days where as a +10 specifies a time stop of 10 bars.

Note: To avoid confusion the time stop now exits on the actual Nth bar/day rather than one bar/day after.

□ Example

The following example sets up a time stop to automatically exit a trade after 60 bars have passed and an ExitTrigger has not been detected.

```
ExtFml ("TradeSim.SetTimeStop", 60) ;
```

□ Example

The following example sets up a time stop to automatically exit a trade after 10 days have passed and an ExitTrigger has not been detected.

```
ExtFml ("TradeSim.SetTimeStop", -10) ;
```

SetStartRecordDate

```
ExtFml ("TradeSim.SetStartRecordDate", day, month, year) ;
```

This function is used to set the earliest date at which trades can be entered and recorded using the *RecordTrades* function. Any trades with entry dates below this date will be ignored and excluded from the trade database. To disable the effects of this function either call it using a date, which is lower than the earliest date in the whole security database or call the *Initialize* function. The "day" and "month" parameters are 1-based.

□ Example

The following example starts recording trades after and including the 21-April-1993.

```
ExtFml ("TradeSim.SetStartRecordDate", 21, 4, 1993) ;
```

SetStopRecordDate

```
ExtFml ("TradeSim.SetStopRecordDate", day, month, year) ;
```

This function is used to set the latest date at which trades can be entered and recorded using the *RecordTrades* function. Any trades with entry dates after this date will be ignored and excluded from the trade database. To disable the effects of this function either call it using a date, which is greater than the latest date in the whole security database or call the *Initialize* function. The “day” and “month” parameters are 1-based.

Note that trades can still be recorded to the trade database if they were entered before and exit after the Stop Record Date.

Example

The following example stops recording trades after and including the 5-June-2000.

```
ExtFml ("TradeSim.SetStopRecordDate", 5, 6, 2000) ;
```

NormalExitIfProfit

```
ExtFml ("TradeSim.NormalExitIfProfit") ;
```

This function exits on a valid exit trigger only if there is a profit condition with respect to the entry price.

Profit Stop Control Functions

SetProfitStop

```
ExtFml ("TradeSim.SetProfitStop", ProfitThreshold%) ;
```

This function is used to automatically exit a trade irrespective of the ExitTrigger when a profit threshold exceeds an amount determined by the *ProfitThreshold* parameter. The *ProfitThreshold* parameter must be positive and is expressed in percentage. The profit calculation takes into account which side of the market (Long or short) the trade has been taken and the profit threshold is always referenced to the entry price. When a trade is exited in this manner the trade is flagged in the database and is shown in the TradeSim Trade Database Manager as a profit stop. A call to the *Initialize* function disables the effects to a call to this function.

For long trades a profit stop is generated when the following criteria is satisfied:-

```
(100 x (XP - EP) / EP) > PercentProfitThreshold
```

For short trades a profit stop is generated when the following criteria is satisfied:-

```
-(100 x (XP - EP) / EP) > PercentProfitThreshold
```

where:-

EP is the value of the EntryPrice parameter in the RecordTrades function at the point of entry into the trade.

By default XP is the value of ExitPrice parameter in the RecordTrades function when the above relationship is satisfied. If *SetExitPriceToProfitStop* has been called then XP = Daily High for long trades and XP = Daily Low for short trades.

Note. The true profit is never known until a simulation is actually run due to transaction costs and slippage.

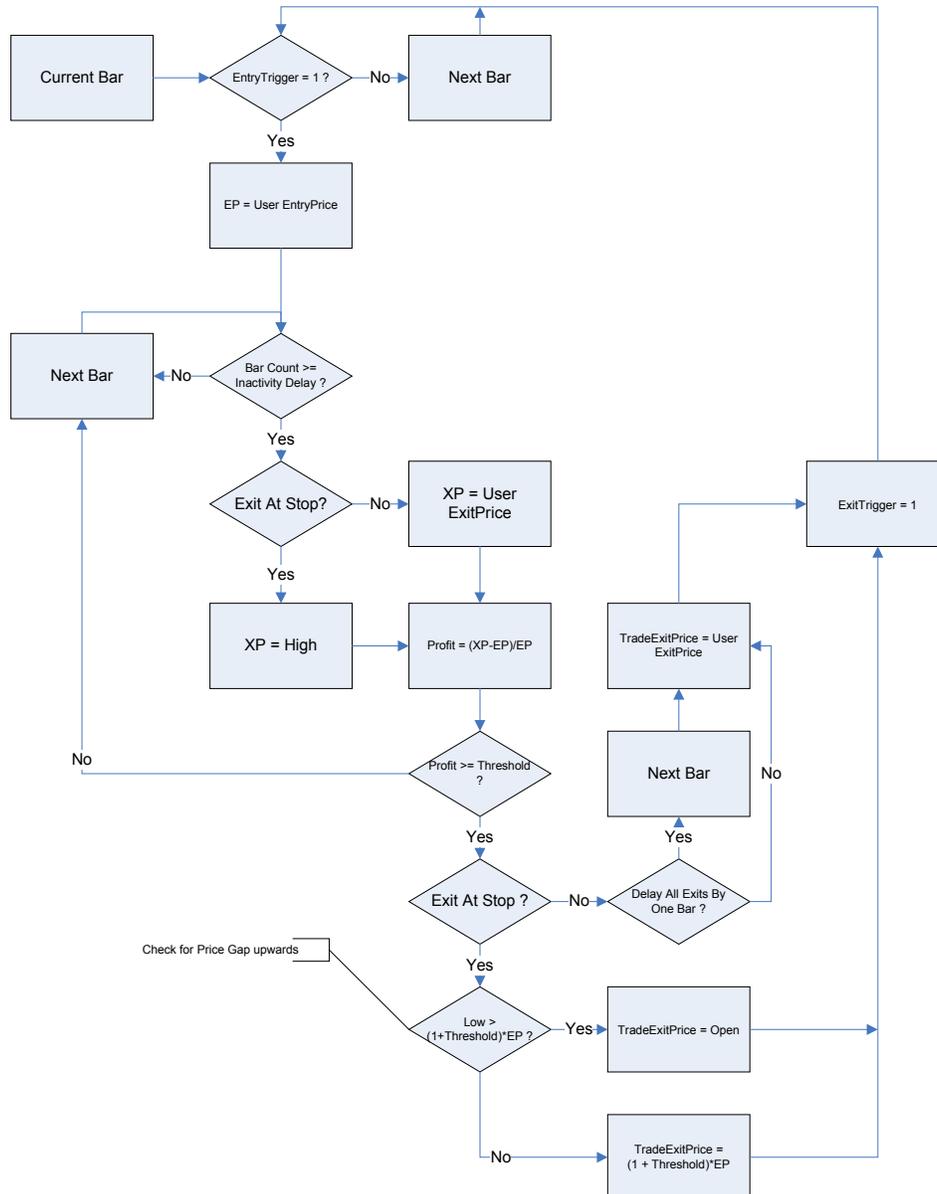
□ **Example**

The following example sets up the RecordTrades function to automatically exit a trade when the open trade profit exceeds 10 percent.

```
ExtFml ("TradeSim.SetProfitStop", 10);
```

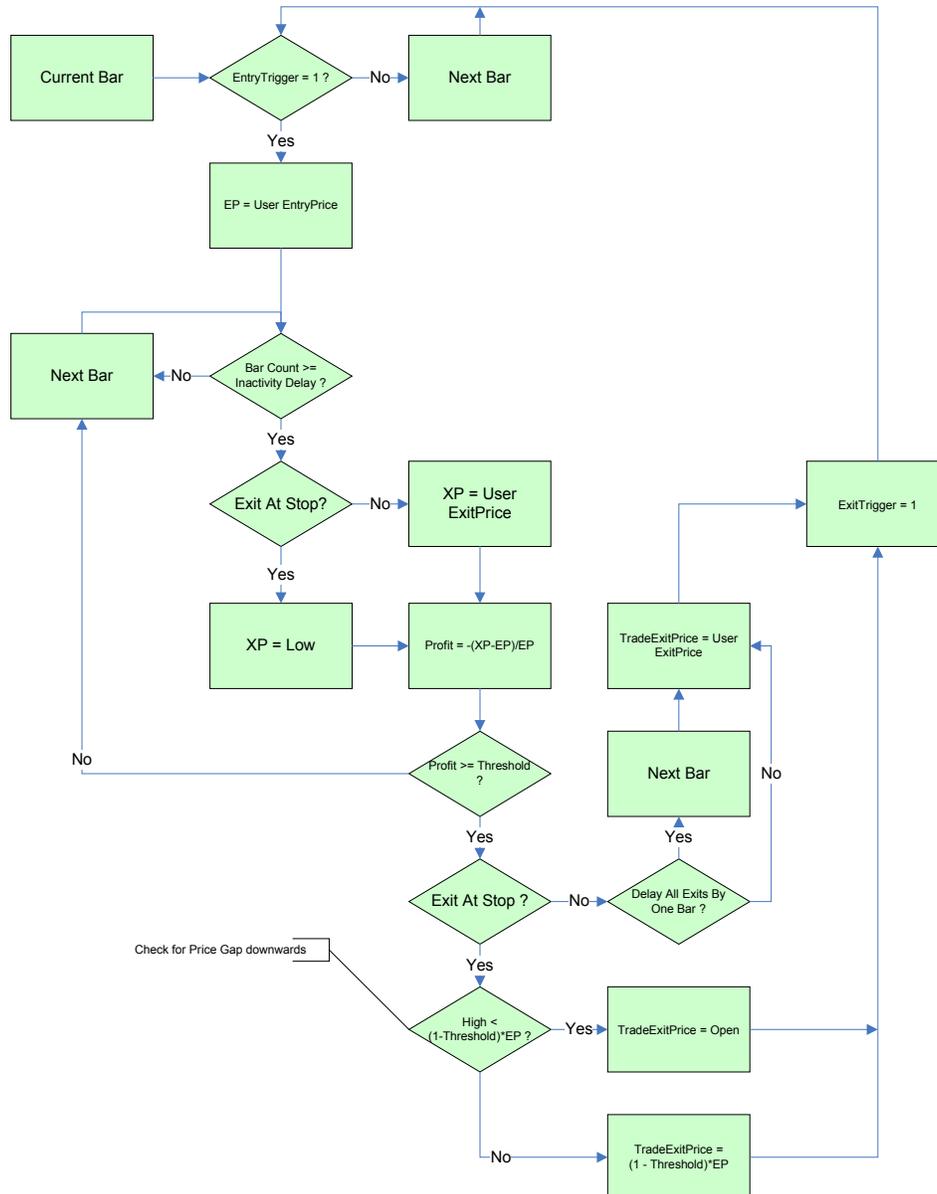
□ Profit Stops on the Long Side

The following flowchart illustrates the procedure used when analysing the price information for a breach of the profit stops on the long side.



Profit Stops on the Short Side

The following flowchart illustrates the procedure used when analysing the price information for a breach of the profit stops on the short side.



SetProfitStopInactivityDelay

```
ExtFml ( "TradeSim.SetProfitStopInactivityDelay", DELAY );
```

By default this is set to zero, which means that a profit comparison is made on the entry bar. If you don't wish to make a profit comparison on the entry bar then DELAY should be made greater or equal to one.

SetExitPriceToProfitStop

```
ExtFml ( "TradeSim.SetExitPriceToProfitStop" );
```

When used with ProfitStops, forces all profit stops to exit at the profit threshold rather than the price specified by the ExitPrice parameter in the RecordTrades function. This is useful for intraday exits.

Note: When *SetExitPriceToProfitStop* is called, the high and low of the daily range is used to make a comparison with the profit threshold for long and short trades respectively. The trade is exited at the profit threshold price if the threshold is met or exceeded unless the price gaps in which the trade will exit at the opening price.

SetVariableProfitStop

```
ExtFml ( "TradeSim.SetVariableProfitStop", ProfitThresholdArray, DELAY );
```

This function is used to automatically exit a trade irrespective of the ExitTrigger when a profit threshold exceeds an amount determined by the *ProfitThresholdArray* parameter. Unlike the *SetProfitStop* function, which takes a numeric constant the ProfitThresholdArray parameter, can be any numeric or Metastock formula expression which evaluates to a relative dollar threshold not a percentage threshold as used in the *SetProfitStop* function. The actual threshold used in the comparison is a snapshot of the *ProfitThresholdArray* when the trade is entered.

The profit calculation takes into account which side of the market (Long or short) the trade has been taken and the profit threshold is always referenced to the entry price. When a trade is exited in this manner the trade is flagged in the database and is shown in the TradeSim Trade Database Manager as a profit stop. A call to the *Initialize* function disables the effects to a call to this function. This function has precedence over the *SetProfitStop* if both functions happen to be used together.

The *DELAY* parameter works exactly the same way as described by the *SetProfitStopInactivityDelay* function in that the delay specifies the number of bars to ignore before the profit comparison is made.

The rules for exiting a trade based on a profit threshold target follow the previous flowcharts except that the constant percentile profit comparison is replaced with a relative comparison.

□ Example

To exit a trade with a 5% target profit relative to the entry price you would use the function as follows.

```
EntryPrice:=Open;
ExtFml ( "TradeSim.SetVariableProfitStop", 0.05*EntryPrice, 0 );
```

□ Example

Exit a trade with a profit target based on the Average True Range for a 10 bar period.

```
ExtFml ( "TradeSim.SetVariableProfitStop", ATR(10), 0 );
```

□ Example

The following is the complete trade database exploration code, which exclusively uses the *SetVariableProfitStop* function to exit a trade base an 10 bar ATR profit target relative to the entry price.

```
EntryTrigger := Ref (Cross (MACD ( ), Mov (MACD ( ), 9, E) ), -1 );
EntryPrice := OPEN;
ExitTrigger := 0;           { No exit trigger used }
ExitPrice := CLOSE;
```

```
InitialStop:=0;           { No Initial Stop used }

ExtFml( "TradeSim.Initialize");
ExtFml( "TradeSim.SetVariableProfitStop",ATR(10),0);

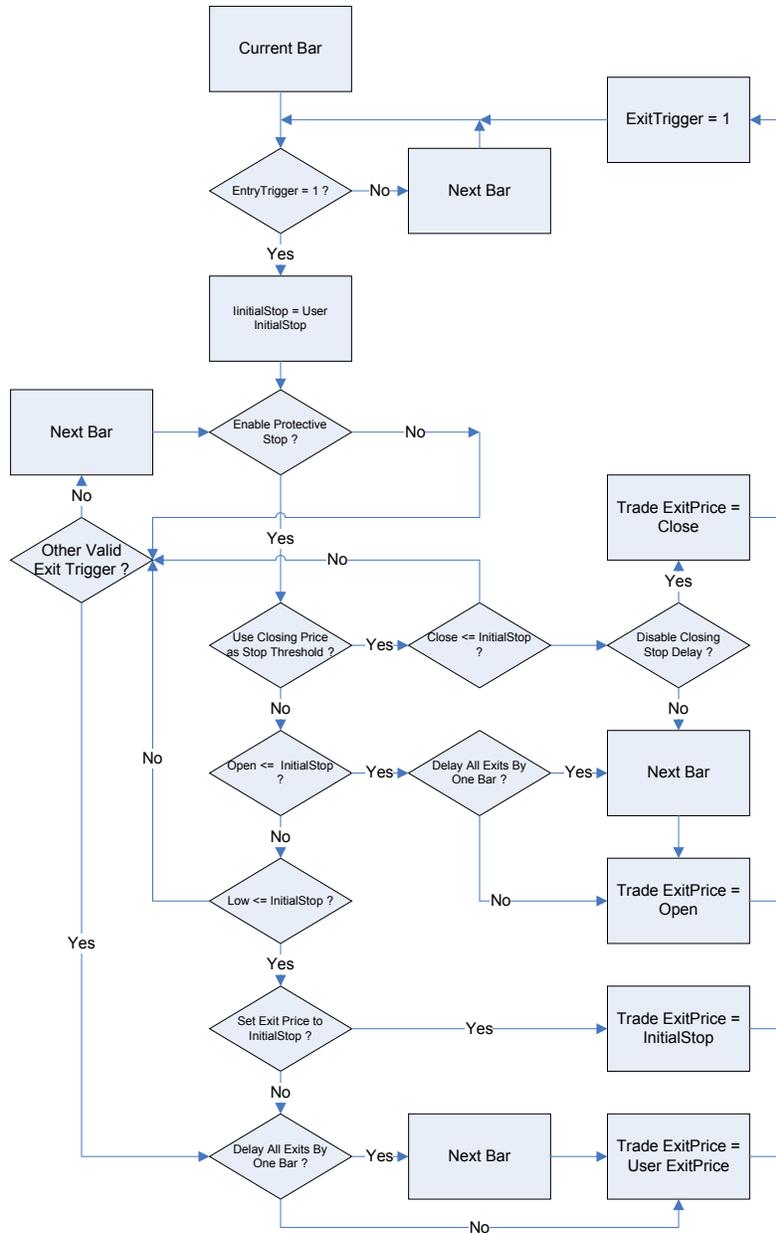
ExtFml( "TradeSim.RecordTrades",
  "Test Variable Profit Stop",      { Trade Database Filename }
  LONG,                             { Trade Position Type }
  EntryTrigger,                     { Entry Trigger }
  EntryPrice,                       { Entry Price }
  InitialStop,                      { Optional Initial Stop }
  ExitTrigger,                      { Exit Trigger }
  ExitPrice,                        { Exit Price }
  START);                          { Recorder Control }
```

Initial Stop Control Functions

The Initial Stop Control Functions are used to modify the way the RecordTrades function treats the InitialStop parameter. They can be used to give more control over the InitialStop parameter than can be obtained using the MetaStock formula language. Protective Stops are handled according to the following flowcharts.

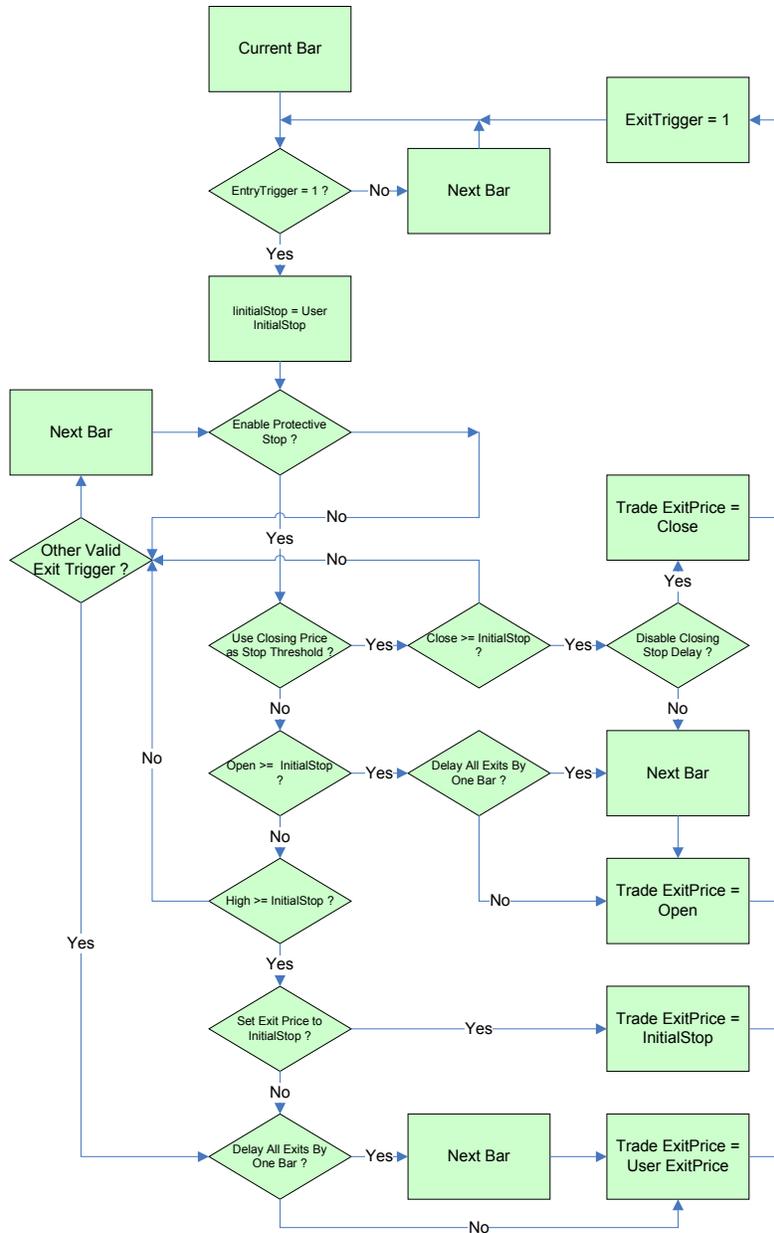
□ Protective Stops on the Long Side

The following flowchart illustrates the procedure used when analysing the price information for a breach of the protective stops on the long side.



□ Protective Stops on the Short Side

The following flowchart illustrates the procedure used when analyzing the price information for a breach of the protective stops on the short side.



EnableProtectiveStop

```
ExtFml ("TradeSim.EnableProtectiveStop", INACTIVITY_DELAY);
```

The **EnableProtectiveStop** function directs the **RecordTrades** function to use the initial stop as a protective stop. For trades on the long side a protective stop is generated when the low of the days trade is less or equal to the initial stop value and is only monitored after and including **INACTIVITY_DELAY** number of bars from the point of entry into a trade. For trades on the short side a protective stop is generated when the high of the days trade is greater or equal to the initial stop value and is only monitored after and including **INACTIVITY_DELAY** number of bars from the point of entry into a trade. A call to the **Initialize** or the **DisableProtectiveStop** function disables the effects of a call to this function.

Note: Prior to Version 4.0.0 of the TradeSim.dll if an exit trigger occurred at the same time the stop was breached and protective stops were enabled the trade would be recorded to the trade database and flagged as a normal exit. In Version 4.0.0 of the TradeSim.dll if an exit trigger occurs at the same time the stop is breached and protective stops are enabled the trade will be recorded to the trade database and flagged as "Stopped Out". This change will not have any effect on the simulation results, as the exit status of the trade is not used in the trade simulation.

DisableProtectiveStop

```
ExtFml ("TradeSim.DisableProtectiveStop");
```

This function disables the protective stop, however, the **InitialStop** data will still be written to the Trade Database. A call to the **Initialize** function also achieves the same result.

□ Example

In the following example the protective stop is enabled and is active after the fifth bar of the trade.

```
ExtFml ("TradeSim.EnableProtectiveStop", 5);
```

SetExitPriceToInitialStop

```
ExtFml ("TradeSim.SetExitPriceToInitialStop");
```

If protective stops have been enabled using the **EnableProtectiveStop** function then when the **InitialStop** is breached you automatically exit at a price, which is determined by the **ExitPrice** array parameter of the **RecordTrades** function. Typically the **ExitPrice** would be the closing price on the day the stop is breached. However there may be some circumstances where your trading routine requires you to exit exactly at the **InitialStop** price on the day the **InitialStop** was breached and not wait for end of the day or the next day to exit the trade. See the flowcharts above for the exact operation.

□ Example

The following example sets up the **RecordTrades** function to exit a trade at the **InitialStop** price on the same day the **InitialStop** is breached.

```
ExtFml ("TradeSim.Initialize");
ExtFml ("TradeSim.EnableProtectiveStop", 0);
ExtFml ("TradeSim.SetExitPriceToInitialStop");
```

SetStopGapPriceToOpen

```
ExtFml ("TradeSim.SetStopGapPriceToOpen");
```

The **SetStopGapPriceToOpen** function is obsolete and no longer has any effect.

UseClosingPriceAsStopThreshold

```
ExtFml ("TradeSim.UseClosingPriceAsStopThreshold") ;
```

Calling this function changes the way the price is compared to the InitialStop value when protective stops have been enabled using the *EnableProtectiveStops* function. If this function is called and protective stops have been enabled using the *EnableProtectiveStops* function then for a trade on the long side a protective stop is generated when the *closing* price of the days trade is less or equal to the initial stop value. Similarly for trades on the short side a protective stop is generated when the closing price of the days trade is greater or equal to the initial stop value. See the flowcharts above for the exact operation.

Note: If a stop has been breached then the trade will always exit at the opening price on the next bar if *UseClosingPriceAsStopThreshold* has been called. See the flowcharts above for the exact operation.

DisableClosingStopDelay

```
ExtFml ("TradeSim.DisableClosingStopDelay") ;
```

This function is used in conjunction with *UseClosingPriceAsStopThreshold* to disable the one bar delay so that when the closing price breaches the InitialStop level the trade exits on the current bar at the closing price instead of exiting on the next bar at the opening price.

Note: In reality the closing price is not technically known until the market closes in which case it is not possible to close the trade until the next opening. However some traders may wish to participate in the last minutes trading where it is possible to roughly guess the closing price and hence exit the trade before the market closes.

Trade Pyramid Functions

EnableTradePyramiding

```
ExtFml ("TradeSim.EnableTradePyramiding", TRIGGER_TYPE, PROFIT_THRESHOLD,
MAXIMUM_PYRAMID_DEPTH) ;
```

For more information on Pyramid Trades and Pyramid Trading Strategies see the relevant documentation ref ⁷⁾ AN3 - *Testing Trade Pyramid Strategies using TradeSim*.

□ Example

The following example sets up the conditions, which allow a trade pyramid to be built based on a minimum profit threshold of 3% gain per level and a maximum pyramid depth of 20 levels.

```
ExtFml ("TradeSim.EnableTradePyramiding", PercentProfit, 3, 20) ;
```

DisableTradePyramiding

```
ExtFml ("TradeSim.DisableTradePyramiding") ;
```

Disables the trade pyramiding mechanism switched on using the *EnableTradePyramiding* function. Also calling the Initialize function has the same effect. For more information on Pyramid Trades and Pyramid Trading Strategies see the relevant documentation ref ⁷⁾ AN3 - *Testing Trade Pyramid Strategies using TradeSim*.

SetPyramidProfitThresholdDetection

```
ExtFml ("TradeSim. SetPyramidProfitThresholdDetection", PROFIT_THRESHOLD_TYPE) ;
```

This function is used to determine the way that the profit threshold detection is measured when any profit threshold trigger type is used to re-enter a pyramid trade. For more information on Pyramid Trades and Pyramid Trading Strategies see the relevant documentation ref⁷⁾ AN3 - *Testing Trade Pyramid Strategies using TradeSim*.

Debugging Functions and Aids

SuppressFileProcessing

```
ExtFml ("TradeSim.SuppressFileProcessing");
```

The *SuppressFileProcessing* function is obsolete and no longer has any effect.

SetReturnInfoType

```
ExtFml ("TradeSim.SetReturnInfoType", INFO_TYPE);
```

By default the RecordTrades function returns the trade tally. This enables the total trade tally for each security to be reported in the exploration report when a trade database exploration is run. However when overlaying the RecordTrades function as an indicator on a chart the trade tally is of limited use. A more useful indicator would be to plot the actual entry or exit triggers or create an expert, which can be overlaid on a chart. The RecordTrades function can be made to report back the trigger information instead of the trade tally and long with the *SuppressFileProcessing* can allow the *RecordTrades* function to be used as an indicator or expert without actually creating a trade database file. Please refer to the [TB-1 document](#) for more information on the usage and application of this function.

The INFO_TYPE parameter can be one of the following four values.

- **TradeTally**
The *RecordTrades* function returns the total trade tally.
- **EntryTriggers**
The *RecordTrades* function returns the actual entry triggers. A value of '1' denotes an actual entry trigger and a value of '0' denotes no entry trigger.
- **ExitTriggers**
The *RecordTrades* function returns the actual exit triggers. A value of '1' denotes an actual exit trigger and a value of '0' denotes no exit trigger.
- **AllTriggers**
The *RecordTrades* function returns all actual entry and exit triggers. To avoid ambiguity with entry and exit triggers that occur at the same time the following encoding scheme is used.
 - '0' - No entry or exit trigger.
 - '1' - Actual entry trigger.
 - '2' - Actual exit trigger.
 - '3' - Both entry and exit trigger on the same day.

ShowTrades (formerly ShowChart)

```
ExtFml ("TradeSim.ShowTrades", Position (LONG,SHORT), SYMBOL);
```

When called with the appropriate symbol brings up a window, which displays a variety of signals in both graphical, tabular and tree form. This information is a useful aid for debugging trade database exploration code.

Note that the symbol of interest must be included with the security list otherwise the chart will not appear. This window is part of the external TradeSim plugin, and is not part of the main TradeSim application.

❑ Example

The following example displays all of the signals for the long side on a chart for symbol ANZ when a trade database exploration is run.

```
ExtFml ("TradeSim.ShowTrades",LONG,"ANZ");
```



Miscellaneous Functions

GetSymbolLength

```
ExtFml ("TradeSim.GetSymbolLength");
```

This function returns the number of characters in the symbol and can be used in a security list exploration to include or exclude securities with symbols that are a certain length. For example if you are only concerned with the primary securities which have symbol lengths of 3 then you can easily use the **GetSymbolLength** function in an exploration to reject all 4,5,6 character stock options and warrants by simply filtering out securities with symbol lengths greater than 3. Like the **FilterSecurity** function the **GetSymbolLength** function would be inserted in the filter section of an exploration as in the following example. More Information can be found from the section on [Generating a Security List the 'Easy Way'](#).

Note. It is recommended that this function should only be used by itself in an exploration to create a security list. It should not be used as part of a trade database exploration.

❑ Example

This following example can be used in the Filter section of the Explorer to filter out securities with 4 or more characters in the symbol name.

```
ExtFml ("TradeSim.GetSymbolLength") <=3;
```

SetCurrencyMultiplier

```
ExtFml ("TradeSim.SetCurrencyMultiplier", MULTIPLIER) ;
```

This function is used to multiply all currency values by a constant value before they are written out to the trade database. The multiplier parameter determines the amount by which the currency values are scaled. Only positive MULTIPLIER values are accepted. The default value for the multiplier is 1.0, which is also the value that is set when the *Initialize* function is called.

❑ Example

The following example is used to multiply all currency values by 0.01 (same as dividing by 100).

```
ExtFml ("TradeSim.SetCurrencyMultiplier", 0.01) ;
```

SetVolumeInfoType

```
ExtFml ("TradeSim.SetVolumeInfoType", VOLUME_TYPE) ;
```

By default when the *RecordTrades* function writes trade data to a trade database it also includes volume information for each trade. This volume is calculated by taking the minimum of the traded volume on the day of entry and exit. The *SetVolumeInfoType* allows you to change the way this volume information is calculated.

The VOLUME_TYPE parameter can be one of the following four values.

- **LOWEST**
The volume for each trade is the minimum traded volume on the days of entry and exit of the trade.
- **ENTRY**
The volume for each trade is the traded volume on the day of entry into the trade.
- **EXIT**
The volume for each trade is the traded volume on the day of exit from the trade.
- **AVERAGE**
The volume for each trade is the average traded volume on the days of entry and exit of the trade.

SetVariableVolume

```
ExtFml ("TradeSim.SetVariableVolume", dataArray) ;
```

The *SetVariableVolume* function allows user to assign traded value using a Metastock formula rather than the predefined values. Using this function will override any volume information as specified by the *SetVolumeInfoType* function and the value used is the value of the *DataArray* at the point of entry into a trade.

❑ Example

The following example sets the traded volume to the average of the last ten bars of the traded volume data.

```
ExtFml ("TradeSim.SetVariableVolume", mov(V, 10, S)) ;
```

SetVolumeMultiplier

```
ExtFml ("TradeSim.SetVolumeMultiplier", MULTIPLIER) ;
```

This function is used to multiply all volume values by a constant value before they are written out to the trade database. The multiplier parameter determines the amount by which the volume values are scaled. Only positive MULTIPLIER values are accepted. The default value for the multiplier is 1.0, which is also the value that is set when the *Initialize* function is called. This function is useful if your data supplier truncates volume data information. It is important to maintain correct volume information in the trade database if you are using the [Volume Filter](#) in TradeSim

❑ Example

The following example is used to multiply all volume values by 100.

```
ExtFml ("TradeSim.SetVolumeMultiplier",100) ;
```

EnablePriceFilter

```
ExtFml ("TradeSim.EnablePriceFilter") ;
```

The price filter is enabled by default and can be disabled by calling the *DisablePriceFilter* function. If prices fall outside the daily range then the trade price will automatically adjusted and a warning reported to the Trade Log. This is done to avoid synthesizing prices that were never present in the historical data in order to maintain realistic simulations. Enabling the price filter constrains the price so that it always falls within the daily range. It is equivalent to writing the following MetaStock code.

```
ActualEntryPrice:=if (EntryPrice>High,High,if (EntryPrice<Low,Low,EntryPrice)) ;  
ActualExitPrice:=if (ExitPrice>High,High,if (ExitPrice<Low,Low,ExitPrice)) ;
```

Note: By default the price filter is switched on so that price checking and adjusting is automatically done so that all trades will be accepted. If a price violation is detected then a warning will be issued to the report log and the prices will be constrained. If the price filter is switched off using *DisablePriceFilter* then price checking is still done but any price violations will cause the respective trade to be rejected and an error message will be reported to the report log.

DisablePriceFilter

```
ExtFml ("TradeSim.DisablePriceFilter") ;
```

By disabling the internal price filter if prices fall outside the daily range then the trade will be rejected and an error reported to the Trade Log. This is done to avoid synthesizing prices that were never present in the historical data in order to maintain realistic simulations. Disabling the price filter does not allow the prices to be constrained so that if the price falls outside the range of the respective bar the trade will be rejected and an error will be reported to the report log.

Note: By default the price filter is switched on so that price checking and adjusting is automatically done so that all trades will be accepted. If a price violation is detected then a warning will be issued to the report log and the prices will be constrained. If the price filter is switched off using *DisablePriceFilter* then price checking is still done but any price violations will cause the respective trade to be rejected and an error message will be reported to the report log.

AllowInvalidPriceData

```
ExtFml ("TradeSim.AllowInvalidPriceData") ;
```

This function allows outside daily range prices to be included in the trade database. Normally any price data, which lies outside the daily range is automatically constrained by the internal price filter or if the price filter is disabled the trade is excluded from the trade database. When *AllowInvalidPriceData* has been called the check is still made and reported but any outside daily range data is now written to the trade database. It should be noted that doing this might cause unexpected results should only be allowed if you understand the effects of doing this. To allow TradeSim to accept invalid price data you have to enable the reciprocal option in the [global preferences](#) in TradeSim otherwise invalid price data will be rejected.

Note: Only experienced users should enable this option, as it is possible to allow unrealistic prices to be incorporated into the trade database. For example if a security

trades between \$3-\$4 on a given day and your entry price is \$19 in most cases this would not be considered to be a realistic account of a trading record.

Note: There is no need to use this function if you are using the price filter EnablePriceFilter, as all prices will be constrained.

DisableOpenTrades

```
ExtFml ("TradeSim.DisableOpenTrades");
```

A call to this function does not include open trades when the trade database is generated.

TrailingStop

```
ExtFml ("TradeSim.TrailingStop", { 1. Name of external function }
    Mode, { 2. Mode }
    TradePosition, { 3. Trade Position Type }
    VolatilityFunction, { 4. Volatility Function }
    RefPoint { 5. Reference Point }
    ThresholdPoint { 6. Threshold Point }
);
```

The fast trailing-stop function is used to create a hard-coded trailing-stop function that operates significantly faster than one that is coded using the MS formula language. For more information regarding this function please refer to the [AN-2 Document](#).

AppendTrades

```
ExtFml ("TradeSim.AppenTrades");
```

This function is used to suppress recreation of the trade database file so that additional trade data can be appended to an existing trade database file. Typically this function would be used to assist creation of a trade database file based on multiple time frames or for multiple systems using different security lists. For more information regarding this function please refer to the [AN-4 Document](#).

SetTriggerAtDate

```
ExtFml ("TradeSim.SetTriggerAtDate", Day [1-31], Month [1-12], Year [YYYY]);
```

This function allows you to create an artificial trigger to occur at any arbitrary date.

□ Example

The following example sets an entry trigger to occur on 1st-February-2002.

```
EntryTrigger:=ExtFml ("TradeSim.SetTriggerAtDate",1,2,2002);
```

The same thing could be coded using the MS formula language as follows:-

```
EntryTrigger:=(DayOfMonth ()=1 AND Month ()=2 AND Year ()=2002);
```

To create multiple entry triggers at specific dates, say for example at 22-Feb-2000, 14-Mar-2000, 13-Jun-2002,

```
EntryTrigger:=ExtFml ("TradeSim.SetTriggerAtDate",22,2,2000) OR
ExtFml ("TradeSim.SetTriggerAtDate",14,3,2000) OR
ExtFml ("TradeSim.SetTriggerAtDate",13,6,2002);
```

Or using the MS formula language:-

```
EntryTrigger := (DayOfMonth()=22 AND Month()=2 AND Year()=2000) OR
(DayOfMonth()=14 AND Month()=3 AND Year()=2000) OR
(DayOfMonth()=13 AND Month()=6 AND Year()=2002);
```

EnableUserExitEncoding

```
ExtFml( "TradeSim.EnableUserExitEncoding" );
```

Normally the ExitTrigger is flagged as a 'Normal Exit' status so that even though your exit may be the combination of a number of exits it is not possible to distinguish between the exits as they all appear as 'Normal Exit' in the Exit Status column.

```
ExitTrigger := ExitTrigger1 OR ExitTrigger2 OR ExitTrigger3 OR .....;
```

By using exit encoding it is now possible to assign a user exit status to each exit trigger thus allowing one to distinguish between different exit triggers when you load the trade database into TradeSim. You can assign up to 16 User Exits which will appear in the Trade Database Manager and Trade Log as "User Exit nn" where nn can be any whole number from 1 to 16. To assign user exits you first enable it by called the function after the initialize function.

```
ExtFml( "TradeSim.EnableUserExitEncoding" );
```

You then need to encode your exits. For example say your main exit trigger is the combination of three exit triggers i.e., you would write your exit trigger as:-

```
ExitTrigger := ExitTrigger1 OR ExitTrigger2 OR ExitTrigger3;
```

To encode these three triggers you would rewrite the above as:-

```
ExitTrigger := If(ExitTrigger1,1,      { User Exit 1 }
                 If(ExitTrigger2,2,    { User Exit 2 }
                 If(ExitTrigger3,3,0)); { User Exit 3 }
```

Note that all ExitTriggers are assumed to be binary arrays, which can contain values of either 0 or 1.

□ Example

The following example encodes two exit signals, which are a MACD crossover and a trailing stop function.

```
EntryTrigger := Cross(MACD(), Mov(MACD(), 9, E));
EntryPrice := CLOSE;

ExitTrigger1 := Cross(Mov(MACD(), 9, E), MACD());
ExitTrigger2 := ExtFml( "TradeSim.TrailingStop", TRIGGER, LONG, Volatility,
CLOSE, LOW);
ExitTrigger := If(ExitTrigger1,1,      { User Exit 1 }
                 If(ExitTTrigger2,2,0)); { User Exit 2 }

ExitPrice := CLOSE;
InitialStop:=0; { No Initial Stop used }
```

```

ExtFml ( "TradeSim.Initialize" );
ExtFml ( "TradeSim.EnableUserExitEncoding" );

ExtFml ( "TradeSim.RecordTrades",
        "User Exit Encoding",  { Trade Database Filename }
        LONG,                  { Trade Position Type }
        EntryTrigger,         { Entry Trigger }
        EntryPrice,          { Entry Price }
        InitialStop,         { Optional Initial Stop }
        ExitTrigger,         { Exit Trigger }
        ExitPrice,           { Exit Price }
        START);               { Recorder Control }

```

Security

```

ExtFml ("TradeSim.Security",      { 1. Name of external function }
        DirectoryPath,          { 2. Directory Path }
        SymbolName,             { 3. Security Symbol }
        DataArray);             { 4. Data Array
(O=Open,H=High,L=Low,C=Close,V=Volume) }

```

This function is useful for Metastock Version 7 EOD users who wish to access data from an alternate security. Version 7 Professional and Metastock Version 8 & 9 offer a similar function called Security(); Typically this function is useful for constructing Relative Strength indicators etc. Data is automatically aligned with the underlying data and any missing data in the requested data is replaced with the last valid data so there are no gaps or holes in the requested security data.

Note: The Metastock version of this function only has 3 parameters. The Directory Path and Symbol Name are combined into one parameter instead of separate parameters as in this function.

Note: If the symbol specified represents the same data as the underlying data then the function does not attempt to re-access the data from the security file but returns a copy of the underlying data specified according to the Data Array parameter.

Parameter	Description	Examples
Directory Path	Used to specify the path that contains the Metastock Master files	"D:\Shares\Au-ASX\C" "D:\Shares\Au-ASX\X"
Symbol	Used to specify the symbol name of the security.	"XAO" "ANZ"
Data Array	Used to specify which data is returned from this function. O = Open Price Data, H = High Price Data, L = Low Price Data, C = Closing Price Data, V = Volume Data	

□ Example

The following example returns the closing price data for the Security with symbol CBA.

```
ExtFml ( "TradeSim.Security", "D:\Shares\Au-ASX\C", "CBA", C );
```

UseSecurityName

```
ExtFml ("TradeSim.UseSecurityName");
```

This function is used to replace the Symbol name with the Security name. As for symbols the trade database only allocates fourteen character places so that names longer than fourteen characters will automatically be truncated. It is possible that using the security name may inadvertently create trade aliases or duplicates. For example "News Corporation" have many different issues available which mirror each others behaviour. For example NCPDP closely mirrors the behaviour of its underlying NCP. Because of this and the fact that after truncating the name to "New Corporati" it is possible to produce a trade duplicate or alias that contain identical entry/exit conditions but only differ in price values. Be aware of these phenomena when using security names instead of symbol names.

Note: You should only use this function in special circumstances as TradeSim relies on the correct symbol when it needs to access security data for the purpose of plotting bar charts plotting the open equity curves.

Extended Data Value Functions

The extended data value functions are used to control the values of the extended data that are used in the Version 5 database format to assign additional information to each trade in the database. These additional data fields are Point Value, Initial Margin, Max Loss, Transaction Cost, System ID, Trade Rank, Margin Requirement. The following table describes the additional fields in detail.

An important Note.

Starting with Version 6.4.0. Extend data can now be loaded post trade database creation. That is after you have created a trade database with or without extended data you can temporarily overwrite the existing extended data using the 'Extended Data' Utility in TradeSim. Please see document [AN-7](#) for a detailed example on how to do this.

A Note on Point Value.

Point Value refers to the \$ amount of one Big Point. A big Point would be 1 point on the SPI, SP or Dow, or 1 point on the ED. To get the \$ value of the big point simply use the following formula:

Big Point in \$'s = 1/(tick size) * \$ tick value.

So for the ED = 1/0.005 * 12.50 = \$2,500

EMini SP = 1/0.25 * 12.50 = \$50.00

Extended Data Field Name	Description and Comments	Stocks	Commodities	AssignValue	SetValue	Allowable Values	Default Value after a call to InitializeValues
PointValue	Point Value	x	✓	✓	✓	≥ 0	0 (use default value in TradeSim)
InitialMargin	Initial Margin	x	✓	✓	✓	≥ 0	0 (use default value in TradeSim)
MaxLoss	Maximum Loss	x	✓	✓	✓	≥ 0	0 (use default value in TradeSim)
TransactionCost	Transaction Cost	✓	✓	✓	✓	≥ 0	0
SystemID	Used to indentify the call to the RecordTrades function.	✓	✓	x	✓	0-255	0
TradeRank	Used to assign a rank to a group of trades.	✓	✓	✓	✓	≥ 0	0
MarginReq	Margin Requirement	✓	x	✓	✓	0-100%	0 (use default value in TradeSim)

InitializeValues

```
ExtFml ("TradeSim.InitializeValues");
```

Initializes all extended values to their default value. This function should be called before any calls to SetValue or AssignValue.

SetValue

```
ExtFml ("TradeSim.SetValue",ATTRIBUTE,VALUE) ;
```

Valid Attributes are {PointValue, InitialMargin, MaxLoss, TransactionCost, SystemID, TradeRank, MarginReq }

A call to this function sets the value of any one of the extended data values irrespective of symbol.

```
ExtFml ("TradeSim.InitializeValues");      { always include this call }

ExtFml ("TradeSim.SetValue",PointValue,30); {sets Point Value to $30 }
ExtFml ("TradeSim.SetValue",InitialMargin,4300); {sets the Initial Margin to $4300 }
ExtFml ("TradeSim.SetValue",MaxLoss,5000); {sets the Maximum Loss to $5000 }
ExtFml ("TradeSim.SetValue",TransactionCost,25); {sets the Transaction Cost to $25 }
ExtFml ("TradeSim.SetValue",SystemID,2); {sets the System ID to 2 }
ExtFml ("TradeSim.SetValue",TradeRank,80); {sets the Trade Rank to 80 }
ExtFml ("TradeSim.SetValue",MarginReq,50); {sets the Margin Requirement to 50 }
```

AssignValue

```
ExtFml ("TradeSim.AssignValue",ATTRIBUTE,SYMBOL,VALUE) ;
```

Valid Attributes are {PointValue, InitialMargin, MaxLoss, TransactionCost, TradeRank, }

A call to this function sets the value of any one of the extended data values depending on the symbol. For example this is a useful way of assigning a different set of commodity values to different markets (symbols).

```
ExtFml ("TradeSim.InitializeValues");      { always include this call }

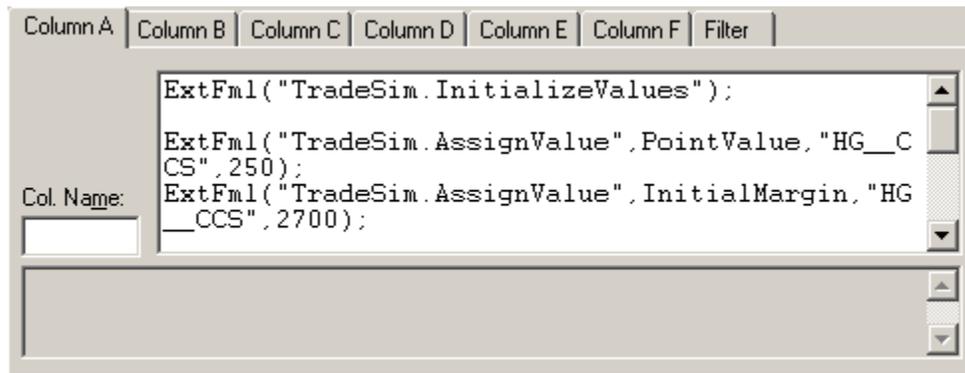
ExtFml ("TradeSim.AssignValue",PointValue,"ABC",40); {sets Point Value of security ABC to $40 }
ExtFml ("TradeSim.AssignValue",InitialMargin,"XYZ",4700); {sets the Initial Margin to of security XYZ to $4700 }
ExtFml ("TradeSim.AssignValue",MaxLoss,"DEF",5000); {sets the Maximum Loss of security DEF to $5000 }
ExtFml ("TradeSim.AssignValue",TransactionCost,"DEF",25); {sets the Transaction Cost of DEF to $25 }
ExtFml ("TradeSim.AssignValue",TradeRank,"ABC",1); {sets the Trade Rank of security ABC to 1 }
ExtFml ("TradeSim.AssignValue",TradeRank,"DEF",2); {sets the Trade Rank of security DEF to 2 }
ExtFml ("TradeSim.AssignValue",TradeRank,"XYZ",3.2); {sets the Trade Rank of security XYZ to 3.2 }
ExtFml ("TradeSim.AssignValue",MarginReq,"PQR",45); {sets the Margin Requirement of security PQR to 45% }
```

Using the Column and Filter tabs to expand the formula space

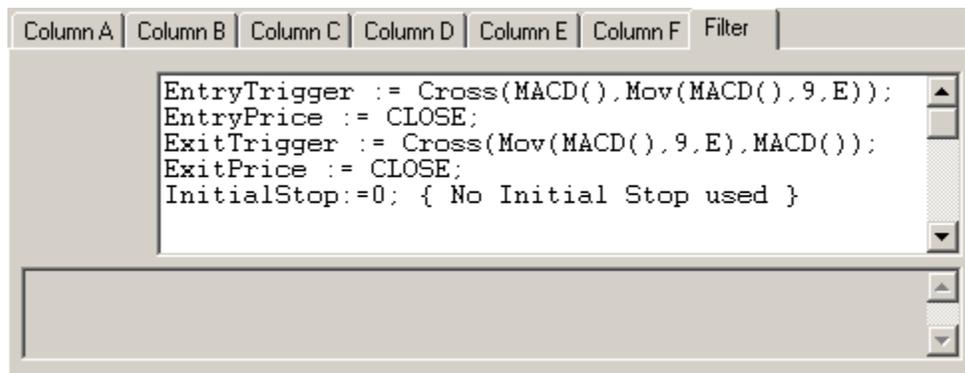
If you add too many SetValue and AssignValue statements, sooner or later you may reach the editor limit and not be able to complete your system formula if everything is stored in the Column-A tab. It is possible to use all of the columns as well as the filter space to expand your system formula. Because the column tabs are executed before the filter tab you would use the column tabs for the AssignValue and SetValue statements and the rest of the system formula would be placed in the filter tab.

For example add all AssignValue and SetValue function calls to the columns starting with column-A.

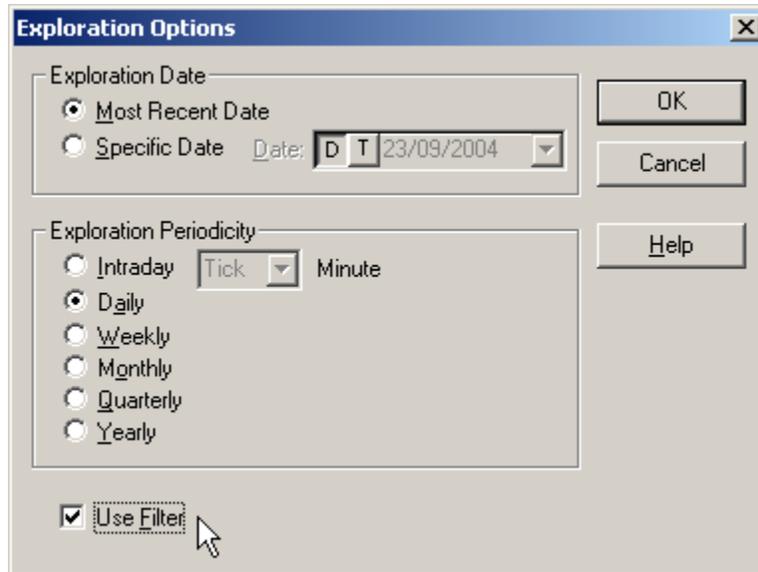
Note: The InitializeValues function should only be used once in column-A and should be placed first at the top of the column before any other calls.



Add your normal system formula in the Filter Tab.

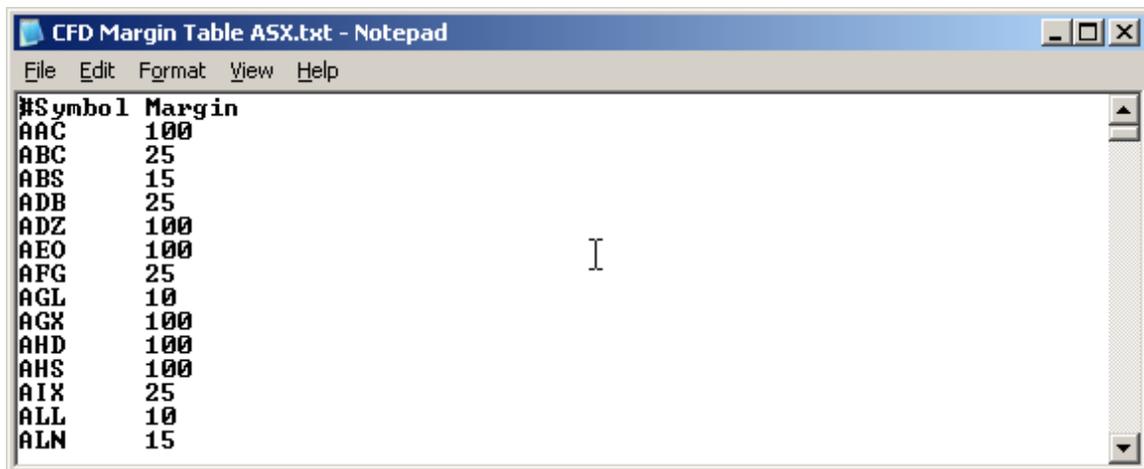


Make sure that the "Use Filter" option is checked in the "Exploration Options".



Using a Table File to specify the extended values

If you have table file, which specifies an extended value for each symbol, then this can be used instead of repeatedly calling the AssignValue from within Metastock. To do this you need to organize a list of values in one text file. For example the following example organizes CFD margin requirement values in a text file called [C:\TradeSimData\Table Files\CFD Margin Table ASX.txt]. As you can see in the example below there is only one value per symbol with the symbol and value arranged in two columns. A hash character at the start of a line indicates that the following information on that line is a comment and should be ignored.



Note: If your table file has additional data then this data may need to be edited with Microsoft Excel® or a suitable text editor with column formatting.

To indicate to the AssignValue function that you are using a table file instead of a symbol you need to insert the full filename including path where the symbol parameter normally goes and then prefix it with '@' character as the following example shows.

```
ExtFml ( "TradeSim.AssignValue",MarginReq,"@C:\TradeSimData\Table Files\CFD
Margin Table ASX.txt",0);
```

SetVariableVolatility

```
ExtFml( "TradeSim. SetVariableVolatility ",ValueArray);
```

This function assigns a volatility value to each trade according to the *ValueArray* parameter. This allows the volatility position size models to be used in TradeSim.

Note: To contain your downside risk you still need use a protective stop. However, unlike the risk position size models in TradeSim the risk can be independent of the volatility and hence the position size.

❑ Example

The following example is the complete trade database exploration code for an MACD trading system, which assigns a volatility to each trade based on a 10 period ATR

```
EntryTrigger := Ref(Cross(MACD(),Mov(MACD(),9,E)),-1);
EntryPrice := OPEN;
ExitTrigger := Ref(Cross(Mov(MACD(),9,E),MACD()),-1);
ExitPrice := CLOSE;
InitialStop:=0;           { No Initial Stop used }

ExtFml( "TradeSim.Initialize");
ExtFml( "TradeSim.SetVariableVolatility",3*ATR(10));

ExtFml( "TradeSim.RecordTrades",
    "Test Trade Rank",    { Trade Database Filename }
    LONG,                 { Trade Position Type }
    EntryTrigger,         { Entry Trigger }
    EntryPrice,           { Entry Price }
    InitialStop,          { Optional Initial Stop }
    ExitTrigger,          { Exit Trigger }
    ExitPrice,            { Exit Price }
    START);               { Recorder Control }
```

Dynamic Selection of the Position Size Model

Version 6 of TradeSim Enterprise Edition supports dynamic position size selection on a trade-by-trade basis or symbol basis. The Metastock plugin allows specification of the position size on a symbol basis through the use of the AssignValue function.

The following table describes the additional fields in detail.

Extended Data Field Name	Description and Comments	Stocks	Commodities	Allowable Values	Default Value after a call to InitializeValues
PositionSizeModel	Position Size Model	✓	✓	1=Equal Dollars Units, 2=Equal Percent Dollar Units, 3=Fixed Dollar Risk, 4=Fixed Percent Risk, 5=Fixed Volatility, 6=Fixed Percent Volatility	0 (use default value in TradeSim)
PortfolioLimit	Portfolio Limit	✓	✓	0-100%	0 (use default value in TradeSim)
MaxNumberOfOpenPositions	Maximum number of open positions	✓	✓	0-65536	0 (use default value in TradeSim)
Sector	Sector	✓	✓		
PSMParm1	Position Size Parameter #1	✓	✓	See table below	See table below
PSMParm2	Position Size Parameter #2	✓	✓	See table below	See table below
PSMParm3	Position Size Parameter #2	✓	✓	See table below	See table below

The allowable values for the three position size model parameters, PSMParm(1-3) changes depending on the position size model selected. The following table describes the additional fields in detail.

PositionSizeModel Value	Position Size Model	PSMParm1 Value	PSMParm2 Value	PSMParm2 Value
1	Equal Dollars Units	Capital per trade	-	-
2	Equal Percent Dollar Units	Fraction of total trading capital per trade (0-100%)	-	-
3	Fixed Dollar Risk	Capital risked per trade	Position Value Limit (0-100%)	Portfolio Heat Limit (0-100%)
4	Fixed Percent Risk	Fraction of Capital risked per trade (0-100%)	Position Value Limit (0-100%)	Portfolio Heat Limit (0-100%)
5	Fixed Volatility	Capital Assigned to Trade	Position Value Limit (0-100%)	-
6	Fixed Percent Volatility	Fraction of Capital Assigned to Trade (0-100%)	Position Value Limit (0-100%)	-

□ Example

The following example is the complete trade database exploration code for an MACD trading system, which assigns the Equal Dollars Position Size model to ANZ trades and Fixed Risk Position Size model to BHP trades. All other symbols will default to the position size model as selected in TradeSim.

```

EntryTrigger := Cross (MACD () , Mov (MACD () , 9 , E ) ) ;
EntryPrice := OPEN;
ExitTrigger := Cross (Mov (MACD () , 9 , E ) , MACD () ) ;
ExitPrice := CLOSE;

```

```

InitialStop:=OPEN-Ref(3*ATR(10),-1);

ExtFml( "TradeSim.Initialize");
ExtFml( "TradeSim.InitializeValues");

ExtFml( "TradeSim.AssignValue", PositionSizeModel, "ANZ", 1); { Equal Dollars
Units PS Model for ANZ trades }

ExtFml( "TradeSim.AssignValue", PSMParm1, "ANZ", 5000); { $5000 Capital per
trade for ANZ trades }

ExtFml( "TradeSim.AssignValue", PositionSizeModel, "BHP", 3); { Fixed Dollar
Risk PS Model for BHP trades }

ExtFml( "TradeSim.AssignValue", PSMParm1, "BHP", 100); { $100 risked per trade
for BHP trades }

ExtFml( "TradeSim.AssignValue", PSMParm2, "BHP", 50); { 50% position value
limit for BHP trades }

ExtFml( "TradeSim.RecordTrades",
    "Test PSM",           { Trade Database Filename }
    LONG,                 { Trade Position Type }
    EntryTrigger,         { Entry Trigger }
    EntryPrice,           { Entry Price }
    InitialStop,          { Optional Initial Stop }
    ExitTrigger,          { Exit Trigger }
    ExitPrice,            { Exit Price }
    START);               { Recorder Control }

```

Provisional Trades and Signal Ranking using TradeSim

Please see document [AN-6](#) for a complete discussion of Provisional Trades and Signal Ranking.

IncludeAllSignals

Please see document [AN-6](#) for an indepth discussion of using this function.

Provisional Trades

Please see document [AN-6](#) for an indepth discussion of using this function.

SetVariableTradeRank

```
ExtFml( "TradeSim.SetVariableTradeRank", ValueArray);
```

Please see document [AN-6](#) for an indepth discussion of using this function.

This function assigns Trade Ranking based on the *ValueArray* parameter. This allows additional scope in assigning trade rank values unlike the *AssignValue* function, which only allows a constant rank value to be assigned to a symbol so that every trade can only have the same rank. The *ValueArray* can be a numeric constant or can be any numeric or Metastock formula expression. The value assigned to the rank

Note: When using rank to prioritize trades with a given entry date it is important to enable the Trade Rank sorting option in the 'Trade Database Loading Options' in the global preferences. This will sort the trade list in the trade database manager so that higher(or lower) ranked trades appear earlier in the list thus assigning higher precedence over other trades of a given entry date. It is also important to note that using Random Walk or running a Monte Carlo simulation invalidates the ranking priority of the trades since the trades will be randomly arranged when a simulation is run.

□ Example

The following example uses the All Ordinaries Index to assign a ranking value to each trade. It requires Version 8 and above of Metastock or Version 7 and above of Metastock Pro which provides the Security function. If you don't have the Security function in your version of Metastock you can use the one built into the TradeSim library.

```
XAO:=Security("C:\My Metastock Data\Au-ASX\X\XAO",Close);
ExtFml("TradeSim.SetVariableTradeRank",XAO);
```

Using the Security function built into the TradeSim library.

```
XAO:=Security("TradeSim.Security","C:\My Metastock Data\Au-ASX\X\XAO",Close);
ExtFml("TradeSim.SetVariableTradeRank",XAO);
```

□ Example

The following example is the complete trade database exploration code for an MACD trading system, which assigns the rank to each trade based on a 10 period ATR

```
EntryTrigger := Ref(Cross(MACD(),Mov(MACD(),9,E)),-1);
EntryPrice := OPEN;
ExitTrigger := Ref(Cross(Mov(MACD(),9,E),MACD()),-1);
ExitPrice := CLOSE;
InitialStop:=0; { No Initial Stop used }

ExtFml("TradeSim.Initialize");
ExtFml("TradeSim.SetVariableTradeRank",ATR(10));

ExtFml("TradeSim.RecordTrades",
    "Test Trade Rank", { Trade Database Filename }
    LONG, { Trade Position Type }
    EntryTrigger, { Entry Trigger }
    EntryPrice, { Entry Price }
    InitialStop, { Optional Initial Stop }
    ExitTrigger, { Exit Trigger }
    ExitPrice, { Exit Price }
    START); { Recorder Control }
```

Problems and Issues using the TradeSim Plug-In

This article has now been moved to the reference library folder in your TradeSim installation folder. [Please click here to view this document.](#) It is recommend that this be compulsory reading for everyone who uses the MetaStock/TradeSim plugin.

Note: If this article is missing it can be downloaded from the following website location
<http://www.compuvision.com.au/DownloadTradeSim.htm>

Summary

Now that we have successfully generated a trade database file we will want to do something with it. In the next chapter we describe the operation of TradeSim and show how TradeSim can be used to back test and simulate a trading system using the trading data that we have just created.

Back Testing and Simulation using TradeSim

What is a Portfolio Simulation?

When trading a system using a portfolio of securities it is important to note that the outcome is no longer unique as it is when testing with one security alone. This is due to the number of different permutations and combinations of securities that can be traded at any given time. For example consider two traders who trade an identical trading system over the same period of time, selecting securities from the same portfolio. If they were both backtesting the same trading system using the same security, a single security back tester such as the one built into MetaStock would produce identical outcomes and in practice you would also expect very similar outcomes. Any discrepancies would be due to slippage etc.

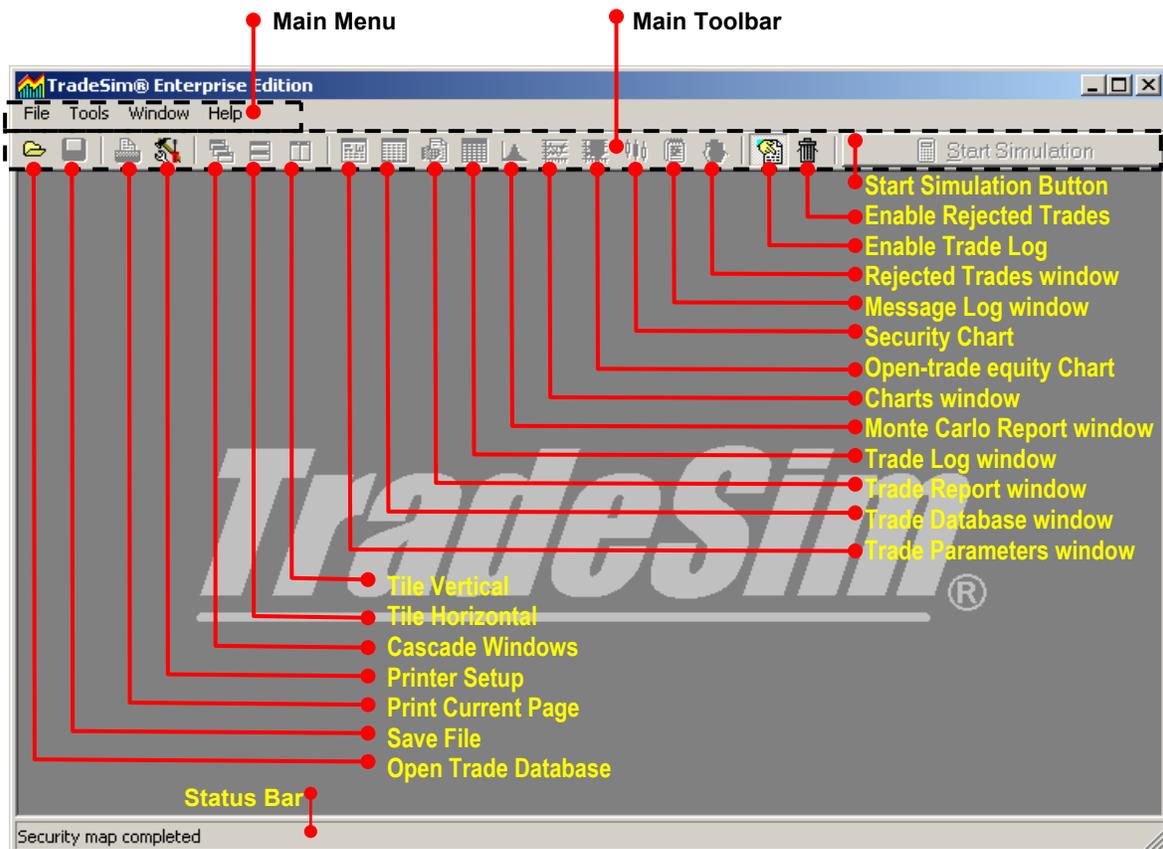
Now if we allow an extra degree of freedom so that our two traders can now select securities from a broad portfolio group such as the DOW or the ASX top 200 then we can no longer expect the two traders to trade an identical selection of securities even though they are trading with an identical trading system. The consequence of all of this is that Trader-A could pick a different set of securities than Trader-B and both traders could come up with a completely different set of results even though they are trading the same trading system over the same period of time.

To understand this aspect more closely consider a trading system that generates entry triggers for six securities on the next trading day. Due to available trading capital limits, only two of these six possible securities can actually be traded. Which two of course depends on the trader trading the system. Two traders trading the same trading system will most likely not pick identical trades on the day. In the case of the Trade Simulator the two trades picked will depend on the trading algorithm in the simulator and the way it has been set up. Once two of these trades are entered the others can be thrown away since the entry triggers are no longer valid after that day. This also explains why all of the trading candidates in the trade database cannot possibly be traded in each simulation. However the Professional and Enterprise Editions of TradeSim allow a random selection of securities from a group of securities that have the same entry date, thus modelling the variability of a trading system when trading with a portfolio of securities. This is a very important aspect that is usually overlooked when back testing a trading system since most back testers are usually limited to the analysis of one security alone.

The next Chapter on Advanced System Testing using the TradeSim Enterprise Edition delves into this aspect more deeply and the introduction to this chapter should be read whether or not your software supports this option.

Using TradeSim

The previous chapters outlined strategies to generate trade data using MetaStock. This is the data acquisition phase of our whole back testing strategy. Without trade data we cannot test our trading system. Now that we have valid trade data it is time to test it using TradeSim. To run TradeSim you can double click on the TradeSim icon from the desktop or access the program via the Program Menu, i.e., Select [Start → Programs → TradeSim → TradeSim]. The main screen will look like the following:



The Main Toolbar

The main toolbar located below the main menu allows quick access to many of the commonly used functions. These functions mirror equivalent functions that are available from the main menu.



File Control

-  **Open Trade Database File**
 This toolbar button is a shortcut for opening a Trade Database file. Trade Database files can also be opened using the File menu.
-  **Save File**
 This toolbar button is used for saving session files.

Printer Control

-  **Print Current Page**
 When it is enabled this toolbar button is used to print the current page. This function is typically used to print a report or a chart.
-  **Printer Setup**
 This toolbar button is used to setup the printer.

Window Control

-  **Cascade Windows**
 This toolbar button is used to cascade windows. This function can also be accessed from the *Window* menu.
-  **Window Tile Horizontally**
 This toolbar button is used to tile windows horizontally. This function can also be accessed from the *Window* menu.
-  **Window Tile Vertically**
 This toolbar button is used to tile windows vertically. This function can also be accessed from the *Window* menu.

Child Window Selection

-  **Trade Parameters Window**
 When enabled this toolbar button selects the Trade Parameters Window and brings it to the foreground.
-  **Trade Database Window**
 When enabled this toolbar button selects the Trade Database Window and brings it to the foreground.
-  **Trade Report Window**
 When enabled this toolbar button selects the Trade Parameter Window and brings it to the foreground.
-  **Trade Log Window**
 When enabled this toolbar button selects the Trade Log Window and brings it to the foreground.
-  **Monte Carlo Report Window**
 When enabled this toolbar button selects the Monte Carlo Report Window and brings it to the foreground.
-  **Charts Window**
 When enabled this toolbar button selects the Charts Window and brings it to the foreground.
-  **Open-trade equity Chart**
 When enabled this toolbar button selects the Open-trade equity Chart Window and brings it to the foreground.
-  **Security Chart**
 When enabled this toolbar button selects the Security Chart Window and brings it to the foreground.
-  **Message Log Window**
 When enabled this toolbar button selects the Message Log Window and brings it to the foreground.
-  **Rejected Trades Window**
 When enabled this toolbar button selects the Rejected Trades Window and brings it to the foreground.
-  **Enable/Disable Rejected Trades**
 This toolbar button enables and disables the Rejected Trades Report. You should only enable the Rejected Trades Report when you absolutely need to since it slows down total report generation time.
-  **Enable/Disable Trade Log**
 This toolbar button enables and disables the Trade Log. Disabling the Trade Log can speed up processing however a lot of additional features will be disabled.

Window Switches

- Start Simulation**
 When enabled this toolbar button starts a trade simulation or multiple simulations if the Monte Carlo analysis option is enabled and selected.

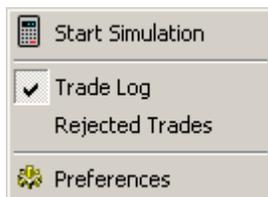
Main Menu Bar

File Menu



- ❑ **Open Trade Database**
Clicking on this menu item allows a trade database file or session file to be opened and processed.
- ❑ **Save Session Information**
This menu item is used for saving session files.
- ❑ **Save as Default Session File**
Creates a default session file. See the section on [Load Default Parameters](#) and [The Default Session file](#) for more information regarding default session files.
- ❑ **Recent Files**
This submenu contains a list of the most recently accessed trade database files.
- ❑ **Printer Setup**
This menu item is used to setup the printer.
- ❑ **Print**
When it is enabled clicking on this menu item is used to print the current page. This function is typically used to print a report or a chart.
- ❑ **Quit**
This menu item is used for quitting TradeSim. The global preferences are saved automatically.

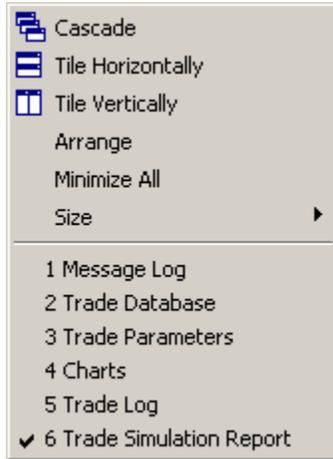
Tools Menu



- ❑ **Start Simulation**
Clicking on this menu item has the same effect as clicking on the Start Simulation button on the main toolbar. This menu item will be disabled if you have not previously loaded a trade database.
- ❑ **Trade Log**
Clicking on this menu item has the same effect as clicking on the Enable/Disable Trade Log button on the main toolbar. A checked item indicates that this option is enabled.
- ❑ **Rejected Trades**
Clicking on this menu item has the same effect as clicking on the Enable/Disable Rejected Trades button on the main toolbar. A checked item indicates that this option is enabled.
- ❑ **Preferences**
Clicking on this menu item brings up a Preferences dialogue box, which contains settings for the global preferences. These preferences are saved automatically when exiting from TradeSim.

Window Menu

The Window menu controls the way that windows are displayed.



- Cascade**
Cascade windows.
- Tile Horizontally**
Tile Windows Horizontally across the screen.
- Tile Vertically**
Tile Windows Vertically across the screen.
- Arrange**
Arrange Windows.
- Minimize All**
Minimize all Windows.

Size

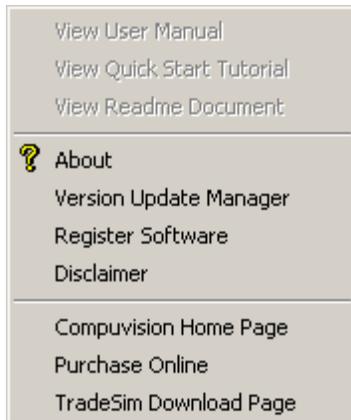
This submenu allows the main window to be reset to a default size. This helps when capturing screen shots of a fixed size to incorporate into your documentation.



There are three default sizes.

- **640x480**
This resizes the main window to a default size of 640x480 pixels.
- **720x512**
This resizes the main window to a default size of 720x512 pixels.
- **800x600**
This resizes the main window to a default size of 800x600 pixels.

Help Menu



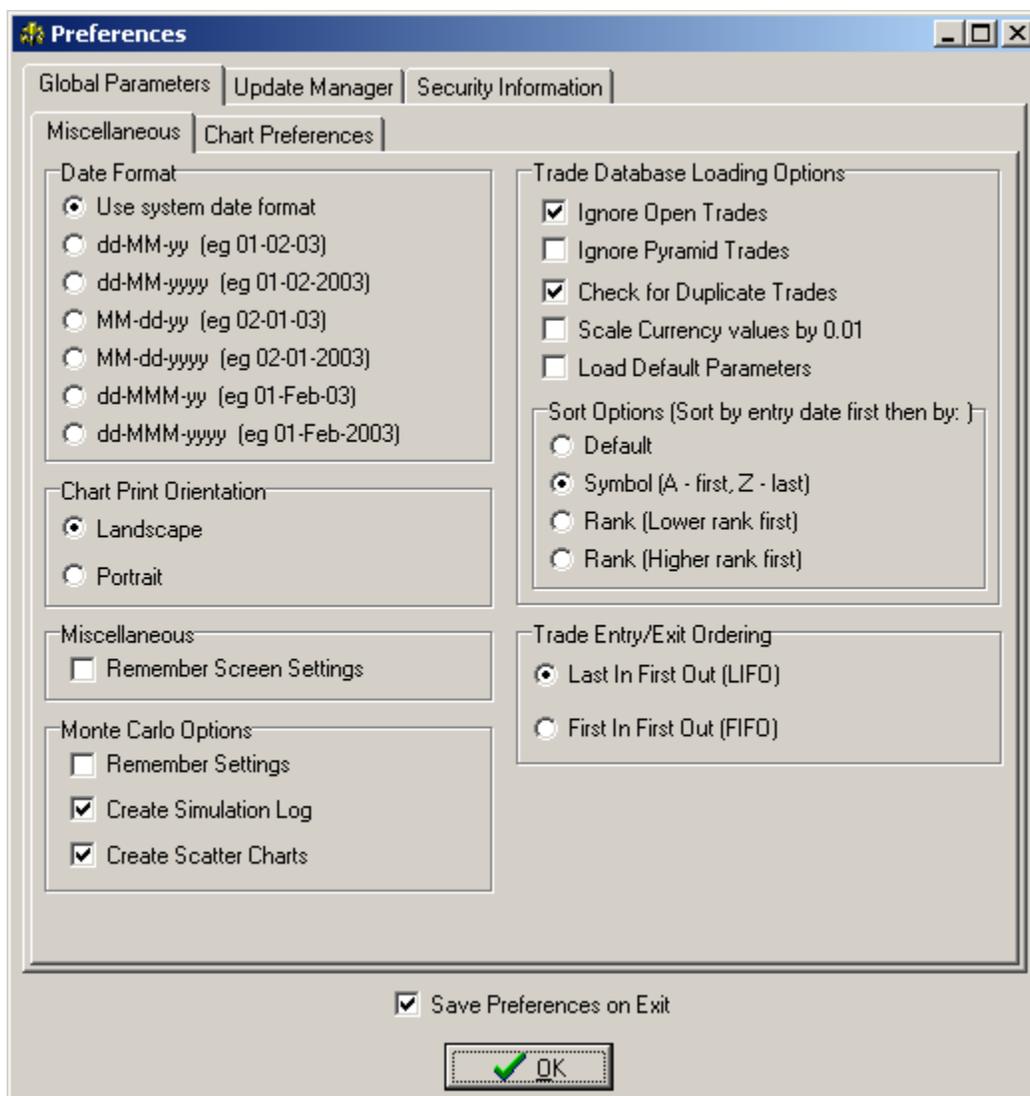
- ❑ **View User Manual**
Provided that you have the Adobe Reader installed, clicking on this menu item will run the Adobe Reader and display the TradeSim User Manual. The User Manual can also be loaded through the Start menu. [Start → Programs → TradeSim → User Manual]
- ❑ **View Quick Start Tutorial**
Provided that you have the Adobe Reader installed, clicking on this menu item will run the Adobe Reader and display the Quick Start Tutorial document. The Quick Start Tutorial can also be loaded through the Start menu. [Start → Programs → TradeSim → Quick Start Tutorial]
- ❑ **View Readme Document**
Clicking on this menu item will run the default Internet Browser and display the Readme file.
- ❑ **About**
Clicking on this menu item will display the *About* dialogue box.
- ❑ **Version Update Manager**
The Version Update Manager allows TradeSim to check to see whether a new version is available for download from the web. You need to be connected to the Internet for the Web Update Manager to operate correctly. For more information see section on the [Version Update Manager](#).
- ❑ **Register Software**
Clicking on this menu item will display the Registration dialogue box.
- ❑ **Disclaimer**
Clicking on this menu item will display the *Disclaimer* dialogue box.
- ❑ **Purchase Online**
Clicking on this menu item will bring up the online purchasing page where a valid license can be purchased.
- ❑ **TradeSim Download Page**
Clicking on this menu item will bring up the TradeSim download page.

The Status Bar

The status bar is used to report the current operational status of TradeSim as well as to provide additional information. In most cases the information mirrors what is displayed in the Message Logs.

Preferences Dialogue Box

The preferences dialogue box contains a number of global preferences. These preferences can be automatically saved when exiting TradeSim and the last set of parameters saved are automatically restored when TradeSim is started.



Global Parameters

Miscellaneous

□ Date Format

This radio group allows the selection of date display format. Note that changing this selection will only have an effect after a database is loaded.

- **Use system date (recommended)**
This option follows the date format as set in the 'Regional Settings' accessible from the Windows control panel.
- **dd-mm-yy**
European short date format i.e., 19-7-00
- **dd-mm-yyyy**
European short date format i.e., 19-7-2000
- **mm-dd-yy**
US short date format i.e., 3-26-99

- **mm-dd-yyyy**
US long date format i.e., 3-26-1999
- **Chart Print Orientation**
This radio group selection controls the default print orientation of charts.
 - **Landscape**
Print charts in landscape format.
 - **Portrait**
Print charts in portrait format.
- **Remember screen settings**
When checked this option remembers the screen settings and size of the TradeSim panel.
- **Monte Carlo Options {E}**
 - **Remember Settings**
When this option is checked all Monte Carlo chart settings are remembered upon program exit.
 - **Create Simulation Log (formerly 'Update Monte Carlo Log')**
 - **Create Scatter Charts**
You can individually enable and disable the simulation log and scatter charts from the global preferences. If you don't require them, disabling either or both the log and scatter charts improves resource usage for a large number of simulations.

Note: When requesting a large number of simulations (i.e., 1 million) in a Monte Carlo analysis the program would appear to hang after the analysis was completed. This was found to be caused by the huge resources required by the excessively large simulation log and scatter charts. The software has been modified so that when a MC simulation with more than 20,000 simulations is requested, the software gives you the option of temporarily disabling both the simulation log and scatter charts.

- **Trade Database Loading Options**
This radio group controls the way a trade database is loaded into TradeSim.
 - **Ignore Open Trades**
This option controls the way "Open Trades" are processed when loading a trade database. Enabling the *Ignore Open Trades* option ignores any open trades in the trade database so they do not appear in the trade database manager and is subsequently not included in any trade simulation.
 - **Ignore Pyramid Trades**
This option controls the way "Pyramid Trades" are processed when loading a trade database. Enabling the *Ignore Pyramid Trades* option ignores any pyramid trades in the trade database so they do not appear in the trade database manager and are subsequently not included in any trade simulation. To test or evaluate a pyramid trading strategy, you need to first create a trade database that includes pyramid trades, and then you need to make sure the Ignore Pyramid Trades option is unchecked (disabled). For more information on Pyramid Trades and Pyramid Trading Strategies see the relevant documentation ref ⁷⁾ AN3 – *Testing Trade Pyramid Strategies using TradeSim*.
 - **Check for Duplicate Trades**
This option will force a check for duplicate trades when a trade database is loaded. Duplicate trades occur when there is more than one trade with an identical symbol name and entry date.

Note: Correct checking for duplicate trades assumes that the trade database has been sorted so that duplicate trades are ordered in a contiguous manner. This can only happen if the *Sort by Symbol* and *Check for Duplicate Trades* options have been enabled before a trade database is loaded. If the *Sort by Symbol* option is not enabled and the *Check for Duplicate Trades* option is subsequently enabled a message box will popup with a warning allowing the user to enable the *Sort by Symbol* option. Although it is possible to check for duplicate trades without the *Sort by Symbol* option enabled there is no guarantee that all duplicate trades will be detected.

- **Scale Currency Values by 0.01**
When enabled this option scales (multiplies) currency values by 0.01 (divide by 100). This is useful when your data supplier or stock exchange supplies data that is expressed in cents, rather than dollars. For example the London Stock Exchange supplies currency data that is denoted in pence.

Therefore to be compatible with the native denomination used by TradeSim it is necessary to scale the data by a factor of one hundred so all denominations can be expressed in pounds. It is also possible to pre-scale the data at the time the trade database is generated however the results are then permanent. See the section on [SetCurrencyMultiplier](#) for more information on how to do this.

- **Load Default Parameters**

When this option is enabled, the default parameters that are stored in the file “_default.ses” will be loaded any time a trade database is loaded. To create the default session file refer to the section on [The Default Session file](#).

- **Sort Options**

This option controls the way trades in a trade database are initially sorted when loaded into TradeSim. By default, when a trade database is loaded the trade database is processed and sorted by trade entry date only; therefore all trades with the same entry date are not sorted by their symbol. By checking the “Sort by Symbol” checkbox the trades with the same entry date will be sorted alphabetically by the security symbol.

- **Default sorting**

- Trade database is sorted by entry date only. This useful when you are loading a text trade database and you want to preserve the ordering with respect to entry date only.

- **Sort by Symbol (A – first, Z – last)**

- Trade database is sorted by entry date and symbol.

- **Sort by Trade Rank (lower rank first)**

- Trade database is sorted by entry date and rank where the lower rank trades appear in the trade database manager before higher rank trades.

- **Sort by Trade Rank (higher rank first)**

- Trade database is sorted by entry date and rank where the higher rank trades appear in the trade database manager before lower rank trades.

Note: If ‘Check for duplicate trades’ has been enabled a message will appear before you load a trade database if ‘Sort by Symbol’ has not been selected.

- **Trade Entry/Exit Ordering**

For a group of open trade positions that have the same exit date you can change the order by which trades are closed out.

- **Last in First Out (LIFO)**

- For a group of trades with a given exit date, the trade that was the last trade entered (i.e., highest trade number) is the first trade that is closed out.

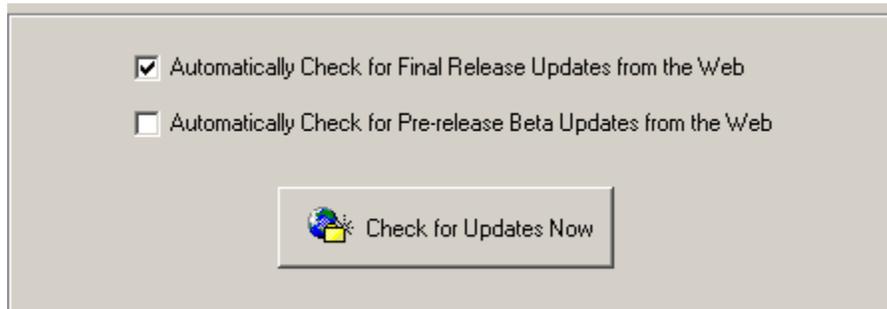
- **First in First Out (FIFO)**

- For a group of trades with a given exit date, the trade that was the first trade entered (i.e., lowest trade number) is the first trade that is closed out.

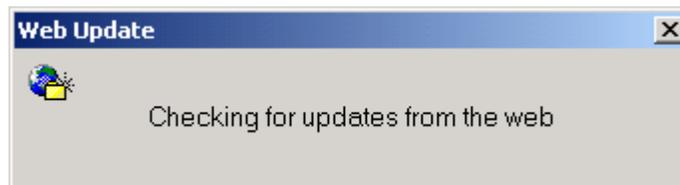
- **Allow Price Violations** 

Enabling this option allows TradeSim to accept invalid price data, which consists of entry, and exit prices that lie outside their respective daily range. It is usually used in conjunction with the reciprocal [AllowInvalidPriceData](#) function in the function library.

Version Update Manager



The Version Update Manager allows TradeSim to check to see whether a new version is available for download from the web. It can check this every time the program is run or it can be forced to check for an update. Any time version checking is done, the following dialogue box will momentarily appear indicating that checking is in progress.



Version information is stored on the web and is compared to the current version of the software running. If there is a newer version available then additional message boxes will appear, prompting the user to download the newer version from the web. If there is a problem accessing the update information from the web then a message box will appear indicating the problem.

- ❑ **Automatically Check for Final Release Updates from the Web**
With this checkbox ticked the availability of a new version of TradeSim is checked from the web every time TradeSim is run. However to avoid repeated checking of updates from the web every time TradeSim is run, the current date is compared to the date the program was last run and only if there is a difference will a check will be made. If there is a problem accessing the update information from the web then a message box will appear indicating the problem.
- ❑ **Automatically Check for Pre-release Beta Updates from the Web**
With this checkbox ticked the availability of a new beta pre-release version of TradeSim is checked from the web every time TradeSim is run. However to avoid repeated checking of updates from the web every time TradeSim is run, the current date is compared to the date the program was last run and only if there is a difference will a check will be made. If there is a problem accessing the update information from the web then a message box will appear indicating the problem.
- ❑ **Check for Update Now**
When this button is clicked the availability of a new version of TradeSim is checked from the web. If there is a problem accessing the update information from the web then a message box will appear indicating the problem.

Security Information {E}

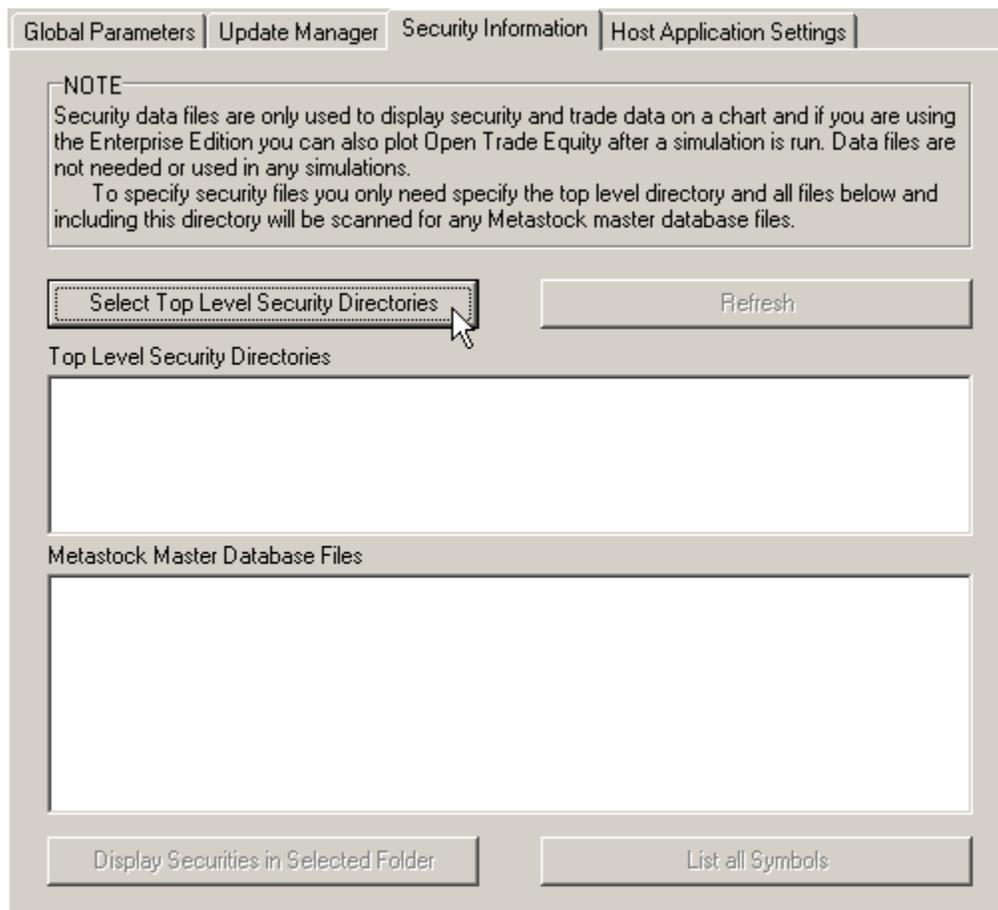
The Enterprise Edition allows you to display trade data on a bar chart for the associated security, as well as generate open and closed-trade equity plots on a bar by bar basis. To do this requires access to the security data.

Note: TradeSim only supports security data in MetaStock data format.

TradeSim provides a simple method of accessing security data by only requiring the top level security directory upon which TradeSim will search out all of the MetaStock ‘master’ index files.

❑ **Selecting the top-level security directories**

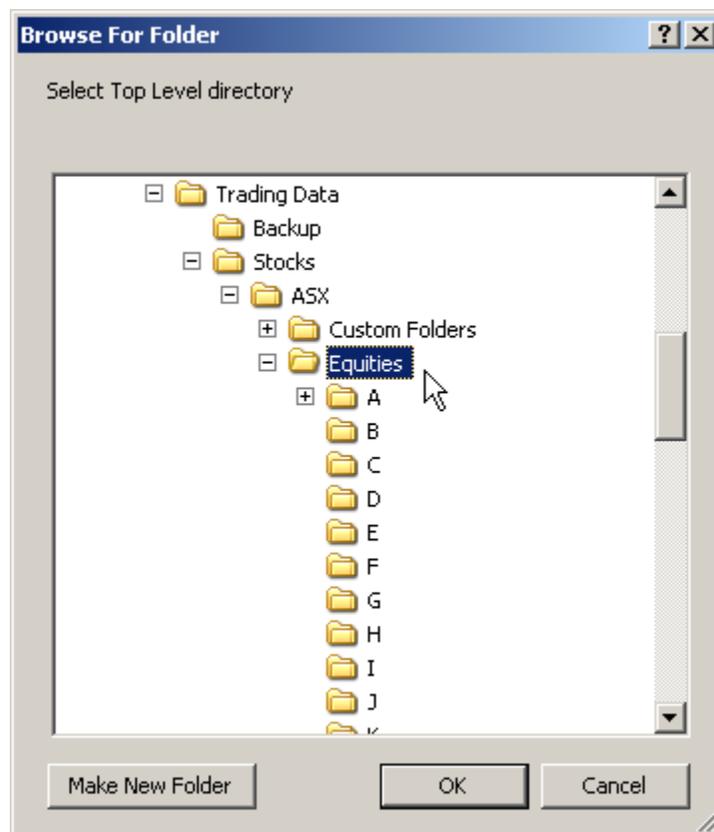
From the global preferences click on the ‘Security Information’ tab.



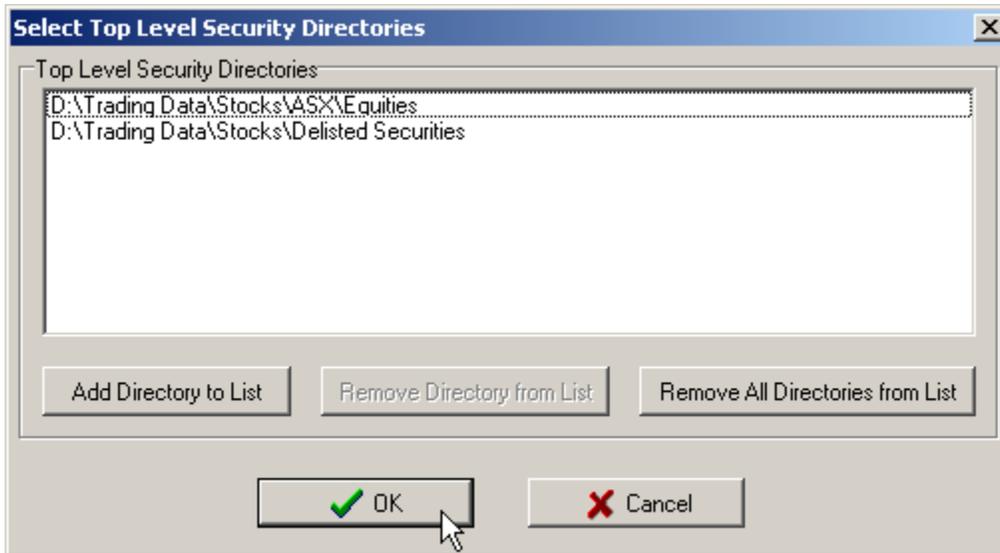
Click on the ‘Select Top Level Security Directories’ button. You will be greeted with the following dialog box.



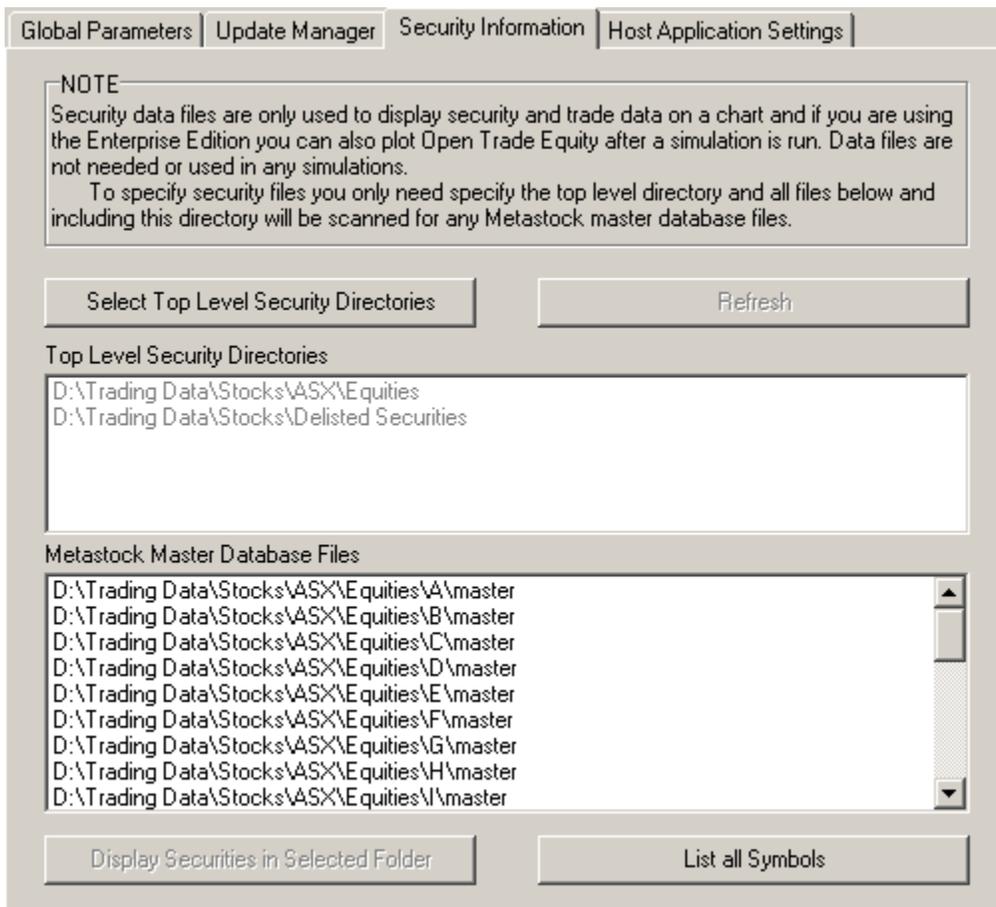
Click on 'Add Directory to List' button and select the top-level directory that contains all of the data directories of interest.



Click 'OK' and TradeSim will scan all directories below for any MetaStock index (master) files.



Once you have selected all of the top level directories click 'OK'



❑ **Displaying all securities in a folder**

You can display all securities in a folder by selecting a master file from the master file list and then clicking on 'Display Securities in Selected Folder'.

Index	Symbol	Name	Start Date	End Date
1	TBL	3D GLOBAL LIMITED	02/01/1998	28/11/2003
2	TAB	TAB LIMITED	22/06/1998	21/06/2004
3	TABIDH	TAB LIMITED DBAJN04RW	10/10/2003	02/06/2004
4	TABDDH	TAB LIMITED DBAJN04RW	02/06/2003	02/06/2003
5	TABEMG	TAB LIMITED MQBENDWMT	21/12/1999	21/06/2004
6	TQL	TAB QUEENSLAND	16/11/1999	03/12/2002
7	TAH	TABCORP HOLDINGS LTD	26/08/1994	21/06/2004
8	TAHIZO	TABCORP HOLDINGS LTD ABNJNO...	09/10/2003	16/06/2004
9	TAHIZG	TABCORP HOLDINGS LTD ABNMY...	24/10/2002	27/05/2004
10	TAHIZA	TABCORP HOLDINGS LTD ABNOC...	20/06/2001	08/10/2002
11	TAHIAA	TABCORP HOLDINGS LTD ANZJNO...	27/06/2001	18/06/2003
12	TAHWAC	TABCORP HOLDINGS LTD ANZOC...	11/04/2002	24/10/2002
13	TAHIPD	TABCORP HOLDINGS LTD BNPDE...	11/01/2002	19/12/2002
14	TAHIPA	TABCORP HOLDINGS LTD BNPSE0...	18/12/2001	27/05/2004

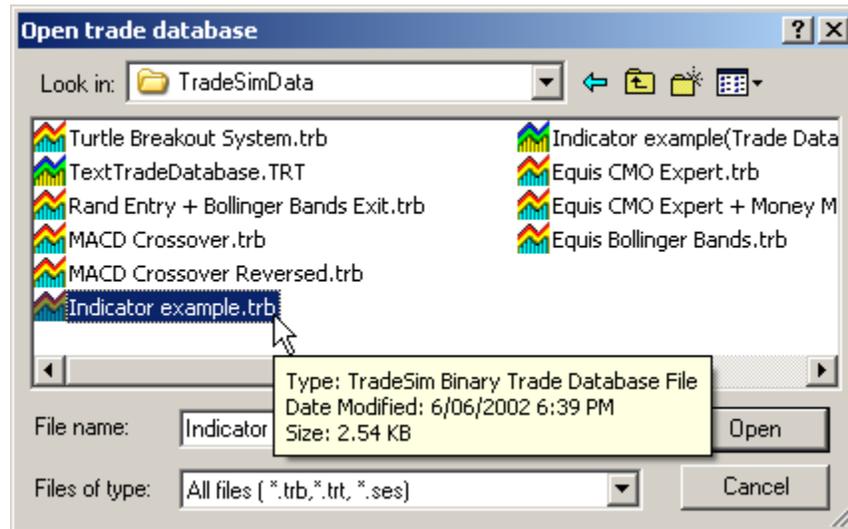
List all symbols

You can list all symbols in all of the security folders by clicking on 'List all Symbols'.

All Securities									
AAB	AATR	ABSXX	ACLAK	ADK	ADX	AEN	AFIR	AGCO	AGLDSG
AAC	AAU	ABSZZ	ACLXX	ADL	ADXDA	AEO	AFL	AGG	AGLDSH
AAI	ABB	ABX	ACU	ADM	ADY	AES	AFLO	AGGDB	AGLDSS
AAM	ABC	ABXD	ACX	ADMO	ADZ	AET	AFM	AGH	AGLEME
AAMAI	ABG	ACDHA	ADA	ADMO	ADZXX	AEX	AFMOB	AGI	AGLEMG
AAMAK	ABI	ACDHB	ADB	ADN	AEA	AEXCD	AFMOC	AGIN	AGLIAA
AAMAM	ABK	ACDHC	ADBDMR	ADP	AEAN	AEXO	AFT	AGIR	AGLIDA
AAMAD	ABP	ACE	ADBHA	ADS	AEC	AFC	AFTAI	AGL	AGLIDH
AAMAQ	ABS	ACEO	ADBHB	ADT	AEF	AFF	AFTAM	AGLDDA	AGLIGC
AAMAS	ABSDA	ACF	ADBIMR	ADU	AEFAK	AFFG	AFYHA	AGLDDH	AGLIGF
AAR	ABSN	ACFN	ADBPA	ADUO	AEI	AFFD	AGA	AGLDGJ	AGLIGH
AAT	ABSPA	ACL	ADBXX	ADV	AEIO	AFI	AGADA	AGLDMC	AGLIGJ
AATO	ABSR	ACLAI	ADG	ADVXE	AEL	AFIN	AGC	AGLDSE	AGLIGK

Loading a Trade Database file

To load a trade database file there are two methods you can choose from. You can either select the File menu item [File → Open Trade Database] or simply select the *Open File* icon from the toolbar. After choosing the appropriate option you will be greeted with an *Open trade database* dialogue box.



The trade database files are stored in a default directory set up by the installation program. This is always the *c:\TradeSimData* directory. Files with the extension *.trb* are trade database files, and files with the *.ses* extension are session files that contain user settings that are associated with a particular trade database file. Both file types can be selected from the dialogue box by selecting the appropriate filter from the *Files of type:* combo box. Session files are created using the *Save Session* option from the file menu.

There are three types of files that TradeSim can use. These are summarised in the following table.

File Type	Icon	File Extension
Binary Trade Database Files		trb
Universal Text Trade Database Files		trt
Session files		ses

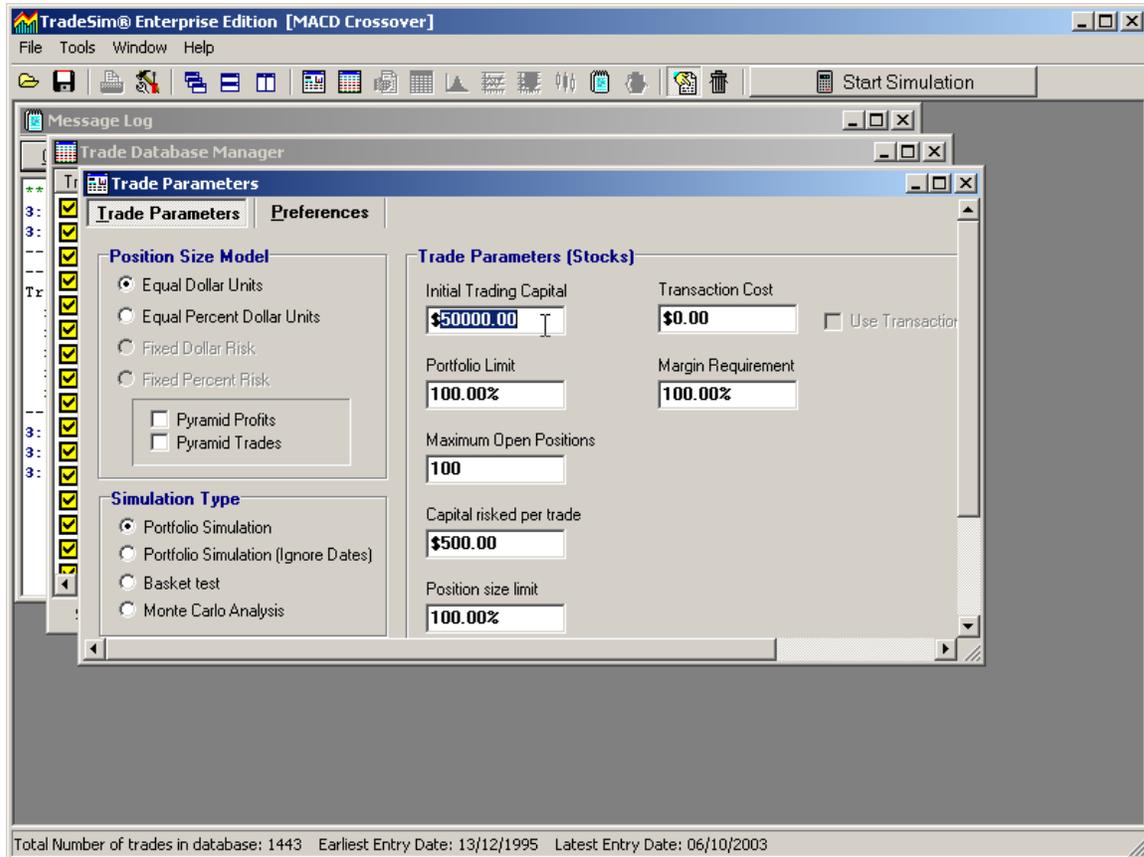
At this stage we will only be concerned with the binary trade database and session files. The Universal Text Trade Database files allow database files to be constructed in ascii text form. The Professional and Enterprise Editions have the ability to read and import ASCII text file versions of the trade database. This means that you are not limited to using MetaStock to generate your trade database files. For example you could import a trade database that was generated with another program such as Excel™, the Notepad text editor or another charting package such as Trade Station™ for example. As this is an advanced feature we have devoted a full chapter to it. Those who are interested should refer to [Appendix E](#):

Example

As an example select the MACD Crossover example (MACD Crossover.trb). After selecting and opening a trade database file, the trade database file will be loaded and processed and any errors found are reported to the Message Log.

Prior to version 4.0.0 a *database Manager Status* dialogue box would appear which displayed the processing status of the current trade database file. Version 4.0.0 of TradeSim now processes trade database files very quickly so there is no need to display the loading status.

After the trade database has been successfully loaded and processed the *Database Manager Status* dialog box will disappear and the main window will reappear if it has previously been minimized. When the trade database has been successfully loaded and processed three new child windows will open up in the main window, which includes the *Trade Database Manager* window with the newly loaded trade database.



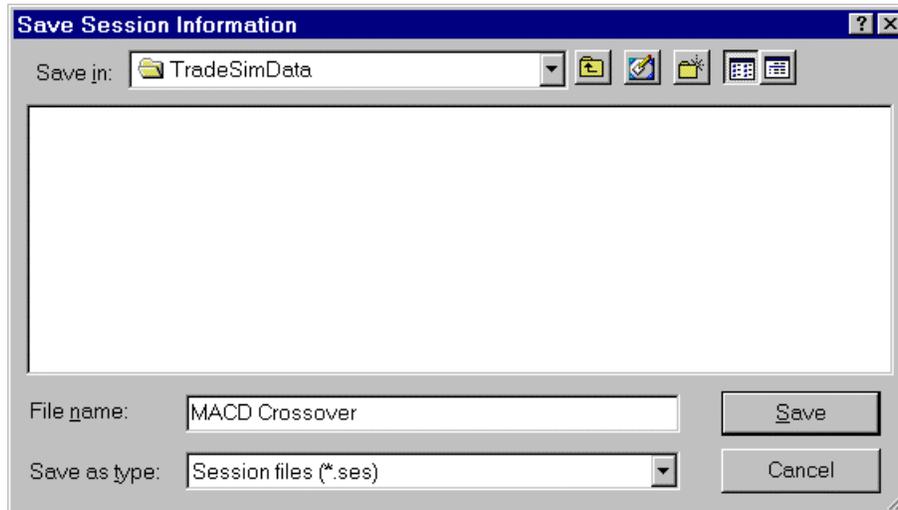
The first window on top is called the *Trade Parameters* window. We will talk about the details of this window later on; however in brief this window contains all of the trading parameters needed to set-up a trading simulation. The next window is called the *Trade Database* window and contains pre-processed trading information that was generated using a MetaStock Record Trades Exploration. The last window is called the *Message Log* window and contains informational messages that correspond to events that occur when using TradeSim. You will also note that a lot of the messages that appear in the Message Log Window also appear on the bottom Status Bar.

Session Files

Session files are used to save the current TradeSim settings and associate these settings with the currently loaded trade database file. These settings include all of the trade parameters and preferences. This feature adds the convenience of being able to reload the trade database files along with all of the settings associated with that trade database file at the time the session file was created. Alternatively, if you have a number of session files you can quite easily apply the settings in these files to the currently loaded trade database file without having to go through the motions of re-entering all of the trade parameters and preferences.

Creating Session Files

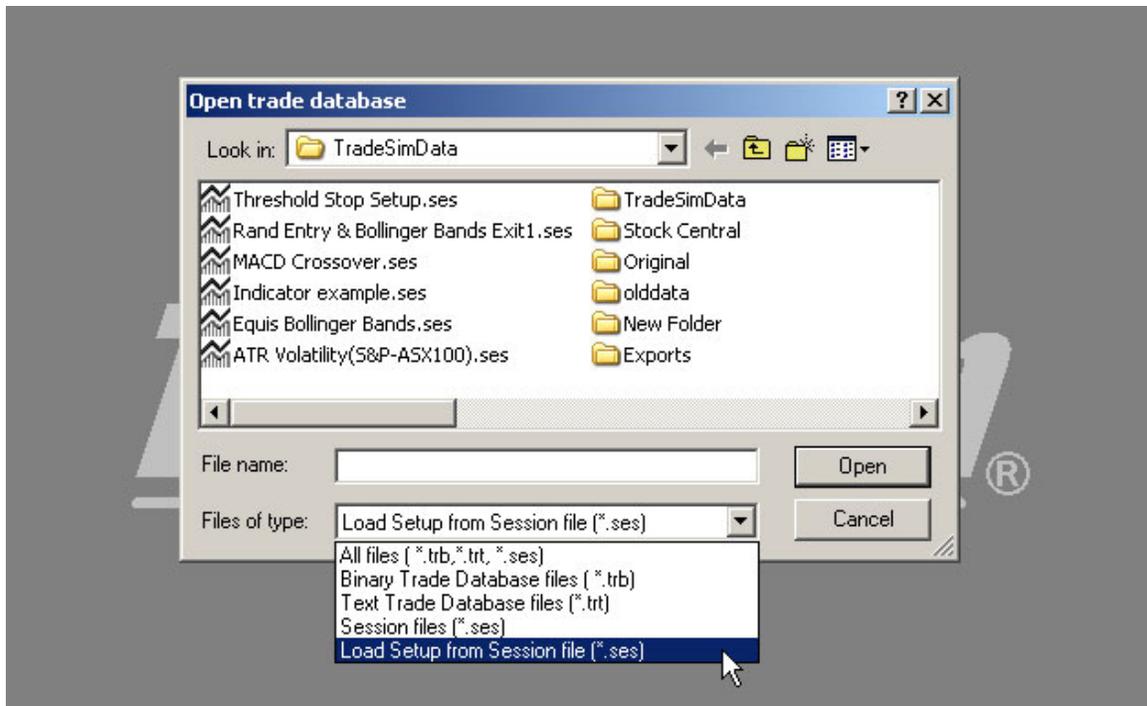
Session files are created using the **Save Session** option from the file menu. To create a new session file first load a trade database file. Once you have adjusted all of your trade parameters and preferences for a particular session you can save this information in a session file by selecting the **Save Session Information** option from the file menu. Once this is done you should be greeted with the following dialogue box, which will allow you to save the session information along with the trade database file.



All session files are saved with an **.ses** extension, and by default, the name of the trade database file appended with the **.ses** extension is automatically used as the name of the session file. You can change the file name to whatever you like but it is best to stick with convention and use the name of the trade database file that it represents.

Using a Session File with another trade database

You can use the settings of one session file with another trade database file. If you have already loaded up a trade database and wish to use the settings from another session then just load up a session (**.ses**) file by selecting **Load Setup from Session file (*.ses)** from the **Files of Type** menu in the **Open Trade Database** dialogue box, and then select the session file that contains your setup.

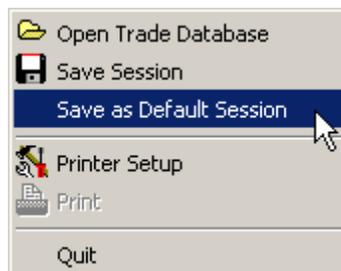


Using the current session with another trade database file

You do not have to re-enter the same set of parameters every time you load another trade database file. Most of the trade parameters and preferences are not altered when another trade database file is loaded so the original settings will be preserved, however the original database that was loaded with the session file will be replaced by the new trade database.

The Default Session file

The first time you load a trade database, a built-in set of default trade parameters and preferences is used. You can change this default set of parameters by creating a default session file. If you have enabled the **Load Default Parameters** option in the Global Parameters dialogue box [Global Parameters](#) this default set of parameters and preferences will override the built in set any time a trade database is loaded. From then on you can alter the parameters and preferences if you wish and even update the default session file to reflect the changes. To create a default session file first load a trade database file then adjust all of the trade parameters and preferences to your preferred values and then use the **Save as Default Session** option from the file menu to create a default session file. If the default session file does not exist then one is automatically created. However, if a default session file exists then you will be asked if you want to overwrite the existing default session file. This file is saved as a file with the name “_default.ses” in the TradeSim data directory.



The Trade Database Manager Window

Click on the *Trade Database Manager* window to bring it to the foreground and maximize it by clicking on the maximize icon on the top right hand side of this window.

Trade	Sys ID	Pos	Symbol	Entry Date	Exit Date	Level	Bars	Days	Initial Stop	Entry Price
<input checked="" type="checkbox"/> 1	0	Long	WSF	13/12/1995	14/12/1995	0	1	1	\$0.0000	\$3.3500
<input checked="" type="checkbox"/> 2	0	Long	WSF	11/01/1996	23/02/1996	0	30	43	\$0.0000	\$3.2300
<input checked="" type="checkbox"/> 3	0	Long	AMC	12/01/1996	06/02/1996	0	16	25	\$0.0000	\$7.5784
<input checked="" type="checkbox"/> 4	0	Long	WBC	15/01/1996	06/02/1996	0	15	22	\$0.0000	\$6.0500
<input checked="" type="checkbox"/> 5	0	Long	ANZ	18/01/1996	24/01/1996	0	4	6	\$0.0000	\$6.5600
<input checked="" type="checkbox"/> 6	0	Long	ANZ	29/01/1996	07/02/1996	0	7	9	\$0.0000	\$6.8300
<input checked="" type="checkbox"/> 7	0	Long	CBA	29/01/1996	09/02/1996	0	9	11	\$0.0000	\$11.4900
<input checked="" type="checkbox"/> 8	0	Long	NAB	30/01/1996	07/02/1996	0	6	8	\$0.0000	\$12.8200
<input checked="" type="checkbox"/> 9	0	Long	CML	31/01/1996	21/02/1996	0	15	21	\$0.0000	\$4.2814
<input checked="" type="checkbox"/> 10	0	Long	SGB	31/01/1996	06/02/1996	0	4	6	\$0.0000	\$7.5974
<input checked="" type="checkbox"/> 11	0	Long	RID	01/02/1996	11/03/1996	0	27	39	\$0.0000	\$19.2100
<input checked="" type="checkbox"/> 12	0	Long	WOW	01/02/1996	05/02/1996	0	2	4	\$0.0000	\$3.4200
<input checked="" type="checkbox"/> 13	0	Long	BHP	02/02/1996	12/02/1996	0	6	10	\$0.0000	\$8.3007
<input checked="" type="checkbox"/> 14	0	Long	BHP	13/02/1996	20/02/1996	0	5	7	\$0.0000	\$8.2746
<input checked="" type="checkbox"/> 15	0	Long	NCP	13/02/1996	11/03/1996	0	19	27	\$0.0000	\$7.2500
<input checked="" type="checkbox"/> 16	0	Long	WPI	14/02/1996	21/02/1996	0	5	7	\$0.0000	\$7.0437

Start Entry Date: 13/12/1995 Stop Entry Date: 06/10/2003 1443 trades selected from a total of 1443 trades

Note: The Standard Edition of TradeSim does not have the trade selection facilities as indicated by the checkboxes at the left of each row.

This window contains pre-processed trading information – by pre-processing we mean that it has been sorted by entry date. The entries in the table are also color coded according to the percentage change for each trade. This provides a quick visual overview of the trades in the database and gives a rough indication of the number of winning trades as opposed to the number of losing trades. Of course this is only a rough estimate; a trade that has a positive change may not be profitable when actually traded due to transaction costs and the position size model used. If the percentage change is positive, then the entry in the table will be green; otherwise it will be black and red for zero and negative change, respectively. Note that right clicking on the table and then selecting the appropriate option from the popup menu can disable the color-coding.

Note. The color-coding and percentage change column will always reflect the potential profitability of the trade irrespective of the trade position type. For example if a trade is long and the exit price is greater than the entry price then the record will be green in color and the percentage change will be positive. Likewise the record will be red and the change negative if the exit price is less than the entry price.

If a trade is short and the exit price is less than the entry price then the record will be green in color and the percentage change will be positive even though the exit price is lower than the entry price. Likewise the record will be red and the change negative if the exit price is greater than the entry price.

Column Description

- ❑ **Column: Trade ID**
The first column assigns a trade ID number to each trade in the database so that it can be used to identify the trade. A checkbox beside each trade is used to include or exclude the trade when doing a simulation.
- ❑ **Column: System ID**
This column displays the System ID that is typically used to identify the trading system.
- ❑ **Column: Trade Position**
This column displays the trade position as was assigned when we generated trades using the external RecordTrades function in the MetaStock/TradeSim plugin.
- ❑ **Column: Stock Symbol**
This column displays the stock symbol for the trade.
- ❑ **Column: Periodicity ~~UPDATED~~**
This column displays a one-character symbol, which represents the periodicity for the trade when it was generated using the [RecordTrades](#) function in the MetaStock/TradeSim plugin.

Symbol	Periodicity
?	Unknown periodicity, which is caused by loading a binary trade database prior to Version 6, or loading a text trade database.
I	Intraday
D	Daily
W	Weekly
M	Monthly
Q	Quarterly
Y	Yearly

- ❑ **Column: Entry Date-Time ~~UPDATED~~**
This column displays the trade entry date and time that corresponds to the time of the entry trigger. If the time stamp is non-zero then it will be displayed in 24 hours time format alongside the date in the form of HH:MM:TTT where HH represents hours(23-0), MM represents minutes(59-0) and TTT represents Ticks (999-0)
- ❑ **Column: Exit Date-Time ~~UPDATED~~**
This column displays the trade exit date that corresponds to the time of the exit trigger. If the time stamp is non-zero then it will be displayed in 24 hours time format alongside the date in the form of HH:MM:TTT where HH represents hours(23-0), MM represents minutes(59-0) and TTT represents Ticks (999-0)
- ❑ **Column: Level**
This column represents the pyramid level of the trade. More information regarding trade pyramid strategies can be found from the following Application Note ⁷⁾.
- ❑ **Column: Pyramid Re-entry status**
This column represents the pyramid re-entry status of the trade. Note that only level 1 trades or greater can have a pyramid re-entry status. Possible values or combination of the following values are :-

Status Symbol	Description
Trig	Pyramid Re-entry was cause by an Entry Trigger.
% Profit	Pyramid Re-entry was cause when the current open trade profit (in percent) relative to the previous entry price exceeded the profit threshold parameter.
% Profit AND Trig	Re-enters a trade when the percent profit threshold (relative to the previous entry price) is exceeded and the EntryTrigger is asserted at the same time.
% Profit OR Trig	Re-enters a trade when the percent profit threshold (relative to the previous entry price) is exceeded or the EntryTrigger is asserted at the same time.
\$ Profit	Pyramid Re-entry was cause when the current open trade profit (in dollars) relative to the previous entry price exceeded the profit threshold parameter.
\$ Profit AND Trig	Re-enters a trade when the dollar profit threshold (relative to the previous entry price) is exceeded and the EntryTrigger is asserted at the same time.

\$ Profit OR Trig	Re-enters a trade when the dollar profit threshold (relative to the previous entry price) is exceeded or the EntryTrigger is asserted at the same time.
??	Unknown re-entry status because the trade database was created using the TradeSim.dll Metastock plug-in prior to version 5.1.0.

More information regarding trade pyramid strategies can be found from the following Application Note ⁷⁾.

❑ **Column: Bars (in trade)**

This column represents the number of bars in the trade. One bar is always equal to one bar on the chart irrespective of the chart periodicity.

❑ **Column: Days (in trade)**

This column represents the number of days in the trade.

Note: TradeSim uses the starting and ending dates of each trade to calculate the number of days between the entry and exit dates. It does not distinguish between trading and non-trading days.

❑ **Column: Initial Stop**

This column displays the optional initial stop. It is optional because if the initial stop is zero for all trades then position size models that rely on the initial stop in order to calculate the position size for each trade will be disabled and cannot be selected. To use the initial stop value as a money management or hard dollar stop you need to enable this behavior in the RecordTrades function when creating the trade database (see previous chapter on generating trade data). A non-zero initial stop value means that you can use position size models that rely on the initial stop in order to calculate the position size for each trade.

❑ **Column: Entry Price**

This column displays the entry price for the trade that corresponds to the entry date, and hence the entry trigger of the trade.

❑ **Column: Exit Price**

This column displays the exit price for the trade that corresponds to the exit date, and hence the exit trigger of the trade.

❑ **Column: % Change**

This column displays the percentage change in the trade. The *%Change* is only a guide to a trade's potential profitability. The true profitability of a trade will not be known until it is traded and the transaction costs and slippage are taken into account.

❑ **Column: Exit Status**

This column displays the exit status for the trade. The exit status indicates the way a trade was closed. There are a number of exit scenarios that are stored along with the trade data for each trade.

○ **Normal Exit**

This type of trade exit was caused when a normal Exit Trigger forced a trade exit.

○ **Delayed Exit**

This type of trade exit was caused when the *SetExitTriggerDelay* external function was used to set an exit delay in the *RecordTrades* function. See the section on the [The TradeSim Function Library](#) for more information.

○ **Open Trade**

This type of trade exit was caused when an internal mechanism in the RecordTrades function forced closure of an open trade.

○ **Stopped Out**

This type of trade exit was caused when the *EnableProtectiveStop* external function was used to force the InitialStop to be used as a protective stop in the *RecordTrades* function. See the section on the [The TradeSim Function Library](#) for more information.

○ **Time Stop**

This type of trade exit was caused when the *SetTimeStop* external function was used to force a trade to exit after a certain number of bars have occurred. See the section on the [The TradeSim Function Library](#) for more information.

○ **Profit Stop**

This type of trade exit was caused when the *SetProfitStop* external function was used to force a trade to exit after a certain profit threshold has been reached. See the section on the [The TradeSim Function Library](#) for more information.

○ **User Exit #** **NEW**

By using [exit encoding](#) it is now possible to assign a user exit status to each exit trigger thus allowing one to distinguish between different exit triggers when you load the trade database into TradeSim. You can assign up to 16 User Exits which will appear in the Trade Database Manager and Trade Log as “User Exit nn” where nn can be any whole number from 1 to 16.

□ **Column: Traded Volume**

This Column, which displays the Traded Volume, is the minimum of the trade volume at the time of the entry and exit triggers. TradeSim can now use this information to determine whether or not there is enough traded volume for the trade to be taken.

Note: If the trade database does not contain volume information then a dash ‘-‘ will appear to signify that the volume data is not present. All trade databases generated with the latest MetaStock Plug-In will contain volume information.

□ **Column: Trade Rank**

In this column the trade rank is assigned to each trade. By default the rank is assigned a zero value when generating a trade database. The rank value is not used in any simulations. It is only used when the trade database is loaded and the sort option in the global preferences is set to “Sort by Rank”. If the trade database has been sorted by rank then using “Random walk” where the trade ordering is randomized will defeat the original ordering and hence ranking of the trades.

Note: Trade Database file formats prior to version 5 will have zero assigned to the Trade Rank column. This can be changed by exporting the trade database file (Professional and Enterprise versions only) as a text trade database file and then assigning a rank column to the database file and then importing it back into TradeSim again.

□ **Column: Point Value (Commodities only)**

In this column a point value is assigned to each trade. If the “Use Point Value from Trade Database” option is checked in the trade parameters and the point value is non-zero then the value assigned to the trade will be used instead of the default value. If a zero value is assigned to this column then the default value is automatically used. This feature facilitates concurrent simulation of different markets.

Note: Trade Database file formats prior to version 5 will have zero assigned to the Point Value column. This can be changed by exporting the trade database file (Professional and Enterprise versions only) as a text trade database file and then assigning a rank column to the database file and then importing it back into TradeSim again.

□ **Column: Initial Margin (Commodities only)**

In this column an Initial Margin value is assigned to each trade. If the “Use Initial Margin from Trade Database” option is checked in the trade parameters and the initial margin is non zero the value assigned to the trade will be used instead of the default value. If a zero value is assigned to this column then the default value is automatically used. This feature facilitates concurrent simulation of different markets.

Note: Trade Database file formats prior to version 5 will have zero assigned to the Initial Margin column. This can be changed by exporting the trade database file (Professional and Enterprise versions only) as a text trade database file and then assigning an initial margin column to the database file and then importing it back into TradeSim again.

❑ **Column: Transaction Cost**

In this column a transaction cost value is assigned to each trade. If the “Use Transaction Cost from Trade Database” option is checked then only a valid value assigned to the trade will be used instead of the default value.

Note: Trade Database file formats prior to version 5 will have zero assigned to the Transaction Cost column. This can be changed by exporting the trade database file (Professional and Enterprise versions only) as a text trade database file and then assigning a transaction cost column to the database file and then importing it back into TradeSim again.

❑ **Column: Margin Requirement**

In this column a Margin Requirement value is assigned to each trade. If the “Use Margin Requirement from Trade Database” option is checked then only a valid (non zero) value assigned to the trade will be used instead of the default value. If a zero value is assigned to this column then the default value is automatically used.

Note: Trade Database file formats prior to version 5 will have zero assigned to the Margin Requirement column. This can be changed by exporting the trade database file (Professional and Enterprise versions only) as a text trade database file and then assigning a Margin Requirement column to the database file and then importing it back into TradeSim again.

❑ **Column: Highest**

This column represents the highest value found during the trade and is used to facilitate calculation of Maximum Adverse Excursion (MAE) or Maximum Favorable Excursion (MFE).

❑ **Column: Date** 🚫🚫🚫🚫

Date at which highest trade value occurred.

❑ **Column: Lowest**

This column represents the lowest value found during the trade and is used to facilitate calculation of Maximum Adverse Excursion (MAE) or Maximum Favorable Excursion (MFE).

❑ **Column: Date** 🚫🚫🚫🚫

Date at which lowest trade value occurred.

Dynamic Position Size model columns. 🚫🚫🚫🚫

❑ **Column: PS Model**

Position Size model.

❑ **Column: Sector**

❑ **Column: Portfolio Limit(%)**

Portofolio Limit.

❑ **Column: Max Trades**

Maximum number of Trades.

❑ **Column: PS Parm 1-3**

Position Size parameter #1-3

Sorting the list

The list can be sorted by any criteria by clicking on the respective column header. For example if you would like to sort by symbol rather than entry price just click on the **Symbol** column and the list will be sorted from A to Z. Clicking on the **Symbol** column again will reverse the sorting order so that the list will now be sorted by symbol but from Z to A. Note that the header symbol changes depending on the sort direction.

Note: Changing the sort criteria does not affect the internal database structure or how trades are processed.

Enabling and Disabling trades in the database {P,E}

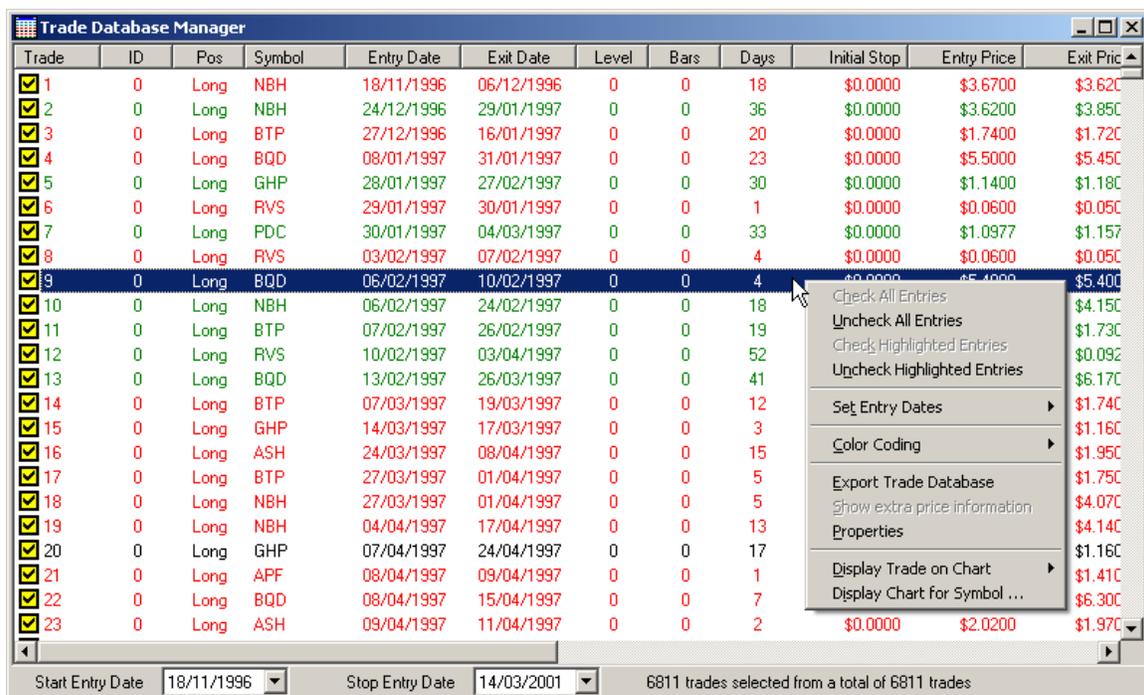
TradeSim allows complete flexibility in allowing trades to be included or excluded in a trade simulation. For example you may have ten years' worth of trade data but only want to simulate over two particular years of data. Alternatively you may want to exclude a certain security from the simulation because it is an outlier trade or is simply generating erratic trade data because the original trade data fed to MetaStock did not account for share splits etc.

Beside each of the trade numbers is a checkbox. When this checkbox is ticked the corresponding trade will be included when a trade simulation is in process. This does not mean that the trade will be taken when running a simulation because this will depend on a number of other trading parameters and criteria. However when this checkbox is not ticked the trade will not be included as part of the trade simulation and it will never show up in the results of the trade simulation.

To disable or enable a single trade just check or uncheck its corresponding checkbox by clicking with the mouse pointer on the checkbox. To check or uncheck a group of trades or all of the trades, a simpler procedure is available. First you need to select a group of trade records.

Trade Record Selection

Select an initial record by clicking on the first trade record. To select a contiguous range of records hold down the **Shift** key whilst selecting the last record of the group. The group should now be reverse highlighted in dark blue. To select a non-contiguous group of records, hold down the **Ctrl** key whilst clicking on the trading records of interest. Each record should then be reverse highlighted in dark blue. You can now check or uncheck all of the highlighted records by bringing up the database popup menu.



Database Popup Menu

On the Trade Database window click the right mouse button and a popup menu should appear. This popup menu contains procedures that allow quick selections to be made.

□ Check All Entries {P,E}

By clicking on this item all of the items in the Trade Database list will be checked whether or not they were checked before.

Uncheck All Entries {P,E}

By clicking on this item all of the items in the Trade Database list will be unchecked whether or not they were unchecked before. Note that you must have at least one trade item checked otherwise you cannot run a trade simulation.

Check Highlighted Entries {P,E}

If you have highlighted multiple trades then selecting this menu item will check each highlighted trade item whether or not they were checked before.

Uncheck Highlighted Entries {P,E}

If you have highlighted multiple trades then selecting this menu item will uncheck each highlighted trade item whether or not they were unchecked before.

Example

In this example we shall remove all of the AUN trades from our list by following these steps.

1. Sort the list by Symbol by clicking on the *Symbol* column header.
2. Select and highlight all of the AUN trades.
3. Right click to bring up the popup menu and select the *Uncheck Highlighted Entries* menu item.

Hint: The selection can be achieved by holding down the Ctrl key and clicking each item in the list or alternatively a consecutive group of trades can be selected by left clicking on the first item in the list and then holding the Shift key down and left clicking the last item.

The resulting trade database list should now look like the following:

Trade	ID	Pos	Symbol	Entry Date	Exit Date	Level	Bars	Days	Initial Stop	Entry Price	Exit Price	
<input checked="" type="checkbox"/>	5915	0	Long	AUD	14/09/2000	19/09/2000	0	0	5	\$0.0000	\$1.9500	\$1.710
<input checked="" type="checkbox"/>	5953	0	Long	AUD	26/09/2000	25/10/2000	0	0	29	\$0.0000	\$1.8500	\$1.760
<input checked="" type="checkbox"/>	6282	0	Long	AUD	17/11/2000	18/12/2000	0	0	31	\$0.0000	\$1.5100	\$1.500
<input checked="" type="checkbox"/>	6451	0	Long	AUD	22/12/2000	11/01/2001	0	0	20	\$0.0000	\$1.5400	\$1.520
<input checked="" type="checkbox"/>	6710	0	Long	AUD	14/02/2001	14/03/2001	0	0	28	\$0.0000	\$1.2400	\$1.240
<input type="checkbox"/>	4145	0	Long	AUN	21/10/1999	22/11/1999	0	0	32	\$0.0000	\$4.6900	\$5.600
<input type="checkbox"/>	4372	0	Long	AUN	01/12/1999	17/12/1999	0	0	16	\$0.0000	\$5.8300	\$6.250
<input type="checkbox"/>	4584	0	Long	AUN	12/01/2000	25/02/2000	0	0	44	\$0.0000	\$6.5280	\$8.000
<input type="checkbox"/>	4947	0	Long	AUN	14/03/2000	15/03/2000	0	0	1	\$0.0000	\$8.9000	\$8.500
<input type="checkbox"/>	5003	0	Long	AUN	23/03/2000	30/03/2000	0	0	7	\$0.0000	\$9.6000	\$8.750
<input type="checkbox"/>	5204	0	Long	AUN	02/05/2000	19/05/2000	0	0	17	\$0.0000	\$7.2000	\$6.000
<input type="checkbox"/>	5420	0	Long	AUN	02/06/2000	28/07/2000	0	0	56	\$0.0000	\$5.8200	\$5.880
<input type="checkbox"/>	5871	0	Long	AUN	04/09/2000	13/09/2000	0	0	9	\$0.0000	\$5.2000	\$4.790
<input type="checkbox"/>	6022	0	Long	AUN	03/10/2000	20/10/2000	0	0	17	\$0.0000	\$4.3500	\$3.950
<input type="checkbox"/>	6187	0	Long	AUN	02/11/2000	07/11/2000	0	0	5	\$0.0000	\$3.8000	\$3.640
<input type="checkbox"/>	6231	0	Long	AUN	08/11/2000	09/11/2000	0	0	1	\$0.0000	\$3.6900	\$3.620
<input type="checkbox"/>	6408	0	Long	AUN	12/12/2000	02/02/2001	0	0	52	\$0.0000	\$2.3800	\$2.300
<input checked="" type="checkbox"/>	4320	0	Long	BAM	15/11/1999	08/12/1999	0	0	23	\$0.0000	\$14.5000	\$13.500
<input checked="" type="checkbox"/>	4495	0	Long	BAM	22/12/1999	07/01/2000	0	0	16	\$0.0000	\$13.8100	\$13.250
<input checked="" type="checkbox"/>	4558	0	Long	BAM	10/01/2000	12/01/2000	0	0	2	\$0.0000	\$13.4000	\$13.200
<input checked="" type="checkbox"/>	4629	0	Long	BAM	19/01/2000	11/02/2000	0	0	23	\$0.0000	\$13.5000	\$13.200

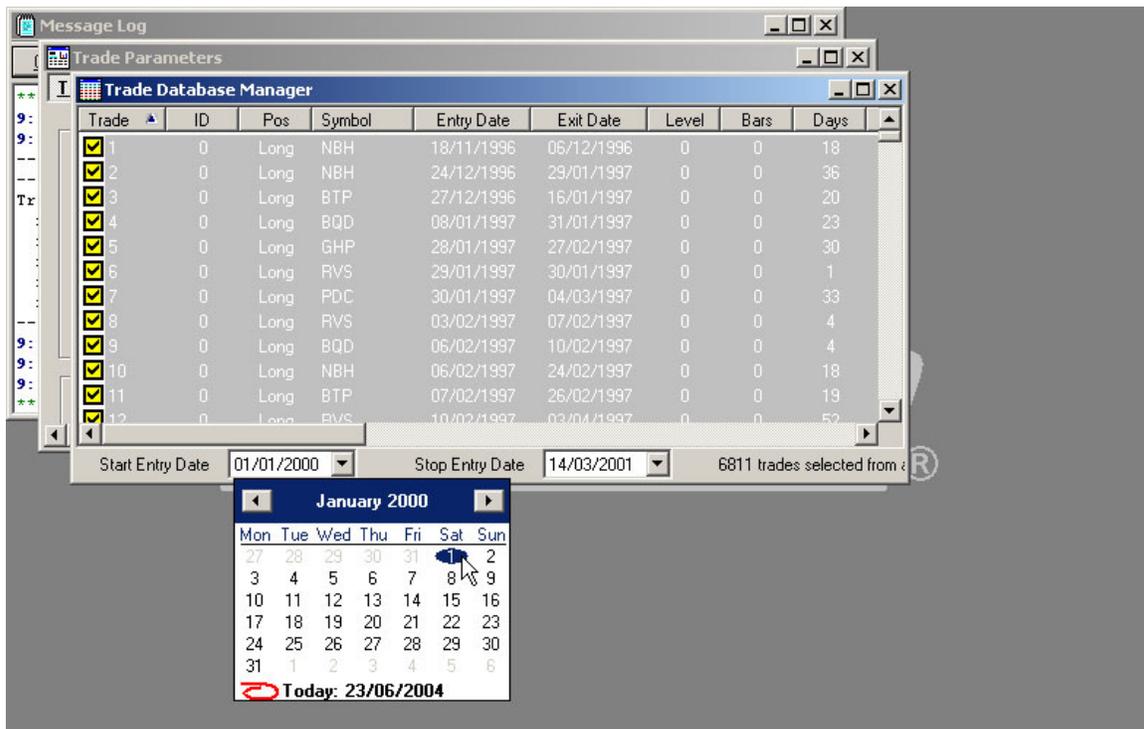
Start Entry Date: 18/11/1996 Stop Entry Date: 14/03/2001 6799 trades selected from a total of 6811 trades

Global date selection mask

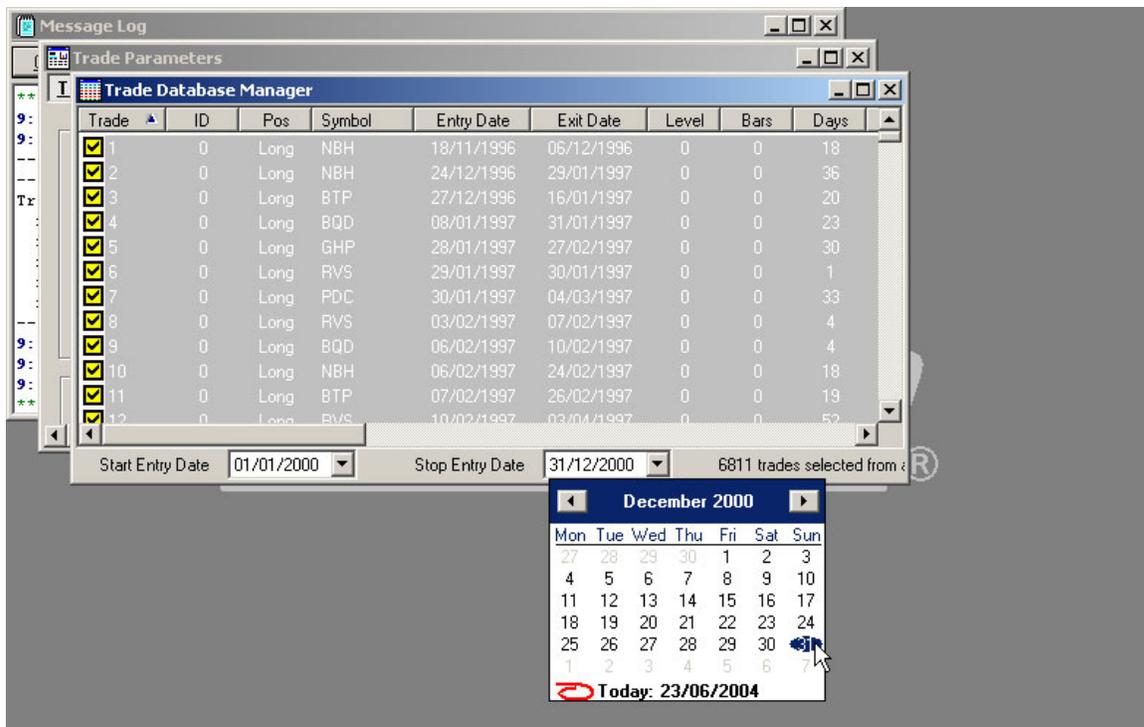
You can quickly include or exclude a group of trades within a contiguous entry date range without having to go through the arduous task of selecting and unchecking the trades. For example to only include trades with an entry date that fell in the year 2000, you can do one of the following:

Method A: Select the entry dates from the drop-down calendars

Select the start entry date from the 'Start Entry Date' calendar.



Select the stop entry date from the 'Stop Entry Date' calendar.

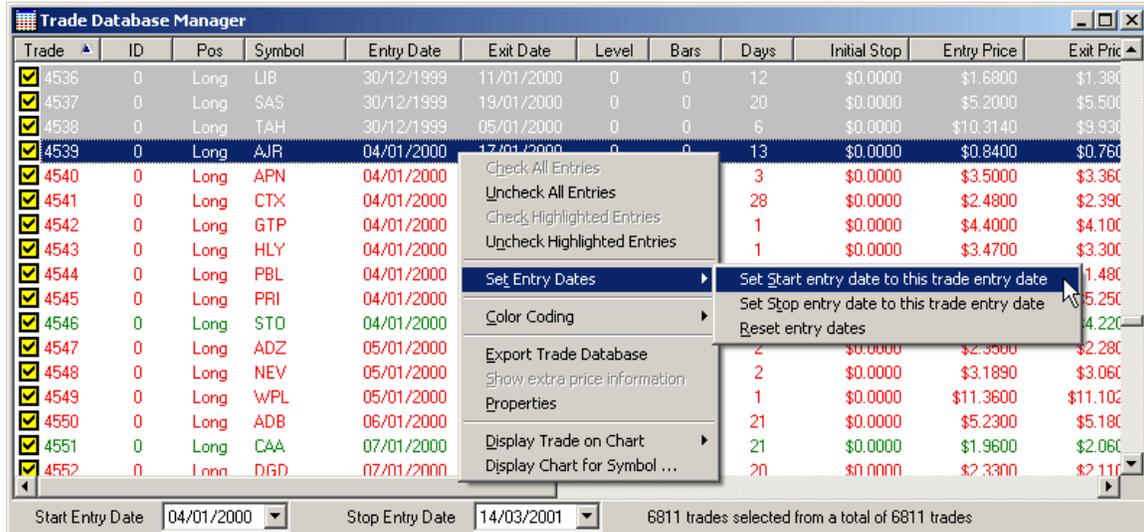


Note: All excluded trades are now “greyed” out and even though they are still checked they will not be included in any simulations.

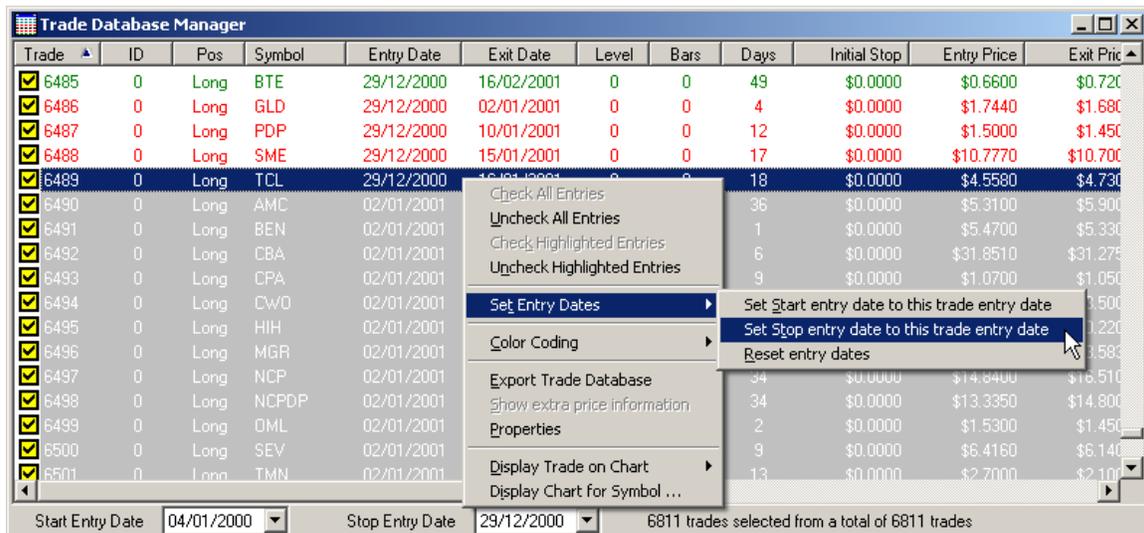
Method B: Select the trades directly from the trade database manager

In this method the starting and ending entry dates will be selected directly from the trade database manager.

Scroll the trade database manager down and select the first trade with an entry date of the year 2000. Right click on the trade to select it and then click on the following menu item: ‘Set Entry Dates’→ ‘Set Start entry date to this trade entry date’.



Now scroll the trade database manager down and select the last trade with an entry date of year 2000. Right click on the trade to select it and then click on the following menu item: ‘Set Entry Dates’→ ‘Set Stop entry date to this trade entry date’.

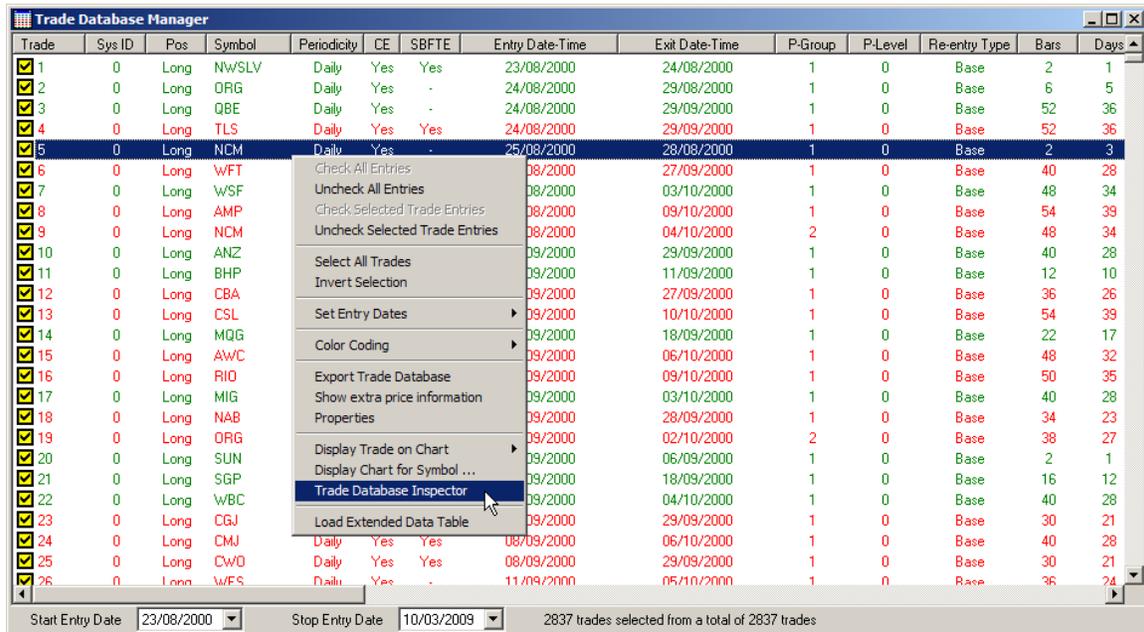


Reset Entry Date Mask

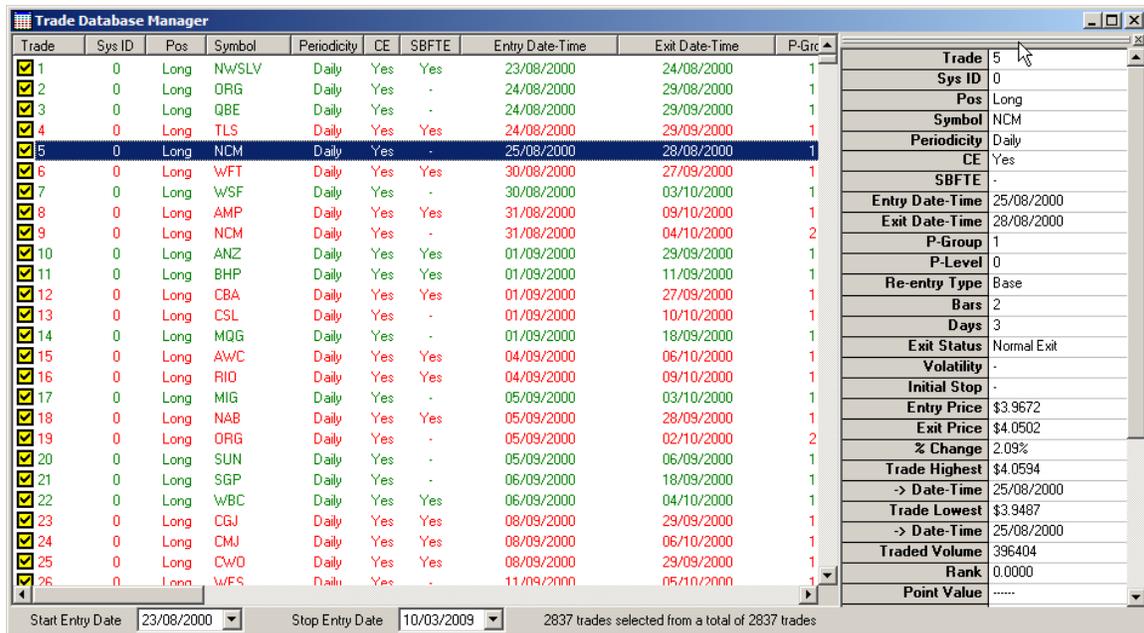
You can disable the date selection mask. Just right click on the trade database manager and select the following menu item: ‘Set Entry Dates’→ ‘Reset Entry Dates’.

The Trade Database Inspector **NEW**

Sometimes it is not possible to see all of the columns in the Trade Database Manager. To facilitate this you can switch on the Trade Database Inspector, which displays all of the trade data for the currently highlighted trade in the trade database manager. To switch on the Trade Database Inspector right click on the Trade Database Manager and select 'Trade Database Inspector' from the popup menu.



The Trade Database Inspector will automatically be displayed docked to the Trade Database Manager. Each time you select a trade from the Trade Database Manager the Inspector will be updated with the trade data. You can scroll the Inspector to view the parts you can't see or you can undock it from the Trade Database Manager by dragging its docking bar away from the Trade Database Manager.



Trade Database Manager

Trade	Sys ID	Pos	Symbol	Periodicity	CE	SBFTE	Entry Date-Time	Exit Date-Time
1	0	Long	NWSLV	Daily	Yes	Yes	23/08/2000	24/08/2000
2	0	Long	ORG	Daily	Yes	-	24/08/2000	29/08/2000
3	0	Long	QBE	Daily	Yes	-	24/08/2000	29/09/2000
4	0	Long	TLS	Daily	Yes	Yes	24/08/2000	29/09/2000
5	0	Long	NCM	Daily	Yes	-	25/08/2000	28/08/2000
6	0	Long	WFT	Daily	Yes	Yes	30/08/2000	27/09/2000
7	0	Long	WSF	Daily	Yes	-	30/08/2000	03/10/2000
8	0	Long	AMP	Daily	Yes	Yes	31/08/2000	09/10/2000
9	0	Long	NCM	Daily	Yes	-	31/08/2000	04/10/2000
10	0	Long	ANZ	Daily	Yes	Yes	01/09/2000	29/09/2000
11	0	Long	BHP	Daily	Yes	Yes	01/09/2000	11/09/2000
12	0	Long	CBA	Daily	Yes	Yes	01/09/2000	27/09/2000
13	0	Long	CSL	Daily	Yes	-	01/09/2000	10/10/2000
14	0	Long	MQG	Daily	Yes	-	01/09/2000	18/09/2000
15	0	Long	AWC	Daily	Yes	Yes	04/09/2000	06/10/2000
16	0	Long	RIO	Daily	Yes	Yes	04/09/2000	09/10/2000
17	0	Long	MIG	Daily	Yes	-	05/09/2000	03/10/2000
18	0	Long	NAB	Daily	Yes	Yes	05/09/2000	28/09/2000
19	0	Long	ORG	Daily	Yes	-	05/09/2000	02/10/2000
20	0	Long	SUN	Daily	Yes	-	05/09/2000	06/09/2000
21	0	Long	SGP	Daily	Yes	-	06/09/2000	18/09/2000
22	0	Long	WBC	Daily	Yes	Yes	06/09/2000	04/10/2000
23	0	Long	CGJ	Daily	Yes	Yes	08/09/2000	29/09/2000
24	0	Long	CMJ	Daily	Yes	Yes	08/09/2000	06/10/2000
25	0	Long	CWO	Daily	Yes	Yes	08/09/2000	29/09/2000
26	0	Long	WFS	Daily	Yes	-	11/09/2000	05/10/2000

Trade Database Inspector

Trade	5
Sys ID	0
Pos	Long
Symbol	NCM
Periodicity	Daily
CE	Yes
SBFTE	-
Entry Date-Time	25/08/2000
Exit Date-Time	28/08/2000
P-Group	1
P-Level	0
Re-entry Type	Base
Bars	2
Days	3
Exit Status	Normal Exit
Volatility	-
Initial Stop	-
Entry Price	\$3.9672
Exit Price	\$4.0502
% Change	2.09%
Trade Highest	\$4.0594
-> Date-Time	25/08/2000
Trade Lowest	\$3.9487
-> Date-Time	25/08/2000
Traded Volume	396404
Rank	0.0000
Point Value	.....
Initial Margin	.....
Max Loss	.....
Trans Cost	.....
Margin Req	.....
PS Model	.....
Sector	.....
Portfolio Limit (%)	.....
Max Trades	.....
PS Param 1	.....
PS Param 2	.....
PS Param 3	.....

Start Entry Date: 23/08/2000 Stop Entry Date: 10/03/2009 2837 trades selected from database

Total Number of trades in database: 2837 Earliest Entry Date: 23/08/2000 Latest Entry Date: 10/03/2009

The Inspector can be redocked by dragging it over to the right side of the Trade Database Manager.

Exporting the Trade Database {P,E}

It is possible to export the data from the Trade Database in a variety of formats which include:-

- Hypertext Markup Language (.html and .htm) format
- Universal Text Trade Database Format (.trt) (see [The Universal Text Trade Database File Format](#) for more information)
- Comma Separated Values file - long dates (.csv)

Note: In this instance dates are exported as decimal values, i.e., 20th-November-2000 is represented by 20001120. You should use this export option if you use the formatted date option below and the day and month are being transposed when importing into Excel®.

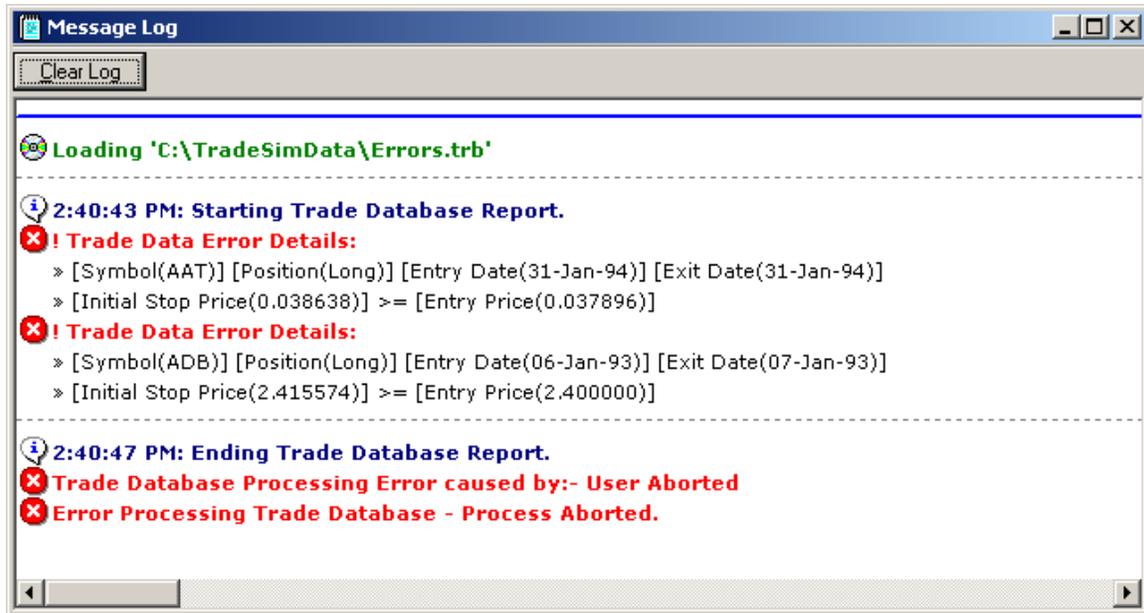
- Comma Separated Values file - formatted dates (.csv)

Note: In this instance dates are exported exactly as they appear in the trade database manager. You should use the long date format export option above if the day and month fields are being transposed when importing into Excel®.

To access this facility just right click on the Trade Database Manager Window and select the Export file option. A file save dialogue box will appear asking you to select the appropriate file and file format. Select the appropriate file format from the **Save as Type:** drop-down menu and then select a file or use the optional filename given in the **File Name** field. You do not need to specify a file extension, as one will be automatically appended.

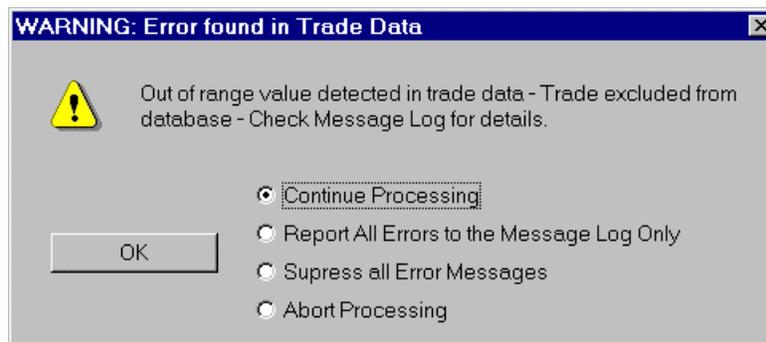
Problems when loading Trade Database files

You may experience problems loading a trade database file if that file happens to contain errors. All errors and warnings are either displayed with popup message boxes prompting used action and/or are logged to the Message Log Window. An example of the Message Log Window is shown in the following screen shot.



Trade Data Errors

If you have used the latest MetaStock/TradeSim plug-in to generate a trade database file then you should not need to worry about errors with trade data as invalid trade data is automatically filtered out of the trade database. However if you are loading a [Universal Text Trade Database](#) file, TradeSim contains extensive error detection and recovery needed to flag and report invalid trade data. If a trade data error is detected a popup message box will appear prompting action from the user.



The message box allows several options, which can be selected by clicking on one of the several error handling options. No matter which option is selected, all trades that contain invalid trade data are suppressed from the trade database although the original errors still remain in the trade database files.

□ Continue Processing

This is the default setting. Every time an error is detected this message box will pop up. Clicking the 'OK' button will close the message box and if further errors are detected in the trade data the message box will popup again. Every time this message box pops up the details of the errors are logged to the Message Log Window.

- Report All Errors to the Message Log**
When this option is selected all errors are reported to the Message Log without any user intervention.
- Suppress All Error Messages**
When this option is selected all error messages are suppressed.
- Abort Processing**
When this option is selected the trade database is aborted and no further processing is done.

Duplicate Trades

If the [Check for Duplicate Trades](#) option is selected then this option will force a check for duplicate trades when a trade database is loaded. Duplicate trades occur when there is more than one trade with an identical symbol name and entry date. Unlike trade data errors, duplicate trades are not eliminated from the trade database. However when a duplicate trade is found the same popup message box is displayed and the same set of error handling options are given.

Trade Database Error Report Summary

At the end of the error report in the Message Log a trade database error report summary is displayed providing that the '[Abort Processing](#)' error processing option has not been selected. This error summary provides a summary of the number of valid and invalid trades in the database as well as the number of duplicate trades that are found whilst processing the trade database.

The Trade Parameters Window

The screenshot shows the 'Trade Parameters' window with two tabs: 'Trade Parameters' and 'Preferences'. The 'Trade Parameters' tab is active and contains several sections:

- Position Size Model:**
 - Equal Dollar Units
 - Equal Percent Dollar Units
 - Fixed Dollar Risk
 - Fixed Percent Risk
 - Fixed Dollar Volatility
 - Fixed Percent Volatility
 - Pyramid Profits
 - Pyramid Trades
- Simulation Type:**
 - Portfolio Simulation
 - Portfolio Simulation (Ignore Dates)
 - Basket test
 - Monte Carlo Analysis
- Simulation Options:**
 - Use Original Ordering
 - Random Walk
- Trade Parameters (Stocks):**
 - Initial Trading Capital:
 - Transaction Cost (each way): Use Transaction Cost from Trade Database
 - Portfolio Limit:
 - Margin Requirement: Use Margin Req from Trade Database
 - Maximum Open Positions:
 - Magnify Position Size (and Risk) according to Margin Requirement
- Parameters - Equal Dollar Units:**
 - Capital per Trade:
 - Margin Requirement Interest Rate:
 - Long Trades (Debit):
 - Short Trades (Credit):
 - Specify Daily Interest Rate
 - Select Position Size Model from Trade Database

The *Trade Parameters* window is used to set up the trading methodology and trading parameters as well as to select the type of simulation that is to be carried out. There are two tabs in this window – the *Trade Parameters* tab and the *Preferences* tab. Note that some simulation options will be permanently disabled depending on which edition of software you have purchased. Setting up a trading methodology first requires one to select a position size model. The term position size usually goes hand in hand with money management and before we go on we shall briefly recap this very important topic.

Money Management

Money management is that part of your system that answers the question “how much?” or “how many?” throughout the course of a trade. How much essentially means how big a position you should have at any given time throughout the course of any one trade. As a result of this it is sometimes referred to as “position-sizing” which is the terminology that is used in this manual. The “Position Size” of the trade refers to how many shares or contracts of the one security were purchased (or sold) as part of the trade, whereas “Position Value” refers to the aggregate cost of the trade.

The position size methodology chosen for a trading system will have a profound effect on its long-term profitability so it is imperative that this part of the trading system be scrutinized rather than focus on less important issues such as entry criteria.

Position Sizing Models

TradeSim supports six different position-sizing models. This allows quick performance comparisons of a given trading system using different position-sizing models thus establishing the most effective position size model for the trading system being tested. Each position size model has a number of trading parameters that are common to all position-sizing models such as Initial Capital, Total Transaction Cost and Portfolio Limit. These parameters are described below.

Common Trading Parameters

❑ Initial Capital

This is the initial amount of trading capital that is used when trading commences.

❑ Transaction Cost

The transaction cost specifies the cost of doing each side (entry and exit) of a trade. It can be specified as either a fixed cost, or a fractional cost that depends on the size of the trade. When the transaction cost is specified as a fixed cost the transaction cost is always the same for both sides of the trade.

When the transaction cost is specified as a fractional cost the transaction cost depends on the position value, which can be different for each side of the trade.

❑ Use Transaction Cost from Trade Database

[Refer to the column description in the trade database manager.](#)

❑ Portfolio Limit

This parameter sets a limit on the total amount of capital that can be allocated to all open trades at the one time and is specified as a percentage of the total trade capital available at the time. If the **Profit Pyramiding** option is enabled then the portfolio limit will increase as the total equity increases and decrease as the total equity decreases.

❑ Pyramid Profits

When this parameter is not checked then we aim to maintain the total trading capital at an amount specified by the **Initial Capital** parameter. However in the course of trading we may have a situation where we have many losing trades so that the total capital has fallen below the initial capital in which case the total trading capital will be less than the initial capital. If the trading system produces too many losing trades so that the total capital falls below what can reliably be traded then any simulation in progress will abort and a ‘bankrupt’ condition will be reported.

If there are enough profitable trades so that the total capital exceeds the initial capital then the total trading capital will be ‘clamped’ or held at the initial capital and the rest of the trading profits are put aside to be used later when the total trade capital starts to fall due to losing trades.

When this parameter is checked any profits that are returned by profitable trades are added to the total equity and trade capital. The effect of this on the trading strategy will depend on what position size model is used. However it should be noted that a trading system that is profitable without profit compounding should benefit from using profit compounding. How much of an improvement will depend on other factors of course but the position size model used will have the most profound effect. Position size models which size trades according to a proportion of the total trading capital will benefit the most from profit compounding.

❑ Pyramid Trades

When a simulation is run in TradeSim pyramid trades (level greater than ‘0’) are normally ignored. However when the ‘Pyramid Trades’ option is checked then pyramid trades are included in the

simulation. For more information on Pyramid Trades and Pyramid Trading Strategies see the relevant documentation ref⁷⁾ AN3 - *Testing Trade Pyramid Strategies using TradeSim*.

❑ **Initial Margin (Commodities only)**

This parameter specifies the initial margin required for each futures contract. This parameter is only visible when Commodities have been selected in the preferences.

❑ **Use Initial Margin from Trade Database (Commodities Only)**

[Refer to the column description in the trade database manager.](#)

❑ **Point Value (Commodities only)**

The parameter specifies the price quotation for one full point.

A Note on Point Value.

Point Value refers to the \$ amount of one Big Point. A big Point would be 1 point on the SPI, SP or Dow, or 1 point on the ED. To get the \$ value of the big point simply use the following formula:

Big Point in \$'s = $1/(\text{tick size}) * \$ \text{ tick value}$.

So for the ED = $1/0.005 * 12.50 = \$2,500$

EMini SP = $1/0.25 * 12.50 = \$50.00$

❑ **Use Initial Margin from Trade Database (Commodities Only)**

[Refer to the column description in the trade database manager.](#)

❑ **Maximum Open Positions**

This parameter allows you to limit the maximum number of open positions at any one time.

❑ **Margin Requirement (Stocks Only)**

This parameter specifies the percent of funds that you must deposit in order to place a trade. This allows you to leverage your transactions. For example, if you trade a security with a 20% margin requirement (i.e., where you are required to deposit only 20% of the actual cost of the security), then a 10% move in the security's price will create a 50% gain because the trade is leveraged at 5 to 1.

If the initial equity was \$1,000 when a long position was entered, and the security's price increased by 10% before the long position was closed, the profit would be \$100 (i.e., 10% of \$1,000). However, if you place this trade using a 20% margin requirement, then you are able to buy \$5,000 worth of the security (your \$1,000 is the 20% margin requirement, plus \$4000, or 80% of borrowed funds). Thus, the 10% increase in the security's price would create a \$500 dollar gain (i.e., 10% of \$5,000). This \$500 gain represents a 50% gain on your \$1,000 investment.

Note: Although the leverage provided by trading on margin can magnify trading profits it can also magnify trading losses.

❑ **Magnify Risk and Position Size according to Margin Requirement**

When using risk based models where the downside risk is contained by a protective stop then the risk for each trade is magnified by the margin requirement in much the same way as the potential profit is. You can switch this feature off so that the total risk incurred by any trade will be preserved at the value that you specified in the risk position size model parameters. In this case the effect of using a less than 100% margin for leveraging whilst preserving the total risk will be that more small trades will be taken instead of larger leveraged trades.

❑ **Use Margin Requirement from Trade Database**

[Refer to the column description in the trade database manager.](#)

❑ **Margin Requirement Interest (Long Trades)**

This is the interest applied to leveraged long trades where the Margin Requirement is less than 100% and is calculated on a daily basis. It can be specified in terms of a daily interest rate or an annualized yearly interest rate depending on the "Specify daily interest rate" option.

Note: Interest payments for Long trades are deducted from the trading account and have 'D' appended to the amount in the Trade Log.

For example the current overnight interest rate for long CFD positions as per CMC Markets is 5.50% (over night cash rate) + 2.0% (premium) = 7.5%

See http://www.cmcmarkets.com.au/en/content/cfd/what_is_a_cfd.jsp?section=overnight for more information on CFD interest rates.

Note: No Interest will be charged for Margin Requirements of 100%

Margin Requirement Interest (Short Trades)

This is the interest applied to leveraged short trades where the Margin Requirement is less than 100% and is calculated on a daily basis. It can be specified in terms of a daily interest rate or an annualized yearly interest rate depending on the "Specify daily interest rate" option.

Note: Interest payments for Short trades are credited to the trading account and have 'C' appended to the amount in the Trade Log.

For example the current overnight interest rate for short CFD positions as per CMC Markets is 5.50% (over night cash rate) - 2.0% (premium) = 3.5%

See http://www.cmcmarkets.com.au/en/content/cfd/what_is_a_cfd.jsp?section=overnight for more information on CFD interest rates.

Note: No Interest will be charged for Margin Requirements of 100%

Specify Daily Interest Rate

This checkbox determines whether or not the interest rate for margin positions specifies a daily or annualized yearly (365 days) interest rate.

Select Position Size Model from the trade database. {E} 

This checkbox allows you to use the extended values in the trade database to dynamically select the position size on a trade-by-trade basis. For more information see [Dynamic Selection of the Position Size Model](#) and [Dynamic Position Size model data](#).

1. The Equal Dollars Position Sizing Model.

In this model we allocate an equal amount of capital (excluding the transaction costs) to each trade. This amount is determined by the *Capital per Trade* parameter and is specified in dollars. When a trade position is taken the actual position size may be slightly less than this amount because only a whole number of shares or contracts can be purchased, thus rounding off the total position size to a value which accommodates a whole number of shares or contracts. If the total capital allows multiple positions to be taken then each position will be an amount that is close to the *Capital per Trade* and the maximum number of positions that can be taken at one time will depend on the total trading capital and the *Portfolio Limit*.

When trading commodities the *Capital per Trade* determines the number of contracts purchased. The number of contracts purchased is calculated by dividing the *Capital per Trade* by the *Initial Margin* and rounding the result to the lowest integer.

Capital per Trade

This parameter specifies the amount of capital allocated to each trade. When a trade position is taken the actual position size may be slightly less than this amount because only an integer number of shares or contracts can be purchased, thus rounding off the total position size to a value which accommodates an integer number of shares or contracts.

2. The Equal-Percent Dollar Units Position Sizing Model.

In this model we allocate an amount (excluding the transaction costs) that is a fraction of the total trading capital to each trade. This fraction is determined by the *Fraction of total trade capital per trade* parameter and is specified as a percentage of the available trade capital. For example if this parameter is set to 10% and our initial trading capital is \$50,000 then we would allocate \$5,000 to any new trades irrespective of any existing trade positions that have already been taken.

When a trade position is taken the actual position size may be slightly less than this amount because only an integer number of shares or contracts can be purchased thus rounding off the total position size to a value which accommodates an integer number of shares. If the total capital allows multiple positions to be taken then the maximum number of positions that can be taken at any one time will depend on the total trading capital and the *Portfolio Limit*.

When trading commodities the *Fraction of total trading capital per trade* determines the number of contracts purchased. The number of contracts purchased is calculated by dividing the *Capital per Trade* by the *Initial Margin* and rounding the result to the lowest integer value.

❑ **Fraction of total trading capital per trade**

This parameter specifies the fraction of total trading capital that is allocated to each trade. For example if this parameter is set to 10% and the total trading capital (including existing positions) is \$50,000 then we would allocate \$5,000 to the trade irrespective of any existing trade positions that have already been taken.

3. The Fixed Dollar Risk Position Sizing Model.

In this model a fixed amount of capital is risked on each trade. This should never be confused with the actual position size, which is calculated from the amount risked. This model requires an *Initial Stop* parameter to be included along with each trade in the trade database that was generated with the MetaStock plug-in. If valid *Initial Stop* data is not detected in the trade data then this model will be disabled from the radio group.

Important: The initial risk is only really valid if a protective stop or trailing stop has been used to limit the maximum loss of the trade to a level that corresponds to the initial stop value. To enable protective stops when generating a trade database please refer to the section in the previous chapter [Using the Initial Stop as a Protective \(Money Management\) Stop](#) for more details on how to do this.

❑ **Capital risked per trade**

This parameter determines the total amount of capital risked per trade and is specified in dollars.

❑ **Position Value(Size) Limit**

This parameter limits the maximum position value(size) of any one trade to a value that is a fraction of the total trading capital at the time the trade is to be taken.

○ **Example**

As an example, say you currently have \$100,000 tied up in both open positions and cash i.e., your total trading capital is \$100,000. You risk 1% (\$1,000) of your trading capital on a trade and calculate the position size/value of the trade according to the difference between the entry price and initial stop price. If your position value(size) is limited to 10% of total trading capital (ie \$10,000) then the trade will be capped at \$10,000 even if the position size required is greater than \$10,000.

❑ **Portfolio Heat**

This parameter limits the total portfolio risk exposure to a value that is a fraction of the total trading capital at the time the trade is to be taken. The Portfolio Heat follows from Ed Seykotas definition of Portfolio Heat²³⁾, which is a measure of the total risk of a portfolio at any given time.

○ **Example**

As an example, say you currently have \$100,000 tied up in both open positions and cash i.e., your total trading capital is \$100,000. If you allow \$2,000 of your trading capital to be risked on any one trade then 5 trades taken at the same time will incur a total risk of \$10,000 or 10% of total trading capital. In other words your portfolio heat is 10%. If you limit your portfolio heat to a maximum of

6% (\$6,000) then only three trades at \$2,000 risk per trade could be taken without exceeding your maximum risk exposure.

4. The Fixed Percent Risk Position Sizing Model.

In this model, we risk a percentage of our total trading capital on each trade. This should not be confused with the actual position size, which is derived from the amount of capital risked on each trade. This model requires an **Initial Stop** parameter to be included along with each trade in the trade database data that was generated with the MetaStock plug-in. If valid Initial Stop data is not detected in the trade data then this model will be disabled from the radio group.

Important: The initial risk is only really valid if a protective stop or trailing stop has been used to limit the maximum loss of the trade to a level that corresponds to the initial stop value. To enable protective stops when generating a trade database please refer to the section in the previous chapter [Using the Initial Stop as a Protective \(Money Management\) Stop](#) for more details on how to do this.

❑ **Fraction of Capital Risked per Trade**

This parameter determines the total amount of capital risked per trade and is specified as a percentage of the total trading capital. For example if our total trading capital is \$100,000 and we risk 1% of our capital on a trade then we will risk \$1,000 on the next trade and this is irrespective of any existing trade positions that have already been taken.

❑ **Position Value(Size) Limit**

This parameter limits the maximum position value(size) of any one trade to a value that is a fraction of the total trading capital at the time the trade is to be taken.

○ **Example**

As an example, say you currently have \$100,000 tied up in both open positions and cash i.e., your total trading capital is \$100,000. You risk 1% (\$1,000) of your trading capital on a trade and calculate the position value(size) of the trade according to the difference between the entry price and initial stop price. If your position value(size) is limited to 10% of total trading capital (ie \$10,000) then the trade will be capped at \$10,000 even if the position value(size) required is greater than \$10,000.

❑ **Portfolio Heat**

This parameter limits the total portfolio risk exposure to a value that is a fraction of the total trading capital at the time the trade is to be taken. The Portfolio Heat follows from Ed Seykotas definition of Portfolio Heat ²³⁾, which is a measure of the total risk of a portfolio at any given time.

○ **Example**

As an example, say you currently have \$100,000 tied up in both open positions and cash i.e., your total trading capital is \$100,000. If you allow 2% of your trading capital to be risked on any one trade then 5 trades taken at the same time will incur a total risk of 10%. In other words your portfolio heat is 10%. If you limit your portfolio heat to a maximum of 6% then only three trades at 2% risk per trade could be taken without exceeding your maximum risk exposure.

Note: Even though the initial stop value may be present in the trade database, the portfolio heat will only have relevance when a protective stop is used to exit a trade if the initial stop has been violated. To enable protective stops when generating a trade database please refer to the section in the previous chapter [Using the Initial Stop as a Protective \(Money Management\) Stop](#) for more details on how to do this.

In summary the Portfolio Limit will limit the number of trades so that the value of all trades combined does not exceed a certain value whereas the position value(size) limit effectively limits the size of an individual trade.

5. The Fixed Dollar Volatility Position Sizing Model.

In this model the Volatility parameter for each trade from the trade database is used to determine the position size along with the “Capital Assigned to Trade”. This model requires a **Volatility** parameter to be

included along with each trade in the trade database that was generated with the MetaStock plug-in. If valid **Volatility** data is not detected in the trade data then this model will be disabled from the radio group. For more information on generating the volatility data please read the relevant section on the [SetVariableVolatility](#) function.

Important: This model does not limit risk in anyway unless a protective stop is used. When. To enable protective stops when generating a trade database please refer to the section in the previous chapter [Using the Initial Stop as a Protective \(Money Management\) Stop](#) for more details on how to do this.

Capital Assigned to Trade

This parameter along with the Volatility of the trade determines the total amount of capital allocated to each trade and is specified in dollars such that:-

$$\text{Position Size} = (\text{Capital Assigned to Trade}) / \text{Volatility}$$

Position Value(Size) Limit

This parameter limits the maximum position value(size) of any one trade to a value that is a fraction of the total trading capital at the time the trade is to be taken.

6. The [Fixed Percent Volatility Position Sizing Model](#).

In this model the Volatility parameter for each trade from the trade database is used to determine the position size along with the “Fraction of Capital Assigned to Trade”. This model requires a **Volatility** parameter to be included along with each trade in the trade database that was generated with the MetaStock plug-in. If valid **Volatility** data is not detected in the trade data then this model will be disabled from the radio group. For more information on generating the volatility data please read the relevant section on the [SetVariableVolatility](#) function.

Important: This model does not limit risk in anyway unless a protective stop is used. When. To enable protective stops when generating a trade database please refer to the section in the previous chapter [Using the Initial Stop as a Protective \(Money Management\) Stop](#) for more details on how to do this.

Fraction of Capital Risked per Trade

This parameter along with the Volatility of the trade determines the total amount of capital allocated to each trade and is specified in dollars such that:-

$$\text{Position Size} = (\text{Fraction of Capital Assigned to Trade}/100) \times (\text{Total Trading Capital}) / \text{Volatility}$$

Position Value(Size) Limit

This parameter limits the maximum position value(size) of any one trade to a value that is a fraction of the total trading capital at the time the trade is to be taken.

Simulation Type

This radio selection panel allows selection of the type of analysis carried out when a simulation is run. If you only have the Standard or Professional editions of TradeSim then the third option **Monte Carlo Analysis** will always be permanently disabled.

Single Simulation

This is the standard form of trade simulation and will be the one that is used most of the time a trade simulation is to be carried out on the trade database that is currently loaded. In this mode of operation trades are processed in accordance to the order of trade entry date. That is, a trade with an earlier entry date will always be taken before a trade with a later date. Note that not all of the trades in the database are taken during a simulation, as this will depend on other factors such as the trade parameters and the position size model chosen as well as available trading capital.

❑ Use Original Ordering

Trades are executed in accordance with the order they appear in the Trade Database list. That is, if there is more than one trade with the same entry date then the trade with the lower **Trade Number** will be executed first as long as its position size constraint can be met.

❑ Random Walk

This parameter setting pertains to trade data where you have the option of randomly selecting a subset of trades from a group of trades with the same entry date. If your trade data has groups of trades with identical entry dates then a random algorithm will randomly choose the trades from a group of trades with the same entry date. If your trade data has trades with unique entry dates (i.e., there are no groups of trades with the same entry dates) then this option will be 'grayed' out.

Single Simulation (dates ignored)

When this option is selected a simulation causes every trade selected in the trade database manager to be taken irrespective of date. The trade entry/exit dates are ignored and each trade is taken serially and consecutively. As a result only one trade position will be active at any one time. This mode of operation is unrealistic in practice and has only been included mainly for academic purposes. Depending on the trading system and position size model used, trade simulations using this mode of operation can sometimes produce astronomically and unrealistically huge profits.

Basket Test

Selecting the **Basket Test** option from the simulation radio group on the Trade Parameters page will allow you to carry out a basket test of all of the securities that have been selected in the trade database. The basket test simulation option allows you to test all of the selected stocks in a trade database independently of one another thus allowing you to objectively compare the strengths and weaknesses of individual securities. When running a basket test, profit pyramiding is automatically disabled and no charts are produced. On completion of a basket test a subset of the **Trade Simulation Report** and an optional **Trade Log** are produced.

Monte Carlo Analysis {E}

If you have purchased the Enterprise edition of TradeSim this comes with the advanced system tester, which includes portfolio system testing as well as advanced statistical analysis. This advanced system testing capability extends the capability of TradeSim by incorporating advanced statistical analysis methods. Please refer to the chapter on [Advanced System Testing using TradeSim \(Enterprise Edition\)](#) for more details on this feature.

Default Trade Parameters

The trade parameters can be set to a default state. This will reset any parameter on the **Trade Parameters** window to a default state. To do this, click the right mouse button on the **Trade Preferences** window and select the **Set to Default Parameters** menu option from the popup menu.

Trade Preferences Tab

Selecting the Preferences Tab on the Trade Parameters Window switches to the preferences page.

Trading Instrument

Stocks

This mode of operation applies to stocks only.

Commodities

This mode of operation applies to commodities and futures. Selecting this mode adds two extra parameters to the Trade Parameters Tab. These are the [Initial Margin](#) and [Point Value](#).

Breakeven Trades

This radio selection group allows one to control how breakeven trades are handled during a simulation. It does not affect the outcome of a simulation but rather it determines how the statistics for a trade simulation are generated. Breakeven trades are those trades where there has been no net gain or loss during the course of a trade.

Process Separately

When selected, this option tells the simulator to keep the breakeven trades separate from both the winning and losing trades.

Include with winning trades

When selected, this option tells the simulator to include the breakeven trades with the winning trades.

Include with losing Trade

When selected, this option tells the simulator to include the breakeven trades with the losing trades.

Trade Positions

This radio selection group determines how trades are processed during a simulation based on the trade position for each trade. Note that a similar filtering process can be achieved in the database manager. However, this method offers a much quicker way of filtering out trades based on the trade position type.

Process all trades

This option tells the simulator to process all trades whether long or short positions.

Process long trades only

When selected, this option tells the simulator to process trades which are on the long side only.

Process short trades only

When selected, this option tells the simulator to process trades which are on the short side only.

Transaction Cost

The transaction cost specifies the cost of doing each side (entry and exit) of a trade. It can be specified as either a fixed cost or a fractional cost, which depends on the size of the trade.

❑ **Fixed Cost**

When the transaction cost is specified as a fixed cost (fixed dollar amount) this option specifies the transaction cost in dollars for each side of a trade, which is always assumed to be equal to the amount specified in the *Transaction Cost* parameter.

❑ **Fractional Cost**

When the transaction cost is specified as a fractional cost (percentage of the trade size) the transaction cost is calculated as a fraction of the position value for each side of a trade. Because the entry and exit prices of a trade are usually different, the transaction cost will be different for each side of the trade.

❑ **Fixed Cost per Share/Contract**

When the transaction cost is specified as a fixed cost per share/contract (fixed dollar amount per share/contract) this option specifies the transaction cost in dollars per share/contract for each side of a trade. The total transaction cost for each side of the trade can be found by multiplying the number of shares/contracts (position size) by the *Transaction Cost* parameter.

❑ **Minimum Transaction Cost**

This option only applies to the “Fractional Cost” and “Fixed Cost per Share/Contract” transaction cost options. If the Transaction Cost as calculated by either of these options falls below a minimum threshold then the minimum threshold is used for the transaction cost.

Trade Pyramiding Enabled/Disabled

A different set of options is displayed in the preferences tab when pyramid trades are enable or disabled. Please refer to the [AN-3](#) application note on pyramid trading for more information regarding these settings.

Position Size Rules

The position size rules are used to control the position size and value of each trade.

□ Minimum Trade Size

This parameter specifies the minimum possible trade size before a trade is taken. If the position value for a trade is less than this value then the trade is automatically rejected. This allows the simulator to take into account the minimum share parcel size in accordance with the rules specified by your exchange. For example the minimum parcel size is 500 dollars for the purchase of securities on the Australian Stock Exchange.

□ Maximum Position Size Limit

This field works to limit or cap the maximum position size. This is a useful feature for limiting the position size to a maximum of N units. A value of zero is ignored. For example in commodities trading you may only want to take 1 contract per trade rather than the position size calculated according to the position size rules.

Note: The Max Position Size Limit can work against or conflict with the Minimum Trade Size and vice versa, such that trades limited to inadequate position values may be rejected if the minimum trade size is greater than zero. You should really specify one or the other and be careful when specifying both.

□ Accept Partial Trades if inadequate capital

Normally TradeSim will only take a trade if there is enough trading capital to do so otherwise the trade will be rejected. If the *Accept Partial Trades if inadequate capital* option is selected then a trade whose position value exceeds the available trading capital will be resized according to the available trading capital and the trade will be taken as long as the available trading capital exceeds the minimum trading size parameter above.

□ Volume Rules

The volume rules allow the volume information in the trade database to be used to determine whether or not trades can be taken or to limit the position size to a value that would be more realistic for the

trade. It is important to limit the traded volume otherwise a large position size in a small or mid cap stock can move the market quite considerably. If volume information is not included in the trade database then this section will be grayed out.

- **Ignore Volume Information**
This is the default setting and trades are taken irrespective of whether there is enough volume to fill the trade.
- **Reject Trade if Position Size is greater than xx%**
When this option is selected the position size for a trade is compared with a specified percentage of the traded volume and the trade is rejected if the position size exceeds this threshold.
- **Limit position size to a maximum of xx%**
When this option is selected the position size of a trade is limited to a maximum of a fraction of the traded volume for the trade in question. This allows a more realistic position size to be taken that takes into account the actual traded volume. For example if a trade of stock ABC requires a position size of 20,000 and only 100,000 shares have been traded then the position size will be limited to XX% of 100,000. If xx=10% then the position size will be limited to 10,000 shares.

Note: If any of the options are 'grayed out' then this is because the trade database used does not contain volume information. All trade databases generated with the latest MetaStock Plug-In will contain volume information.

□ **Round Lot Size**

This parameter allows the position size for a trade to be rounded to a specific lot size. For example you may only be able to trade lot sizes of 100 shares or contracts so if you have a position size of 351 then this will be rounded down to 300 units if the **Round Lot Size to** is set to 100. By default the **Round Lot Size to** is set to 1.

Order Type and Slippage {P,E}

TradeSim includes the ability to model slippage through order control. You can choose to control the amount of slippage at trade entry and trade exit by selecting different entry and exit order type mechanisms.

Note: If any of the options are 'grayed out' then this is because the trade database used does not contain extended price data. All trade databases generated with the latest MetaStock Plug-In will contain extended price information.

Entry Order Types

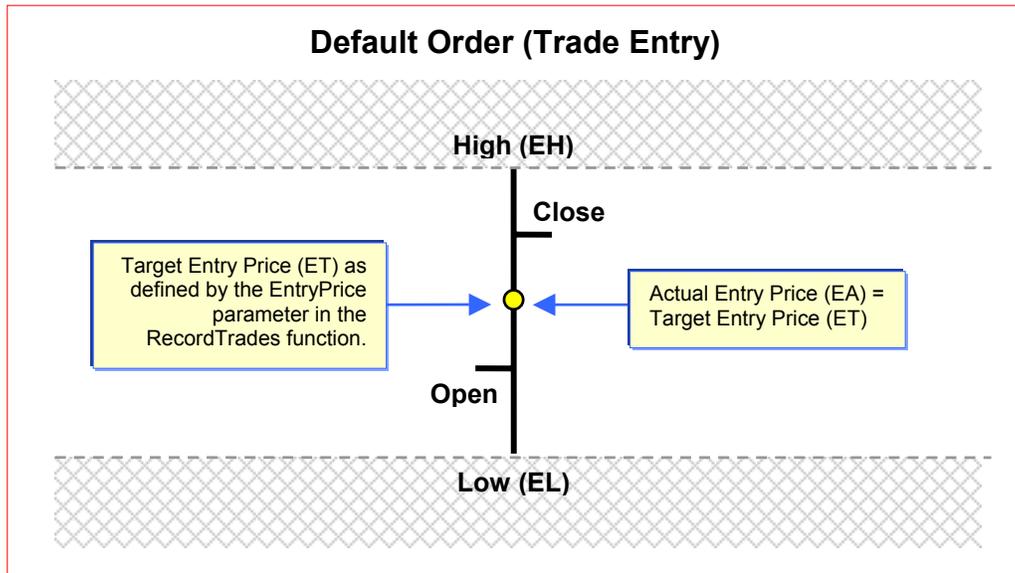
Default Order Stop Order
 Market Order Limit Order
 Worst Case
 Unconditionally Enter Trade
 Readjust Position Size
 Entry Order Control Exit Order Control

Five types of entry order mechanisms are available. These are:-

1. [Entry Order At Default](#)
2. [Entry Order At Limit](#)
3. [Entry Order At Stop](#)
4. [Entry Order At Market](#)
5. [Entry Order At Worst Case](#)

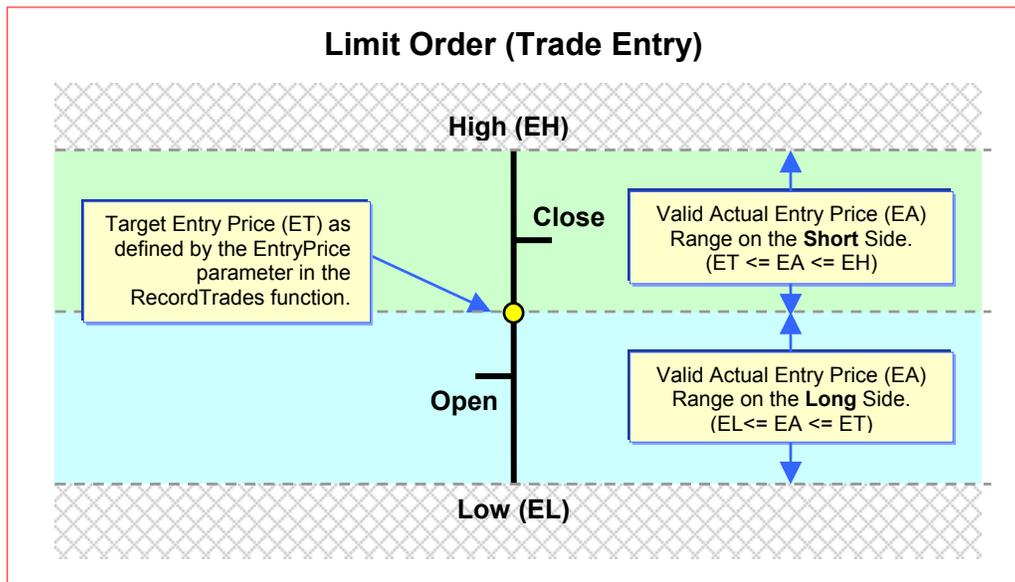
□ Entry Order At Default

This option enters a trade as determined by the entry price specified in the trade database. No slippage is generated using this option. See the following diagram or summary table for more details.



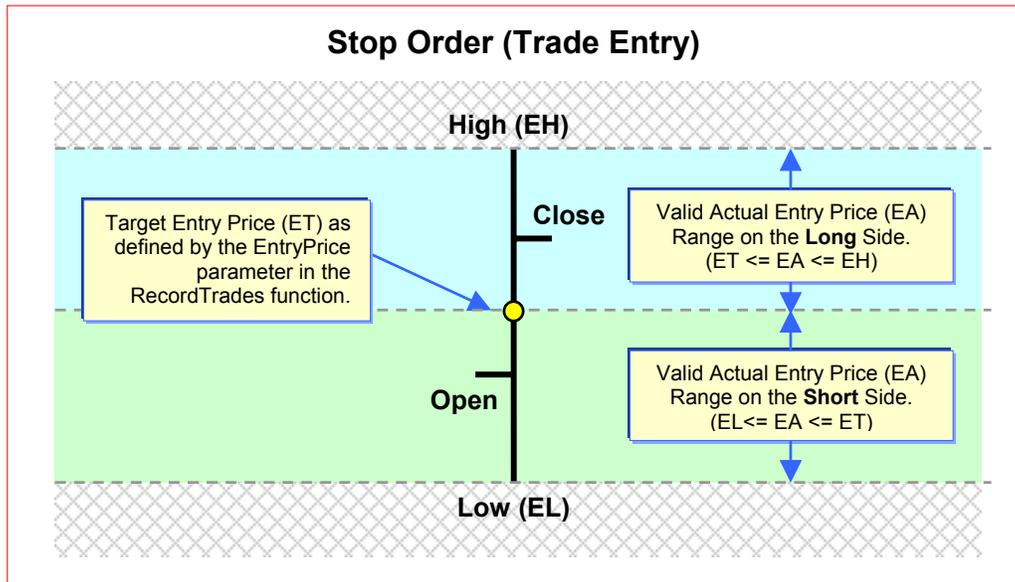
□ Entry Order At Limit

This option enters the market at a limit or better. The market limit or target entry price is defined by the EntryPrice parameter in the RecordTrades function and a random algorithm determines the actual entry price. If the actual entry price is equal to or better than the limit price then the trade is taken; otherwise it is rejected. If the 'Unconditionally Enter Trade' option is enabled then the price is adjusted so that the trade is always taken. The slippage is defined as the difference between the target entry price and the actual entry price. See the following diagram or summary table for more details.



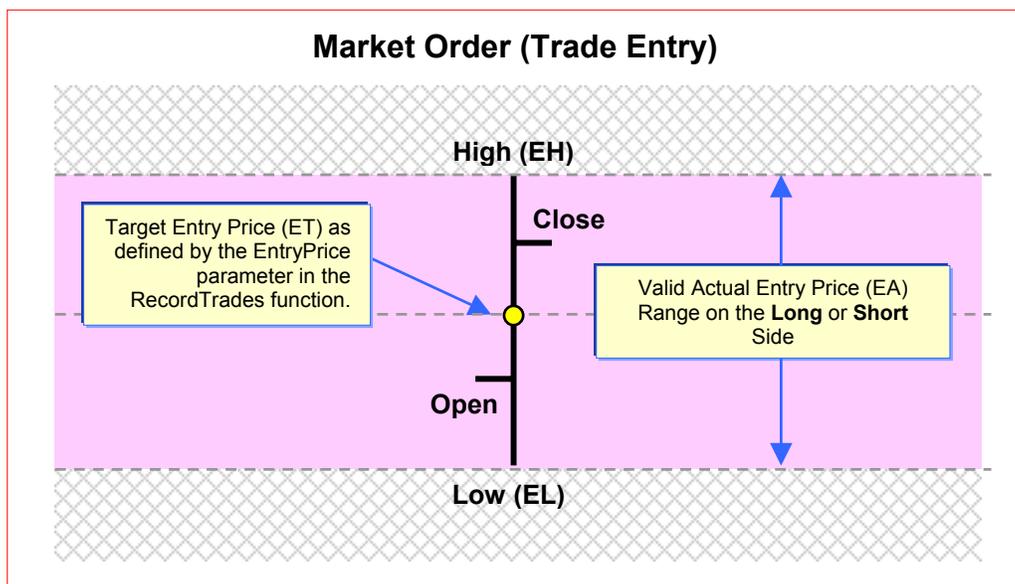
□ Entry Order At Stop

This option enters the market at a stop price. The stop or target entry price is defined by the EntryPrice parameter in the RecordTrades function and a random algorithm determines the actual entry price. If the actual entry price is equal to or worse than the stop price then the trade is taken; otherwise it is rejected. If the 'Unconditionally Enter Trade' option is enabled then the price is adjusted so that the trade is always taken. The slippage is defined as the difference between the target entry price and the actual entry price. See the following diagram or summary table for more details.



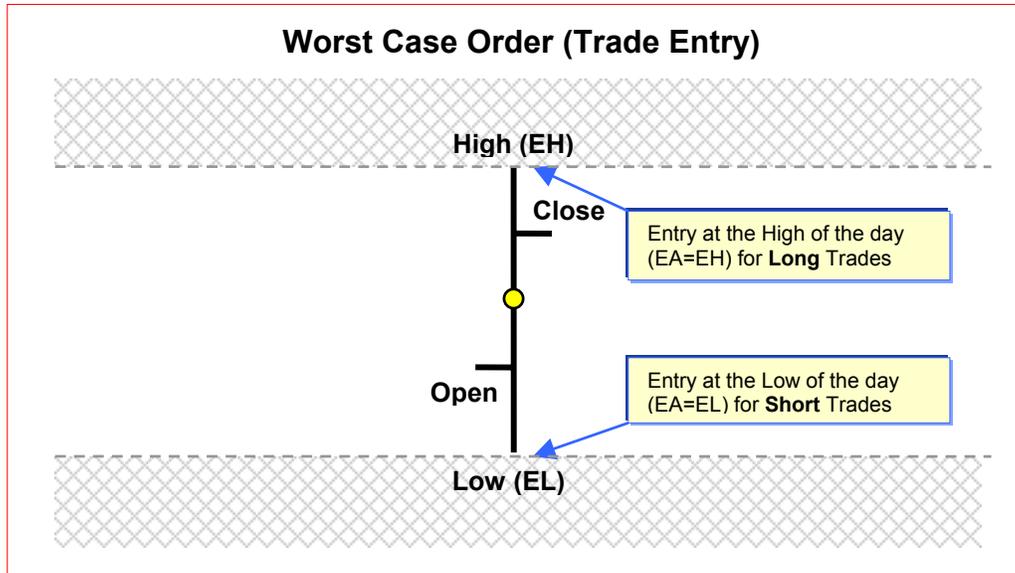
□ Entry Order At Market

This option enters the market at a price that is determined by a random algorithm. In this case the entry slippage is defined by the difference between the target entry price and actual entry price. The actual entry price is always limited to fall within the high and low range of the day. See the following diagram or summary table for more details.



❑ Entry Order At Worst Case

This option enters the market at the worst possible price on the day of entry. For long positions the trade is always entered at the high of the day. For short positions the trade is always entered at the low of the day. See the following diagram or summary table for more details.



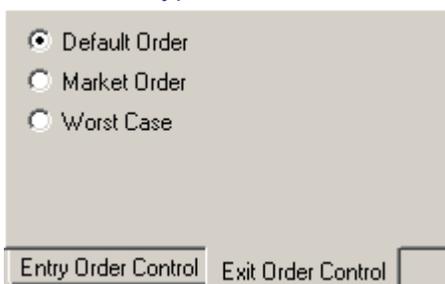
❑ Unconditionally Enter Trade

This option applies to Limit and Stop Orders. When enabled, the random algorithm that generates an entry price is adjusted so that the trade is always accepted.

❑ Readjust Position Size

When this option is enabled it readjusts the position size according to the new entry price. Be careful when using this option as to how realistically one can readjust the position size on the fly when entering the market at a price different from your target entry price.

Exit Order Types

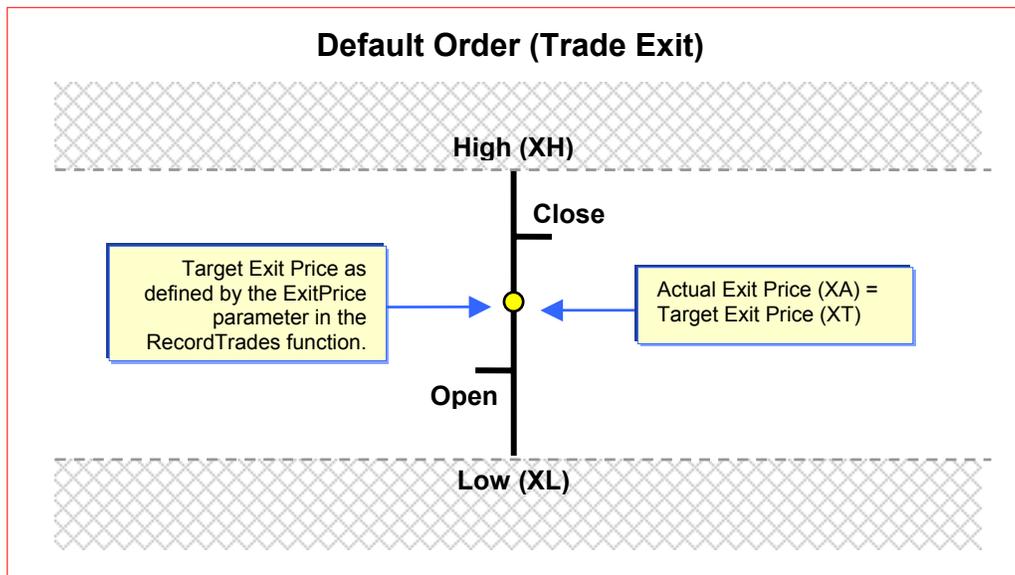


Three types of entry order mechanisms are available. These are:-

1. [Exit Order At Default](#)
2. [Exit Order At Market](#)
3. [Exit Order At Worst Case](#)

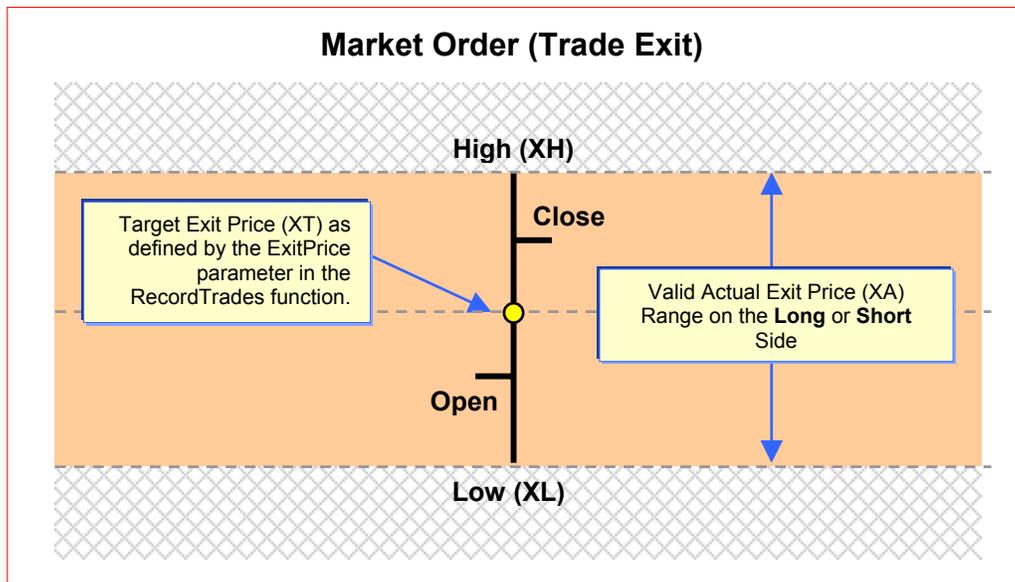
❑ Exit Order At Default

This option exits a trade as determined by the exit price specified in the trade database. No slippage is generated using this option. See the following diagram or summary table for more details.



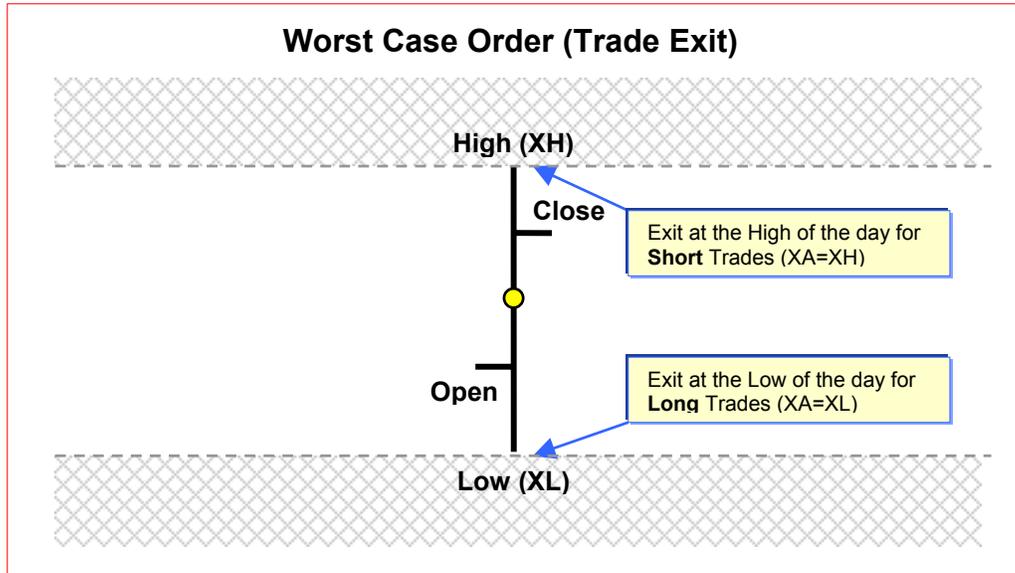
❑ Exit Order At Market

This option exits the trade at a price that is determined by a random algorithm. In this case the exit slippage is defined by the difference between the target exit price and actual exit price. The actual exit price is always limited to fall within the high and low range of the day. See the following diagram or summary table for more details.



❑ Exit Order At Worst Case

This option exits the market at the worst possible price on the day of exit. For long positions the trade is always exited at the low of the day. For short positions the trade is always exited at the high of the day. See the following diagram or summary table for more details.



Order Summary Table

The following table summarizes the different types of order specifications.

Note: that a negative slippage always indicates slippage that goes in favor of the trade. A positive slippage always indicates slippage that goes against the trade.

Entry Ordering						
	Long Trades			Short Trades		
	Actual Entry Price (EA)	Trade Taken?	Slippage	Actual Entry Price (EA)	Trade Taken?	Slippage
Order At Default	$EA = ET$	Always	0	$EA = ET$	Always	0
Order At Limit	$EL \leq EA \leq ET$	Only if $EL \leq EA \leq ET$	$EA - ET$	$ET \leq EA \leq EH$	Only if $ET \leq EA \leq EH$	$ET - EA$
Order At Limit (Unconditionally Enter Trade)	$EL \leq EA \leq ET$	Always	$EA - ET$	$ET \leq EA \leq EH$	Always	$ET - EA$
Order At Stop	$ET \leq EA \leq EH$	Only if $ET \leq EA \leq EH$	$EA - ET$	$EL \leq EA \leq ET$	Only if $EL \leq EA \leq ET$	$ET - EA$
Order At Stop (Unconditionally Enter Trade)	$ET \leq EA \leq EH$	Always	$EA - ET$	$EL \leq EA \leq ET$	Always	$ET - EA$
Order At Market	$EL \leq EA \leq EH$	Always	$EA - ET$	$EL \leq EA \leq EH$	Always	$ET - EA$
Order At Worst Case	$EA = EH$	Always	$EH - ET$	$EA = EL$	Always	$ET - EL$
Exit Ordering						
	Long Trades			Short Trades		
	Actual Exit Price (XA)	Trade Taken?	Slippage	Actual Exit Price (XA)	Trade Taken?	Slippage
Order At Default	$XA = XT$	Always	0	$XA = XT$	Always	0
Order At Market	$XL \leq XA \leq XH$	Always	$XT - XA$	$XL \leq XA \leq XH$	Always	$XA - XT$
Order At Worst Case	$XA = XL$	Always	$XT - XL$	$XA = XH$	Always	$XH - XT$

Symbol	Description
ET	Target Entry Price from the trade database = EntryPrice Parameter in the RecordTrades function.
EA	Actual Entry Price, which includes slippage if any.
EL	Low of the day at entry from the trade database
EH	High of the day at entry from the trade database
XT	Target Exit Price from the trade database = ExitPrice Parameter in the RecordTrades function.
XA	Actual Exit Price, which includes slippage if any.
XL	Low of the day at exit from the trade database
XH	High of the day at exit from the trade database

Simulation Options

□ Allow Intraday Exits

Currently when single bar trades are processed all trades with the same entry date are entered (limited by the available capital) before they are closed off. When "Allow Intraday exits" is enabled single bar trades of the same date are closed off before another same bar trade is entered.

Default Preferences



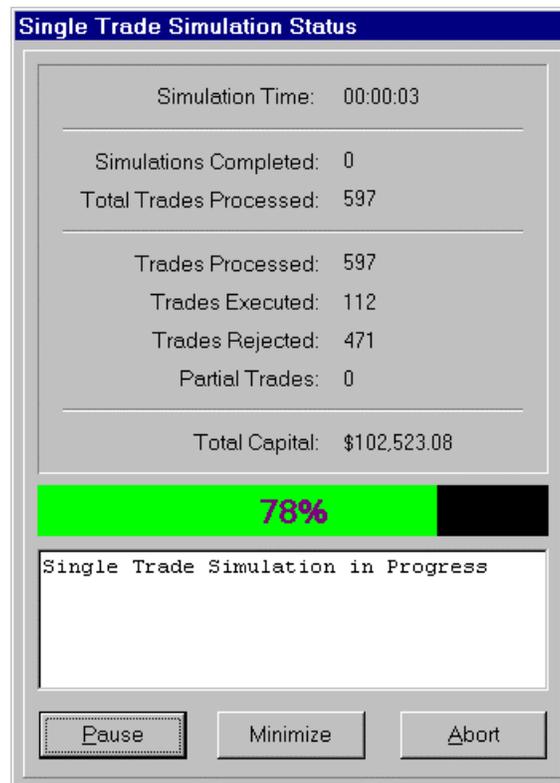
The preferences can be set to a default state. This will reset any parameter on the *Trade Preferences* window to a default state. To do this, click the right mouse button on the *Trade Preferences* window and select the *Set to Default Parameters* menu option from the popup menu.

Running a trade simulation

Once you have loaded your trade database and set up your trading parameters and preferences you are now in a position to run a trade simulation. To run a trade simulation just click on the **Start Simulation** button on the **Main Toolbar**.

Simulation Status Window

When a simulation is run a new window opens up and overlays the main window. This window is called the Simulation Status window and contains information regarding the status of the current simulation.



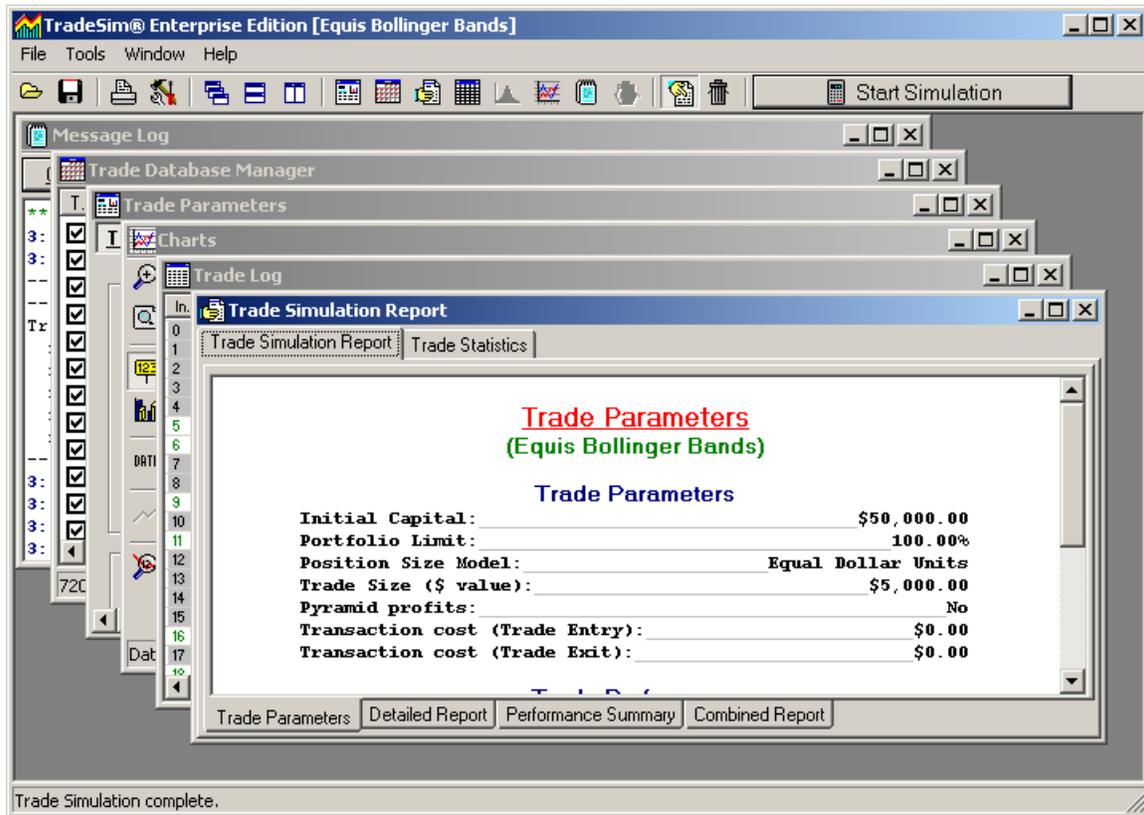
Simulation Status Parameters

- ❑ **Simulation Time HH:MM:SS**
The time display is a measure of the current simulation time and is reset to zero at the start of a simulation and increments by 1 second for every second that passes during a simulation.
- ❑ **Simulations Completed**
Specifies how many simulations have been completed. This parameter is really only useful when running a Monte Carlo simulation. When running a single simulation this parameter will always be 0.
- ❑ **Total Trades Processed**
Specifies the total number of trades that have been processed since the simulation was started. When running a single simulation, the **Total Trades Processed** and the **Trades Processed** will be identical. However when running a Monte Carlo analysis with more than one simulation the **Total Trades Processed** will reflect the total accumulated number of trades processed since the start of the simulation. For the Professional and Enterprise Editions a simulation will only include the trades that are enabled (checkbox is ticked) in the Trade Database Manager. (See the definition of **Trades Processed** above.)

- ❑ **Trades Processed**
Specifies the number of trades that have been processed from the trade database and should not be mistaken with the trades executed since not all of the trades processed are executed. At the end of each simulation the trades processed should be equal to the total number of checked trades in the trade database. For the Professional and Enterprise Editions a simulation will only include the trades that are enabled (checkbox is ticked) in the Trade Database Manager. For example if a Trade Database contains 2,000 trades and only 500 are enabled, then the *Trades Processed* indicator will count from 1 to 500 when a simulation is run.
- ❑ **Trades Executed**
Specifies the number of actual trades taken or executed. This would be synonymous with the actual number of trades that have been executed in a real life-trading scenario. The *Trades Executed* indicator will always be less than or equal to the *Trades Processed* indicator.
- ❑ **Trades Rejected**
Specifies the number of trades that were rejected due to capital or position size constraints.
- ❑ **Partial Trades**
If the *Accept Partial Trades if inadequate capital* option is selected in the Trade Preferences then this indicator will display the number of partial trades taken as the trade simulation progresses.
- ❑ **Total Capital**
Specifies the Total Capital, which includes the Initial Starting Capital plus profits/losses as the trade simulation progresses.
- ❑ **The Completion Gauge**
This gauge gives a visual indication as to the completion status of the total simulation. When running a single simulation this gauge gives an indication of the completion status for that particular simulation. When running a Monte Carlo analysis this gauge gives an indication as to the completion status of all the Monte Carlo simulations.
During a Trade Simulation the color of the progress bar will be dynamically updated after each trade thus giving an indication of the current state of the total capital pool. During a Monte Carlo analysis the progress bar will always be displayed in yellow color. When a Trade Simulation or Monte Carlo analysis is run the following progress bar color coding is used to denote the state of the total capital pool.
 1. **Purple Bar** - Bankrupt condition i.e., **Total Capital = 0**
 2. **Red Bar** - Loss condition i.e., **Total Capital < Initial Capital**
 3. **Grey Bar** - Break Even condition i.e., **Total Capital = Initial Capital**
 4. **Green Bar** - Profit condition i.e., **Total Capital >Initial Capital**
 5. **Yellow Bar** - Monte Carlo analysis in progress
- ❑ **The Message Log**
The Message Log window displays messages that display the current status of the simulation.
- ❑ **Pause/Continue Button**
This button pauses the simulation. When paused, this button displays *Continue* so that clicking this button again will continue the simulation from where it left off.
- ❑ **Minimize/Maximize Button**
When this button is clicked the TradeSim window will be minimized but the simulation window will still remain open to remind the user that a simulation is still in progress. When minimized the button will display *Maximize* so that when it is clicked the TradeSim window will reopen again. Note that the *Simulation Status* window is a modal window so the underlying TradeSim window cannot be brought to the foreground.
- ❑ **Abort Button**
When this button is clicked the simulation will abort and TradeSim will be reset to the state before a simulation was run.

Results of a simulation

When a trade simulation has been run successfully the user will be greeted with a number of newly opened windows. These new windows are the Trade Simulation Report window, Charts window and the optional Trade Log window.



The Trade Simulation Report window

This report is generated when a single trade simulation is completed. It is divided up into two sections on a tabbed page. The first tabbed page contains the Trade Simulation Report for the last simulation that was run. The Trade Simulation Report is further divided up into three sections (four for the Professional and Enterprise Editions), The first page contains a summary report of the trade parameters and preferences used in the simulation. These parameters mirror the parameters set up in the *Trade Parameters* and *Trade Preferences* window. The second page contains a detailed trade simulation report. The third page is only present for the Professional and Enterprise Editions and contains a Performance Summary Report. All in all the Trade Simulation Report provides a number of relevant performance indicators, statistics and parameters that are useful in evaluating a trading system. The last page combines the information contained in the other report pages.

Note: All Reports are displayed using Microsoft Rich Text Format (RTF) and therefore can be copied and pasted into any text editor or word processor that can accept RTF. To copy any part of the report just select the relevant information using the mouse whilst holding down the left mouse button. Once you have selected the text just press the Ctrl+'C' key combination and the selected text will be copied onto the clipboard. You can then paste the information into your word processor document in the same way it is

displayed in the report. Once you have pasted the information into your own document you can then edit it as you would a normal document. Alternatively any page in the report can be exported in either Plain Text or Rich Text formats.

Trade Parameters Tab

These parameters mirror the parameters setup in the *Trade Parameters* and *Trade Preferences* window.

Trade Parameters (Equis Bollinger Bands)

Trade Parameters

Initial Capital:	\$50,000.00
Portfolio Limit:	100.00%
Position Size Model:	Equal Dollar Units
Trade Size (\$ value):	\$5,000.00
Pyramid profits:	No
Transaction cost (Trade Entry):	\$0.00
Transaction cost (Trade Exit):	\$0.00

Trade Preferences

Trading Instrument:	Stocks
Break Even Trades:	Process separately
Trade Position Type:	Process all trades
Entry Order Type:	Default Order
Exit Order Type:	Default Order
Minimum Trade Size:	\$500.00
Accept Partial Trades:	No
Volume Filter:	Ignore Volume Information

Detailed Report Tab

Detailed Report (Equis Bollinger Bands)

Simulation Summary

Simulation Date:	5/12/2002
Simulation Time:	11:06:10 PM
Simulation Duration:	0.47 seconds

Trade Summary

Earliest Entry Date:	10-02-92
Latest Entry Date:	11-03-02
Earliest Exit Date:	03-03-93
Latest Exit Date:	01-05-02
First Trade Entry Date:	10-02-92
Last Trade Exit Date:	01-05-02
Total Trading duration:	3733 days

Profit Summary

Profit Status:	PROFITABLE
Starting Capital:	\$50,000.00
Finishing Capital:	\$95,084.11
Maximum Equity/(Date):	\$49,716.02 (05-06-98)
Minimum Equity/(Date):	\$5,893.05 (03-03-93)
Gross Trade Profit:	\$89,515.57 (179.03%)
Gross Trade Loss:	-\$44,431.47 (-88.86%)
Total Net Profit:	\$45,084.11 (90.17%)
Average Profit per Trade:	\$524.23
Profit Factor:	2.0147

Profit Index:	50.36%
Total Transaction Cost:	\$0.00
Total Slippage:	\$0.00
Daily Compound Interest Rate:	0.0172%
Annualized Compound Interest Rate:	6.4862%

Trade Statistics

Trades Processed:	720
Trades Taken:	86
Partial Trades Taken:	0
Trades Rejected:	634
Winning Trades:	56 (65.12%)
Losing Trades:	29 (33.72%)
Breakeven Trades:	1 (1.16%)
Largest Winning Trade/(Date):	\$12,149.99 (27-09-93)
Largest Losing Trade/(Date):	-\$3,791.00 (19-10-01)
Average Winning Trade:	\$1,598.49
Average Losing Trade:	-\$1,532.12
Average Win/Average Loss:	1.0433

Trade Duration Statistics

Average Days in All Trades:	355
Average Days in Winning Trades:	270
Average Days in Losing Trades:	516

Consecutive Trade Statistics

Maximum consecutive winning trades:	7
Maximum consecutive losing trades:	5
Average consecutive winning trades:	2.95
Average consecutive losing trades:	1.71

Relative Drawdown

Maximum Dollar Drawdown/(Date):	\$9,177.45 (01-04-96)
Maximum Percentage Drawdown/(Date):	10.3000% (01-04-96)

Absolute (Peak-to-Valley) Dollar Drawdown

Maximum Dollar Drawdown:	\$13,761.33 (13.8000%)
Capital Peak/(Date):	\$99,716.02 (05-06-98)
Capital Valley/(Date):	\$85,954.69 (01-08-00)

Absolute (Peak-to-Valley) Percent Drawdown

Maximum Percentage Drawdown:	13.8000% (\$13,761.33)
Capital Peak/(Date):	\$99,716.02 (05-06-98)
Capital Valley/(Date):	\$85,954.69 (01-08-00)

Simulation Summary

- Simulation Date**
Date at which the trade simulation was started.
- Simulation Time**
Time at which the trade simulation was started.
- Simulation Duration**
Duration of the simulation.

Trade Summary

- Earliest Entry Date**
This is the earliest entry date in the trade database.
- Latest Entry Date**
This is the latest entry date in the trade database.
- Earliest Exit Date**
This is the earliest exit date in the trade database.
- Latest Exit Date**
This is the latest exit date in the trade database.

- ❑ **First Trade Entry Date**
This is the entry date of the first trade executed.
- ❑ **Last Trade Exit Date**
This is the exit date of the last trade executed.
- ❑ **Total Trading Duration**
This is total the number of days, including non-trading days, that took place between *First Trade Entry Date* and the *Last Trade Exit Date*.

Profit Summary

- ❑ **Profit Status**
Description of the profit outcome, i.e., *Net Profit*, *Net Loss* or *Bankrupt*.
- ❑ **Starting Capital**
This is the same as the *Initial Capital*.
- ❑ **Finishing Capital**
This is the total net capital after a simulation has completed.
- ❑ **Maximum Equity/(Date)**
This is the Maximum Equity encountered and date of occurrence throughout the Trade Simulation.
- ❑ **Minimum Equity/(Date)**
This is the Minimum Equity encountered and date of occurrence throughout the Trade Simulation.
- ❑ **Total Net Profit**
(*Finishing Capital – Starting Capital*) specified in dollars and as a percentage.
- ❑ **Gross Trade Profit**
This value represents the total gross profit that was made for all of the profitable trades. Adding this value to the *Gross Trade Loss* yields the *Total Net Profit* value.
- ❑ **Gross Trade Loss**
This value represents the total gross loss that was made for all of the losing trades. Adding this value to the *Gross Trade Profit* yields the *Total Net Profit* value.
- ❑ **Net Profit per Trade**
This value represents the average profit made on each of the trades executed in the simulation. It is derived by dividing the *Total Net Profit* value by the number of trades executed in the simulation (*Trades Taken*).
- ❑ **Profit Factor**
This value is the ratio of the *Gross Trade Profit* to the *Gross Trade Loss*.
- ❑ **Profit Index**
This value is the ratio of the *Total Net Profit* to the *Gross Trade Profit* and is expressed as a percentage. It is a measure of the efficiency of a trading system in generating profits. A maximum profit index of 100% indicates a highly efficient trading system with no losing trades. A profit index of 0% indicates a trading system that breaks even and produces no net profit or loss. A negative profit index indicates an inefficient trading system, with a profit index that approaches a negative infinite value indicating the worst-case performance.
- ❑ **Total Transaction Cost**
This is the total transaction cost for all of the trades taken during a simulation based on the Total Transaction Cost per Trade parameter.
- ❑ **Total Slippage Value**
This is the total dollar amount of slippage incurred through the course of trading. The slippage depends on the order type, which is controlled by the order type selection on the Trade Parameters Option Tab. Irrespective of the trade position a positive slippage value always represents slippage that has reduced the overall profit whilst a negative slippage value always represents slippage that has increased the overall profit.
- ❑ **Daily Compound Interest Rate**
This is the equivalent daily compound interest rate based on the *Total Net Profit* and the *Total Trade Duration*.
- ❑ **Annualized Compound Interest Rate**
This is the equivalent annualized (yearly) compound interest rate based on the *Total Net Profit* and the *Total Trade Duration*. It is calculated based on 365 days in each year.

Trade Statistics

- ❑ **Trades Processed**
Trades processed during a simulation, which should be equal to the total number of trades in the trade database.
- ❑ **Trades Taken**
Total number of trades taken or executed during a simulation.
- ❑ **Partial Trades Taken**
Number of partial trades taken or executed during a simulation.
- ❑ **Trades Rejected**
Number of trades rejected during a simulation.
- ❑ **Winning Trades**
Total number of winning trades specified as an actual count and as a percentage of the *Trades Taken*.
- ❑ **Losing Trades**
Total number of losing trades specified as an actual count and as a percentage of the *Trades Taken*.
- ❑ **Breakeven Trades**
Total Number of breakeven trades specified as an actual count and as a percentage of the *Trades Taken*.

Winning/Losing Trade Stats

- ❑ **Largest Winning Trade/(Date)**
The largest winning trade in dollars, and date of occurrence.
- ❑ **Largest Losing Trade/(Date)**
The largest losing trade in dollars, and date of occurrence.
- ❑ **Average Winning Trade**
The average winning trade in dollars.
- ❑ **Average Losing Trade**
The average losing trade in dollars.
- ❑ **Average Win/Average Loss**
The ratio of the average winning trade value to the average losing trade value.

Trade Duration Statistics

- ❑ **Average Days In All Trades**
The average number of days spent in a trade for all trades. There is no distinction between trading and non-trading days.
- ❑ **Average Days In Winning Trades**
The average number of days spent in a winning trade. There is no distinction between trading and non-trading days.
- ❑ **Average Days In Losing Trades**
The average number of days spent in a losing trade. There is no distinction between trading and non-trading days.

Consecutive Trade Statistics

- ❑ **Maximum Consecutive Winning Trades**
The maximum number of consecutive winning trades before a losing trade occurs.
- ❑ **Maximum Consecutive Losing Trades**
The maximum number of consecutive losing trades before a winning trade occurs.
- ❑ **Average Consecutive Winning Trades**
The average number of consecutive winning trades.
- ❑ **Average Consecutive Losing Trades**
The average number of consecutive losing trades.

Trade Expectation Stats (Risk-based PS models only)

The following trade statistics are only available for risk based position size models such as the *Fixed Dollar Risk* model and the *Fixed Percent Risk* model.

- ❑ **Expectation per dollar risked**
This represents the normalized trade expectation and is expressed in the number of dollars returned for every dollar risked.
- ❑ **Maximum Reward/Risk ratio or R-multiple**
For risked based position size models this parameter indicates the maximum or most positive reward/risk ratio that was detected during a simulation.
- ❑ **Minimum Reward/Risk ratio or R-multiple**
For risked based position size models this parameter indicates the minimum or most negative reward/risk ratio that was detected during a simulation.
- ❑ **Average positive Reward/Risk or R-multiple ratio**
Average positive reward/risk ratio. A high average R-multiple is usually a reflection of good money management principles and the use of a trailing stop loss.
- ❑ **Average negative Reward/Risk or R-multiple ratio**
Average negative reward/risk ratio. Ideally for a trading system with a 1-R maximum risk this figure should average out to around -1. If this figure exceeds this by a considerable amount then you may have to investigate the cause, which could be due to excessive slippage at exit or too many trades closing well outside the money management stop.

Relative Drawdown parameters.

Relative Drawdowns are retracements in equity from previous equity highs - in short, losing periods.

Relative Drawdown is calculated using the following algorithm: Scan across the equity chart for rising equity. The point on the equity chart at which the following point is lower becomes the equity reference peak and is assigned a zero value on the drawdown chart. For each of the following points on the equity chart that is lower than the previous equity point, the percentage reduction in equity from the reference point is calculated and plotted on the drawdown chart. When the following equity point is higher than the previous point this indicates an equity reference peak and the drawdown chart is reset to zero again and the whole process is repeated.

Ideally we would like to have no drawdown in equity but in reality this is part and parcel of trading. There will be periods where traders experience a string of losses that outweigh any recent gains. The main implication of drawdown is the psychological effect that this will have on the trader. A large string of losses may cause the trader to abandon his trading system in search of another system that may even have a worse drawdown performance.

- ❑ **Max Relative Dollar Drawdown/(Date)**
This is the maximum equity drawdown and date of occurrence experienced during a trade simulation.
- ❑ **Max Relative Percentage Drawdown/(Date)**
This is the maximum percentage drawdown and date of occurrence experienced during a trade simulation.

Note: Note that the maximum dollar drawdown and the maximum percentage drawdown do not always occur at the same point in time.

Absolute (Peak-to-Valley) Dollar Drawdown parameters.

The Absolute or Peak-to-Valley Dollar Drawdown is the worst-case **dollar** reduction in equity from the highest equity high point. When TradeSim calculates this it looks for an equity high point (peak) and then proceeds to look for an equity low point (valley) from which it can compute the worst case drop in equity. Note that an equity-valley will always follow the equity-peak and not the other way around. If an equity chart features a continually rising equity curve with no retracement in equity then no absolute PV dollar drawdown will exist in which case the PV dollar drawdown will be undefined.

- ❑ **Max Absolute Dollar Drawdown**
The Peak-to-Valley dollar drawdown is calculated by searching for an equity high point (peak) followed by a search for an equity low point (valley). The difference in equity between these two

points defines the maximum or absolute dollar drawdown. The equivalent percentage reduction in equity for these two points is displayed in brackets.

- ❑ **Capital Peak/(Date)**
This is the high point (peak) value in equity from which the P-V Dollar Drawdown is computed.
- ❑ **Capital Valley/(Date)**
This is the low point (valley) value in equity from which the P-V Dollar Drawdown is computed.

Absolute (Peak-to-Valley) Percentage Drawdown parameters.

The Absolute or Peak-to-Valley Percent Drawdown is the worst-case **percentage** reduction in equity from an equity high point (peak). The Peak-to-Valley percent drawdown is calculated by searching for an equity high and low point that result in the largest percentage reduction in equity. Note that an equity-valley will always follow the equity-peak and not the other way around. If an equity chart features a continually rising equity curve with no retracement in equity then no absolute PV drawdown will exist in which case the PV dollar drawdown will be undefined.

Note: It is possible or normal for the peak and valley equity points that defined the Peak-to-Valley Percentage Drawdown not to correspond to the peak and valley points that define the Peak-to-Valley Dollar Drawdown.

For example, for a given equity curve you could have a situation where the maximum Peak-to-Valley Percentage Drawdown of 50% was caused when equity was reduced from a maximum equity of \$10,000 to a minimum equity of \$5,000, or a \$5,000 drawdown or reduction in equity. From the same equity curve you could also have a maximum Peak-to-Valley Dollar Drawdown of \$400,000 when the equity was reduced from \$1,000,000 to \$600,000 even though the percentage reduction is only 40% and less than the 50% maximum Peak-to-Valley Percentage Drawdown caused when the equity was reduced from \$10,000 to \$5,000.

- ❑ **Max Absolute Percent Drawdown**
The Peak-to-Valley percent drawdown is calculated by searching for an equity high and low point that result in the largest percentage reduction in equity and by subtracting the equity low point from the equity high point. The equivalent dollar drawdown is displayed in brackets as a reduction in equity. Note that the
- ❑ **Capital Peak/(Date)**
This is the high point (peak) value in equity from which the P-V Dollar Drawdown is computed.
- ❑ **Capital Valley/(Date)**
This is the low point (valley) value in equity from which the P-V Dollar Drawdown is computed.

Performance Summary Report Tab {P,E}

The Performance Summary Report provides a way of comparing the performance between all trades, long trades and short trades, by comparing a number of important parameters and statistics. Note that at any time when there is zero trades the remaining statistics are invalid such as in the following example for “Short” trades.

Performance Summary Report (Equis Bollinger Bands)

All Trades

Trades Taken:	86
Total Net Profit	\$45,084.11
Average Trade Profit	\$524.23
Maximum Trade Profit	\$12,149.99
Minimum Trade Profit	-\$3,791.00
Break Even Trades	1
Winning Trades	56
Losing Trades	29

Percent Profitable	65.12%
Average Winning Trade Profit	\$1,598.49
Average Losing Trade Profit	-\$1,532.12

Long Trades

Trades Taken:	86
Total Net Profit	\$45,084.11
Average Trade Profit	\$524.23
Maximum Trade Profit	\$12,149.99
Minimum Trade Profit	-\$3,791.00
Break Even Trades	1
Winning Trades	56
Losing Trades	29
Percent Profitable	65.12%
Average Winning Trade Profit	\$1,598.49
Average Losing Trade Profit	-\$1,532.12

Short Trades

Trades Taken:	0
Total Net Profit	N/A
Average Trade Profit	N/A
Maximum Trade Profit	N/A
Minimum Trade Profit	N/A
Break Even Trades	N/A
Winning Trades	N/A
Losing Trades	N/A
Percent Profitable	N/A
Average Winning Trade Profit	N/A
Average Losing Trade Profit	N/A

Copying and Pasting the reports into another application

[See Appendix 'F' for more details.](#)

Exporting the Reports {P,E}

[See Appendix 'F' for more details.](#)

The Trade Statistics Tab

This tab contains a collection of information pertaining to the securities encountered in a trade simulation. It is divided into two tabs. The first tab contains a table that provides tabulated information on all of the securities encountered in a trade simulation. The second tab provides a graphical means of evaluating security performance by comparing accumulated trading profits of all of the securities encountered in a trading simulation.

As a cautionary measure one should always be wary of the statistical relevance of such information particularly when it contains information that applies only to such a small sample space of only a few trades for each security as would be obtained when running a simulation using a broad portfolio containing many hundreds of securities. To alleviate possible sampling errors due to inadequate sample space TradeSim provides a basket tester which tests every trade that is enabled in the trade database manager and applies an equal amount of capital to each trade independent of every other trade. This usually results in significantly more trades and hence more reliable and unbiased statistics but at the cost of being a more unrealistic or a true to life trading scenario since the total capital used for each trade always remains constant.

Trade Statistics Table

This tab contains a table that provides tabulated information on all of the securities encountered in a trade simulation. An example of this is shown below. Unlike a basket tester, when using the normal simulation mode each security is not tested in isolation and so this factor must be taken into account when trying to evaluate the strength and weakness of securities. Also as the equity varies so will the amount of capital applied to each trade so the total net dollar profit may be biased depending on the variation of capital invested in each trade of the respective security. This factor must be taken into account when comparing securities with similar performances because a security that was predominantly traded when equity was low will show a much lower total net profit compared to a security that was traded when the equity was much higher. In this case the average percentage net profit is a much more reliable benchmark to use when comparing the performance of securities.

If you need to objectively evaluate and compare the performance of securities then you should use the **Basket Test** simulation option, which is described later on.

The table entries are color coded with a green entry signifying a net profit whilst red and black specify a net loss and breakeven condition respectively.

Sym...	Total Profit	Min Profit (\$)	Avg Profit (\$)	Max Profit (\$)	Min Profit (%)	Avg Profit (%)	Max Profit (%)	Number of Trades	Win/In
ABC	\$624.95	\$624.95	\$624.95	\$624.95	12.50%	12.50%	12.50%	1	
ADB	\$423.06	\$423.06	\$423.06	\$423.06	8.46%	8.46%	8.46%	1	
ADP	\$770.88	\$770.88	\$770.88	\$770.88	15.42%	15.42%	15.42%	1	
AGL	\$442.38	\$442.38	\$442.38	\$442.38	8.86%	8.86%	8.86%	1	
AMC	-\$25.78	-\$770.58	-\$12.89	\$744.80	-15.42%	-0.26%	14.90%	2	
AMP	\$316.48	\$316.48	\$316.48	\$316.48	6.33%	6.33%	6.33%	1	
ANM	-\$2,646.73	-\$2,646.73	-\$2,646.73	-\$2,646.73	-52.95%	-52.95%	-52.95%	1	
ADG	-\$202.76	-\$202.76	-\$202.76	-\$202.76	-4.06%	-4.06%	-4.06%	1	
ARL	-\$879.54	-\$1,192.67	-\$439.77	\$313.13	-23.86%	-8.80%	6.26%	2	
AUD	-\$1,204.41	-\$1,204.41	-\$1,204.41	-\$1,204.41	-24.09%	-24.09%	-24.09%	1	
AXA	\$315.51	-\$73.72	\$157.76	\$389.23	-1.47%	3.16%	7.79%	2	
AYO	-\$805.57	-\$1,143.37	-\$402.78	\$337.80	-22.87%	-8.06%	6.76%	2	
BDL	-\$216.05	-\$216.05	-\$216.05	-\$216.05	-4.32%	-4.32%	-4.32%	1	
BHP	\$267.17	\$267.17	\$267.17	\$267.17	5.35%	5.35%	5.35%	1	
BIL	\$1,438.37	\$1,438.37	\$1,438.37	\$1,438.37	28.79%	28.79%	28.79%	1	
BOQ	\$172.40	\$172.40	\$172.40	\$172.40	3.45%	3.45%	3.45%	1	
BTA	\$8,147.00	\$8,147.00	\$8,147.00	\$8,147.00	163.00%	163.00%	163.00%	1	
BWA	\$777.36	\$777.36	\$777.36	\$777.36	15.55%	15.55%	15.55%	1	
CCL	\$803.42	\$803.42	\$803.42	\$803.42	16.08%	16.08%	16.08%	1	
CDO	\$3,846.96	\$3,846.96	\$3,846.96	\$3,846.96	76.97%	76.97%	76.97%	1	
CEP	\$23.50	\$23.50	\$23.50	\$23.50	0.47%	0.47%	0.47%	1	
CML	\$1,823.31	\$1,823.31	\$1,823.31	\$1,823.31	36.50%	36.50%	36.50%	1	
CRG	\$300.54	\$300.54	\$300.54	\$300.54	6.01%	6.01%	6.01%	1	
CSL	\$671.07	\$671.07	\$671.07	\$671.07	13.43%	13.43%	13.43%	1	
CSR	-\$868.18	-\$876.07	-\$434.09	\$7.89	-17.53%	-8.69%	0.16%	2	
CTX	\$1,491.84	\$1,491.84	\$1,491.84	\$1,491.84	29.84%	29.84%	29.84%	1	

Note: An inadequate number of trades for each security can often make the results statistically insignificant and prone to error, so bear this in mind when you are trying to objectively evaluate the strength of a trading system with a particular security. For example, 4 winning trades out of a total of 5 trades for a particular trading system is not conclusive evidence that a trading system has a high win ratio, nor would a positive total profit necessarily indicate a successful trading system. The rule of thumb is that at least a total number of 30 trades is required for each security are required before you can draw any conclusions about the security performance. This is the reason why a True Portfolio system test is a much more accurate and statistically significant test of a trading system compared to a basket tester, which tests each security in isolation from each other.

Column Description

- ❑ **Symbol**
This column represents the symbol of the security.
- ❑ **Total Net Profit**
This column represents the sum of the net profit for all of the trades with the same security name irrespective of the capital used in each trade.

Note: Because the net dollar profit for each trade depends on the amount of capital invested in the trade, the results will be biased or skewed toward the trades that have the greater trading capital invested in the trade so that the trades with the higher trading capital will have much more influence on the result. For an unbiased or objective result it is better to use the Basket Tester or use the Average Net Percentage profit figure.

- ❑ **Minimum Profit (\$)**
This column represents the Minimum Dollar Net Profit found for all of the trades with the same security name.
- ❑ **Average Profit (\$)**
This column represents the Average Dollar Net Profit per trade for all of the trades with the same security name. It is numerically equal to the Total Dollar Net Profit (above) divided by the total number of trades for the relevant security.

Note: Because the net dollar profit for each trade depends on the amount of capital invested in the trade, the results will be biased or skewed toward the trades that have the greater trading capital invested in the trade so that the trades with the higher trading capital will have much more influence on the result. For an unbiased or objective result it is better to use the Basket Tester or use the Average Net Percentage profit figure.

- ❑ **Maximum Profit (\$)**
This column represents the Maximum Dollar Net Profit found for all of the trades with the same security name.
- ❑ **Minimum Profit (%)**
This column represents the Minimum Percentage Net Profit found for all of the trades with the same security name.
- ❑ **Average Profit (%)**
This column represents the Average Percentage Net Profit per trade for all of the trades with the same symbol name. It is calculated by summing the net percentage profit for each trade for all of the trades from the same security and dividing the result by the number of trades. Because the net percentage profit is a proportional measure compared to the dollar net profit, it is a more objective and unbiased measurement of net profit particularly when unequal amounts of capital are used in each trade.
- ❑ **Maximum Profit (%)**
This column represents the Maximum Percentage Net Profit found for all of the trades with the same security name.
- ❑ **Number of Trades**
This column represents the total number of trades with the same symbol name.
- ❑ **Winning Trades**
This column represents the percentage of winning trades found from all of the trades with the same symbol name.
- ❑ **Winning Trades (%)**
This column represents the percentage of winning trades with the same symbol name.
- ❑ **Losing Trades**
This column represents the percentage of losing trades found from all of the trades with the same symbol name.
- ❑ **Losing Trades (%)**
This column represents the percentage of losing trades with the same symbol name.
- ❑ **Breakeven Trades**
This column represents the percentage of breakeven trades found from all of the trades with the same symbol name.
- ❑ **Breakeven Trades (%)**
This column represents the percentage of breakeven trades with the same symbol name.
- ❑ **Minimum Days in Trades**
This column represents the trade with the minimum number of days from all of the trades with the same symbol name.
- ❑ **Average Days in Trades**
This column represents the average number of days spent in all trades with the same symbol name.
- ❑ **Maximum Days in Trades**
This column represents the trade with the maximum number of days from all of the trades with the same symbol name.

Note: The number of “days in a trade” should not be confused with the number of “bars in a trade”. For a more complete description see the definition for [Days \(in trade\)](#)

Sorting the columns

By default the Trade Statistics Table is sorted alphabetically by symbol. However, clicking on the column headers activates a sorting routine that resorts the list according to the information contained in the respective column. For example clicking on the **Total Profit** header will sort the list in ascending (or descending) order based on the numeric value of the total profit. Likewise clicking on the **Symbol** will sort

the list based on the alphabetical ordering of the symbol column. Alternately clicking on the same column will resort the list in the opposite direction, i.e., Z to A instead of A to Z.

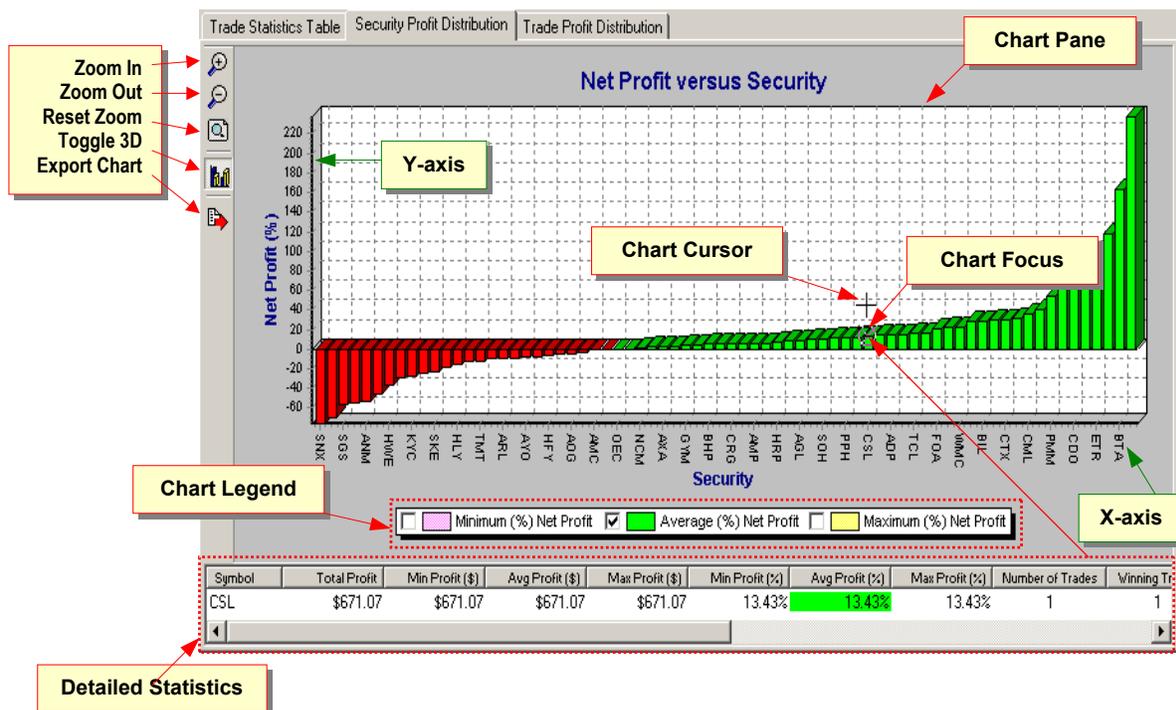
Exporting the Trade Statistics Table {P,E}

It is possible to export the data from the Trade Statistics Table in a variety of formats, which include: -

- Word Document file (.doc) format
- Hypertext Markup Language (.html and .htm) format
- Standard ASCII Text file (.txt) format
- Excel Spreadsheet file (.xls) format

To access this facility just right click on the Trade Statistics Table Window and select the Export file option. A file save dialogue box will appear asking you to select the appropriate file and file format. Select the appropriate file format from the *Save as Type*: drop-down menu and then select a file or use the optional filename given in the *File Name* field. You do not need to specify a file extension, as one will be automatically appended.

Security Profit Chart Tab



The Security Profit Chart charts some of the data contained in the Trade Statistics Table. This includes the:-

- ❑ **Minimum Percentage Net Profit versus Security**
Displays a minimum percentage net profit bar versus security to the left of the average percentage net profit bar. This charting information can be toggled on and off and by default is off.
- ❑ **Average Percentage Net Profit versus Security**
Displays the average net profit versus security. A green bar indicates a positive average percentage net profit whilst a red bar indicates a negative average percentage net profit. This charting information is always displayed and cannot be turned off.
- ❑ **Maximum Percentage Net Profit versus Security**
Displays a maximum percentage net profit bar versus security to the right of the average percentage net profit bar. This charting information can be toggled on and off and by default is off.

By default the Security Profit Chart only displays the Average Percentage Net Profit. You can also display the minimum and maximum percentage net profit by enabling or disabling the respective series on the chart legend.

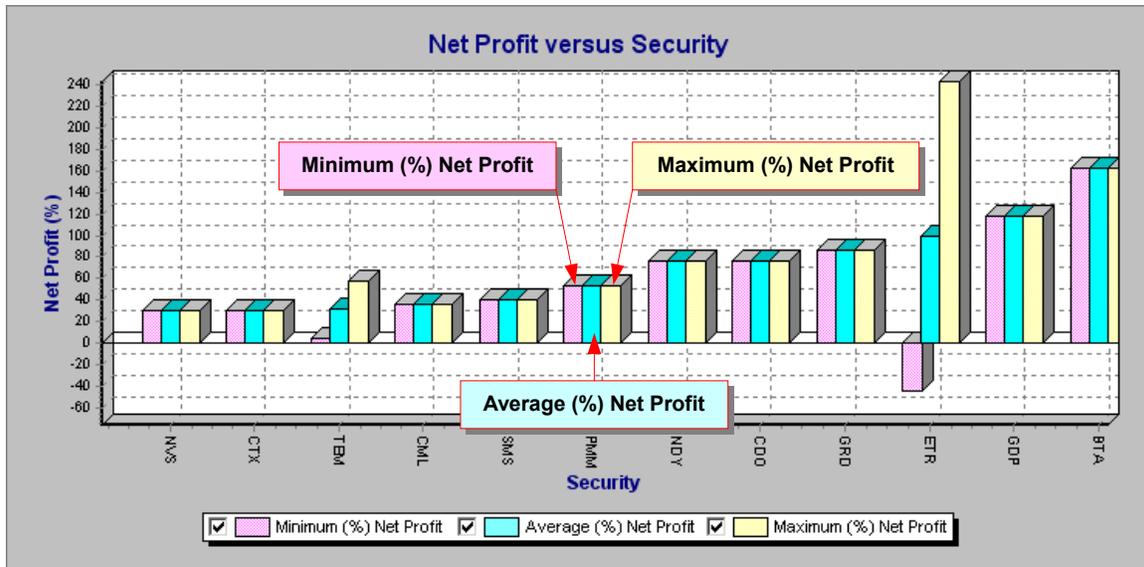


Chart Legend

The chart legend displays the color-coding used on the charts and also allows additional charting information to be toggled on or off. Clicking on the relevant checkbox within the legend toggles the chart information on and off. Note that the Average Percentage Net Profit chart cannot be turned off.

Chart Tools

- Horizontal Zoom In**
Expands the chart in a horizontal direction.
- Horizontal Zoom Out**
Contracts the chart in a horizontal direction.
- Reset Zoom**
Resets the chart zoom so that the whole chart contents are displayed within the confines of the chart pane.
- Toggle 3D-Attributes**
Toggles between standard 2D display and 3D perspective display mode.
- Export Chart {P,E}**
You can export the chart graphics and information in a variety of formats. Please refer to [Appendix G](#) for more information regarding this feature.

Detailed Statistics

The detailed statistics window below the chart mirrors the information contained in the Trade Statistics Table. As the chart focus is moved across the chart the detailed statistics window is updated to show detailed statistics for the security.

Advanced Chart control using the Left and Right Mouse Buttons

The left and right mouse buttons offer advanced control over the display of information in the security profit chart windowpane. The left mouse button supports horizontal zooming of a user-defined window, whilst the right mouse button supports horizontal panning of the chart pane. The operation of the buttons is described in more detail below.

Note: The security profit chart can only be panned and zoomed in the horizontal direction

❑ Horizontal Panning using the right mouse button function

When the mouse cursor is within the chart windowpane, clicking and holding down the right mouse button allows the chart to be panned in the horizontal direction by moving the mouse. This allows detailed viewing of any part of the chart without having to repeatedly click scroll bars.

❑ Horizontal Zooming using the left mouse button function

When the mouse cursor is within the chart windowpane, clicking and holding down the left mouse button and tracing out a rectangle on the chart—by moving the mouse pointer from left to right—will zoom the contents in the rectangular window to fit the chart pane horizontal extents when the left mouse button is released. Dragging the mouse cursor in the opposite direction will reset the chart axis.

Dynamic Cross Referencing {P,E}

TradeSim also provides dynamic object cross-referencing between the Security Profit Chart and Trade Statistics Table. This allows easy cross-referencing from the Security Profit Chart to the Trade Statistics Table and vice versa without having to manually search and cross-reference the information.

❑ Cross Referencing from the Security Profit Chart to the Trade Statistics Table

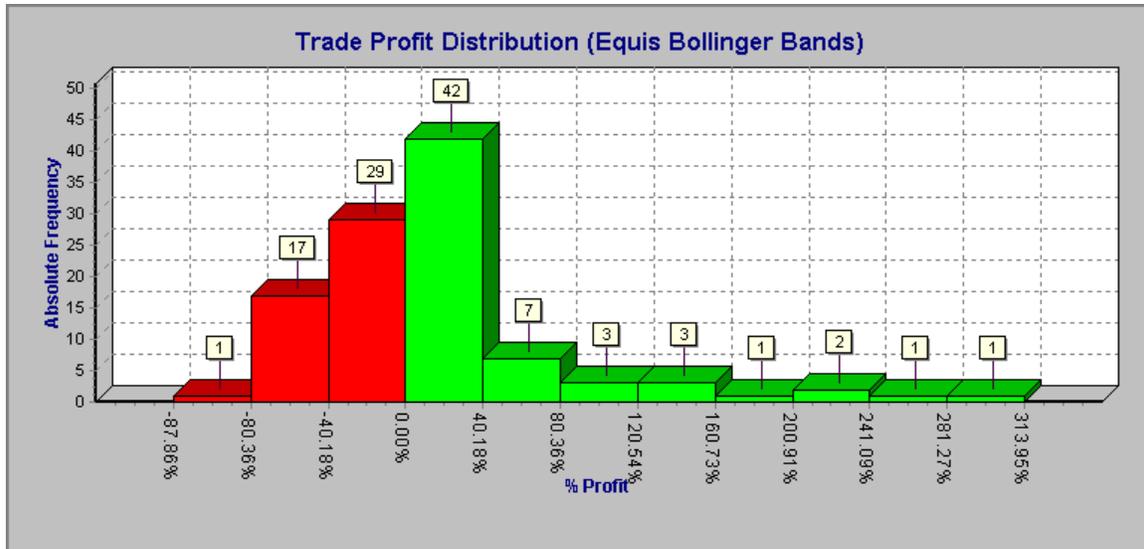
To cross-reference a point on the chart to the entry point in the Trade Statistics Table move the chart focus to the relevant point on the chart and then double click the left mouse button. The Trade Statistics Table tab will then be brought to the foreground with the relevant entry in the Trade Statistics Table highlighted. Note that the point on the chart will be marked with a green circular marker.

❑ Cross Referencing from the Trade Statistics Table to the Security Profit Chart

To cross-reference an entry in the Trade Statistics Table to a point on the chart first select the table entry by clicking the left mouse when the mouse cursor is over the relevant entry and then either double click the left mouse button on the table entry or right click the mouse button and select the appropriate option from the popup menu. The Security Profit Chart tab will then be brought to the foreground with the relevant point on the chart centered in the chart and a green marker added to the chart.

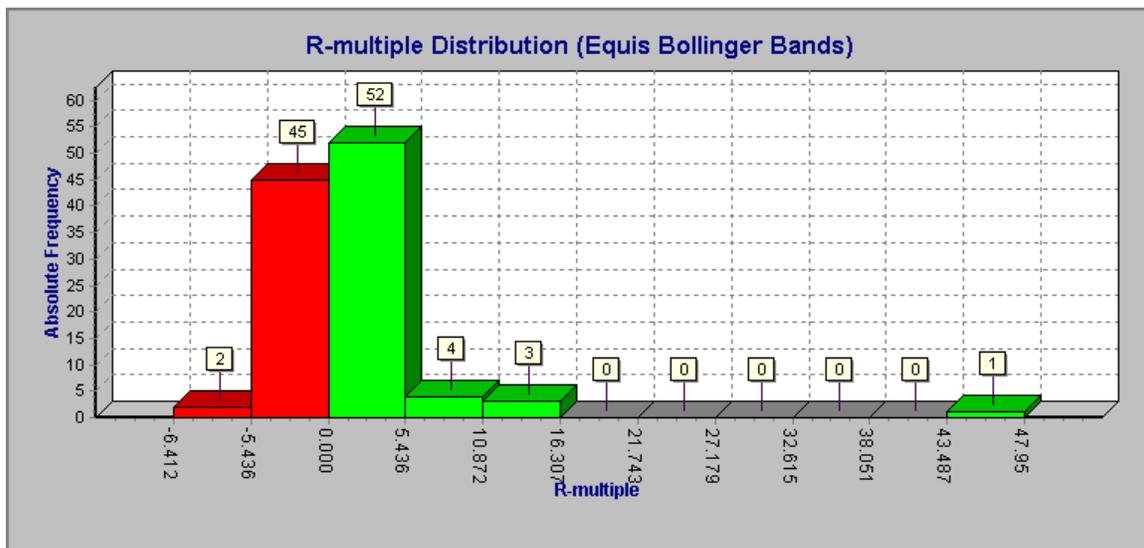
Trade Profit Distribution

Clicking on this tab reveals a Trade Profit Distribution Histogram or Distribution Chart. This chart displays the distribution of trade profits from the simulation. Note that profits are specified in terms of a percentage increase in profit rather than absolute dollar gain. This allows all trade profits to be normalized in terms of profit gain, which would not be possible if the absolute dollar profit gain was used.



R-multiple Distribution {P,E}

Clicking on this tab reveals an R-multiple Distribution Chart. This chart displays the distribution of trade R-multiples from the simulation.



Changing the Distribution Chart display defaults

Right clicking on any of the distribution charts will produce a popup menu like the one shown below.



□ Frequency Display

You can change the distribution chart display format by selecting the *Frequency Display* submenu item.



- **Absolute Frequency**
This option generates a distribution chart that displays the actual number of samples.
- **Relative Frequency**
This option generates a distribution chart that displays each distribution chart bar as a fraction of the total population size (total number of simulations).
- **Relative Frequency (%)**
This option generates a distribution chart that displays each distribution chart bar as a percentage of the total population size (total number of simulations).

□ Bars in Distribution chart



This submenu item controls the number of bars in the distribution chart display. If you have a relatively low number of trades then you will need to use a small number of bars in the distribution chart display otherwise the distribution chart display will look quite distorted. Alternatively if you carry out a simulation with a large number of trades then you might need to increase the number of bars displayed in order to improve the resolution of the distribution chart. By default 10 bars are used. The higher the number of trades used the more accurate the distribution.

Basket Testing

Selecting the **Basket Test** option from the simulation radio group on the Trade Parameters page will allow you to carry out a basket test of all of the securities that have been selected in the trade database. The basket test simulation option allows you to test all of the selected stocks in a trade database independently of one another thus allowing you to objectively compare the strengths and weaknesses of individual securities. When this type of simulation is run a **Trade Summary Table** is produced which provides a summary performance of each of the securities in the trade database. When running a basket test, profit pyramiding is automatically disabled and no charts are produced. On completion of a basket test a subset of the **Trade Simulation Report** and an optional **Trade Log** are produced.

The Trade Log Window

Every time a single trade simulation is carried out a Trade Log can be produced if the Enable/Disable Trade Log button on the main toolbar button has been activated. The Trade Log details information from a trade simulation on a trade-by-trade basis and displays this information in chronological order for later inspection and analysis. Alternatively the information can be sorted by any other criterion. The Trade Log is analogous to records which would be kept when paper trading. A snapshot of the Trade Log window is shown below. Note that not all of the columns are visible.

The trade records that have a yellow background represent the point at which a trade position was entered. The other records, which have a white background, represent trade positions where a trade position has exited. Green text on a white background represents profitable trades whilst red text on a white background represents a trade loss. This is irrespective of whether the trade was on the long or short side. Black text on a white background represents breakeven trades. By default the trades are organized in the correct chronological ordering. That is, they are ordered the same way the trades would have been executed in a real trading scenario. The list can be resorted by other criteria, however the index number assigned to each trade record is a reminder of the correct ordering sequence. That is, if a record index is greater than

another record index then the record with the greater index will always have taken place after the record with a smaller index.

In...	Trade	ID	Symbol	Status	Pos	Trans Date	Level	Days	Initial Stop	Price	Actual Price	Slippage	Stc
0	1	0	SGS	Enter	Long	10/02/1992	0	-	\$0.3091	\$0.3960	\$0.3860	\$0.0000	
1	2	0	ETR	Enter	Long	03/08/1992	0	-	\$0.1849	\$0.2860	\$0.2860	\$0.0000	
2	3	0	GDP	Enter	Long	05/11/1992	0	-	\$0.1931	\$0.3190	\$0.3190	\$0.0000	
3	4	0	HFY	Enter	Long	03/12/1992	0	-	\$0.2306	\$0.3070	\$0.3070	\$0.0000	
4	5	0	GPD	Enter	Long	14/01/1993	0	-	\$0.3274	\$0.4484	\$0.4484	\$0.0000	
5	3	0	GDP	Exit	Long	03/03/1993	0	118	\$0.1931	\$0.6950	\$0.6950	\$0.0000	
6	4	0	HFY	Exit	Long	16/03/1993	0	103	\$0.2306	\$0.4460	\$0.4460	\$0.0000	
7	6	0	SBC	Enter	Long	07/04/1993	0	-	\$0.7889	\$0.8300	\$0.8300	\$0.0000	
8	7	0	ION	Enter	Long	24/09/1993	0	-	\$1.2360	\$1.7000	\$1.7000	\$0.0000	
9	2	0	ETR	Exit	Long	27/09/1993	0	420	\$0.1849	\$0.9810	\$0.9810	\$0.0000	
10	8	0	HFY	Enter	Long	01/10/1993	0	-	\$0.5425	\$0.7070	\$0.7070	\$0.0000	
11	6	0	SBC	Exit	Long	21/10/1993	0	197	\$0.7889	\$2.8000	\$2.8000	\$0.0000	
12	9	0	ETR	Enter	Long	02/12/1993	0	-	\$0.6170	\$0.7770	\$0.7770	\$0.0000	
13	10	0	TEL	Enter	Long	09/12/1993	0	-	\$3.5367	\$3.7610	\$3.7610	\$0.0000	
14	11	0	SDH	Enter	Long	10/12/1993	0	-	\$1.0486	\$1.2220	\$1.2220	\$0.0000	
15	12	0	SFL	Enter	Long	16/12/1993	0	-	\$0.2798	\$0.3470	\$0.3470	\$0.0000	
16	11	0	SDH	Exit	Long	20/01/1994	0	41	\$1.0486	\$1.5120	\$1.5120	\$0.0000	
17	13	0	TGG	Enter	Long	11/03/1994	0	-	\$1.0973	\$1.2110	\$1.2110	\$0.0000	
18	7	0	ION	Exit	Long	11/03/1994	0	168	\$1.2360	\$2.5800	\$2.5800	\$0.0000	
19	14	0	KSM	Enter	Long	22/03/1994	0	-	\$0.2670	\$0.3290	\$0.3290	\$0.0000	
20	10	0	TEL	Exit	Long	22/03/1994	0	103	\$3.5367	\$4.5800	\$4.5800	\$0.0000	
21	15	0	SDH	Enter	Long	24/03/1994	0	-	\$1.1097	\$1.2490	\$1.2490	\$0.0000	
22	16	0	BDL	Enter	Long	30/03/1994	0	-	\$0.5927	\$0.6480	\$0.6480	\$0.0000	
23	17	0	HDR	Enter	Long	31/03/1994	0	-	\$0.1420	\$0.1779	\$0.1779	\$0.0000	
24	16	0	BDL	Exit	Long	03/08/1994	0	126	\$0.5927	\$0.6200	\$0.6200	\$0.0000	
25	31	0	APL	Enter	Long	05/08/1994	0	-	\$0.4102	\$0.4950	\$0.4950	\$0.0000	

Column description

Column: Index

This column represents a number that is assigned to each trade based on the order of the trading events. The index number assigned to each record always indicates the ordering of each trading event in the simulation. If a record index is greater than another record index then the record with the greater index will always have taken place after the record with a smaller index.

Column: Trade

This column represents the trade number for each trade record. This is the same number that is displayed in the **Trade** column of the trade database list and is used to identify each trade so that a trade record can be cross-referenced back to the trade database. For example you may have a trade that is producing rather abnormal profits or losses during a trade simulation. In this case you would like to run a simulation without the possibility of this particular trade being taken.

To do this just cross reference the trade number in the Trade Log of the offending trade back to the trade database and uncheck the corresponding trade in the trade database. The trade log has a number of additional features that simplify this task somewhat, which will be described in a later section.

Column: Sys ID

This column represents the System ID used to identify the trading system.

Column: Symbol

This column represents the symbol of the security.

Column: Status

This column represents the trade status during a trade transaction. It can be either Entry or Exit and determines whether the trade was entered or exited respectively. For every entry trade record a matching exit trade record will exist at a later date.

Column: Position

This column represents the trade position. It can be either **Long** or **Short** for trades taken on the long or short sides respectively.

Column: Periodicity

Refer to the description for the [Trade Database Manager](#).

Column: Trans Date-Time

This column represents that date at which the trade transaction took place. If the time stamp is non-zero then it will be displayed in 24 hours time format alongside the date in the form of HH:MM:TTT where HH represents hours(23-0), MM represents minutes(59-0) and TTT represents Ticks (999-0)

- ❑ **Column: Level**
This column represents the pyramid level of the trade. More information regarding trade pyramid strategies can be found from the following Application Note ⁷⁾.
- ❑ **Column: Pyramid Re-entry status**
This column represents the pyramid re-entry status of the trade. More information regarding trade pyramid strategies can be found from the following Application Note ⁷⁾.
- ❑ **Column: Days (in trade)**
This column, which was formally called Bars, represents the number of days in the trade. TradeSim uses the starting and ending dates of each trade to calculate the number of days between the entry and exit dates. It does not distinguish between trading and non-trading days.
- ❑ **Column: Initial Stop**
This column represents the optional initial stop value contained in the trade database and is the same data displayed in the **Initial Stop** column of the trade database. To enable protective stops when generating a trade database please refer to the section in the previous chapter [Using the Initial Stop as a Protective \(Money Management\) Stop](#) for more details on how to do this. A non-zero initial stop value means that you can use position size models that rely on the initial stop in order to calculate the position size for each trade.
- ❑ **Column: Price**
 - **Status = Trade Entry**
When a trade is entered this column represents the target entry price per security and is identical to the value contained in the **Entry Column** Trade Database for that trade.
 - **Status = Trade Exit**
This column represents the target exit price per security and is identical to the value contained in the **Exit Column** of the Trade Database for that trade.
- ❑ **Column: Actual Price {P,E}**
 - **Status = Trade Entry**
The actual entry price is the actual entry price per security. If no slippage is incurred on entry then the **Actual Entry Price** will be equal to the **Target Entry Price**.
 - **Status = Trade Exit**
The actual exit price is the actual price at which the trade was exited. If no slippage is incurred on exit then the **Actual Exit Price** will be equal to the **Target Exit Price**.
- ❑ **Column: Slippage {P,E}**
 - **Status = Trade Entry**
The slippage on entry represents the difference between the Target and Actual Entry Prices. Irrespective of whether a trade position is long or short a negative slippage value at entry will indicate that the trade was taken at a better price than the target entry price whilst a positive slippage value will indicate that the trade was taken at a worse price than the target entry price.
 - **Status = Trade Exit**
The slippage on exit represents the difference between the Target and Actual Exit Prices. Irrespective of whether a trade position is long or short a negative slippage value at exit will indicate that the trade was exited at a better price than the target exit price whilst a positive slippage value will indicate that the trade was exited at a worse price than the target exit price.
- ❑ **Column: Exit Status**
The exit status indicates the way a trade was closed, and is the same exit status shown for the corresponding trade in the Trade Database.
 - **Normal Exit**
This type of trade exit was caused when a normal Exit Trigger forced a trade exit.
 - **Delayed Exit**
This type of trade exit was caused when the **SetExitTriggerDelay** external function was used to set an exit delay in the **RecordTrades** function. See the section on the [The TradeSim Function Library](#) for more information.
 - **Open Trade**
This type of trade exit was caused when an internal mechanism in the RecordTrades function forced closure of an open trade.
 - **Stopped Out**
This type of trade exit was caused when the **EnableProtectiveStop** external function was used to force the InitialStop to be used as a protective stop in the **RecordTrades** function. See the section on the [The TradeSim Function Library](#) for more information.

- **Time Stop**

This type of trade exit was caused when the *SetTimeStop* external function was used to force a trade to exit after a certain number of bars have occurred. See the section on the [The TradeSim Function Library](#) for more information.

- **Column: Trade Capital**

This column represents the total trading capital at the time of trade entry. This value represents the total value of the trading capital pool irrespective of whether any capital has already been allocated to pending trades. For example if your initial capital is \$50,000 and you have already allocated \$10,000 to two existing trade positions then your trade capital is still \$50,000 not \$40,000. If profit compounding is disabled, then when you exit an existing trade with a loss your trade capital will decrease by the same amount lost; however if you exit with a profit then the trade capital will always be maintained at a level equal to the Initial Capital level and any excess will be stored in a cash reserve.

If profit compounding is enabled, then the trade capital will increase as you exit trade positions with a net trade profit and will decrease when you exit trade positions with a net trade loss.

- **Column: Initial Risk (\$) {P,E}**

For the risk based position size models the entry in this column represent the amount of capital risked on entry to each trade otherwise *N/A* will be displayed indicating that the value is not applicable to the position size model used. For trade exit conditions the value displayed is identical to the value on trade entry.

Note: Even though the initial stop value may be present in the trade database, the portfolio heat and trade risk only have relevance when a protective stop is used to exit a trade if the initial stop has been violated. To enable protective stops when generating a trade database please refer to the section in the previous chapter on [Using the Initial Stop as a Protective \(Money Management\) Stop](#)

- **Column: Initial Risk (%) {P,E}**

For the risk based position size models the entry in this column represents the amount of capital risked as a fraction of the total trading capital on entry to each trade. If a non-risk based position size model has been selected then *N/A* will be displayed indicating that the value is not applicable to the position size model used. For trade exit conditions a dash is displayed indicating that the value is not relevant.

Note: Even though the initial stop value may be present in the trade database, the portfolio heat and trade risk only have relevance when a protective stop is used to exit a trade if the initial stop has been violated. To enable protective stops when generating a trade database please refer to the section in the previous chapter on [Using the Initial Stop as a Protective \(Money Management\) Stop](#)

- **Column: Heat (\$) {P,E}**

For the risk based position size models the Portfolio Heat value is a running total in dollars of the total risk exposure at any time a trade is entered or exited. The Portfolio Heat follows from Ed Seykota's definition of Portfolio Heat, which is a measure of the total risk of a portfolio at any given time. As trades are entered the portfolio heat increases, as there is more risk exposure. When trades are exited the portfolio heat decreases, as there is less risk exposure.

Note: Even though the initial stop value may be present in the trade database, the portfolio heat and trade risk only have relevance when a protective stop is used to exit a trade if the initial stop has been violated. To enable protective stops when generating a trade database please refer to the section in the previous chapter on [Using the Initial Stop as a Protective \(Money Management\) Stop](#)

If a non-risk based position size model has been selected then *N/A* will be displayed indicating that the value is not applicable to the position size model used.

❑ **Column: Heat (%) {P,E}**

For the risk based position size models the Portfolio Heat value is a running total of the risk exposure as a percentage of the total capital at any time a trade is entered or exited. The Portfolio Heat follows from Ed Seykota's definition of Portfolio Heat, which is a measure of the total risk of a portfolio at any given time. As trades are entered the portfolio heat increases, as there is more risk exposure. When trades are exited the portfolio heat decreases, as there is less risk exposure.

Note: Even though the initial stop value may be present in the trade database, the portfolio heat and trade risk only have relevance when a protective stop is used to exit a trade if the initial stop has been violated. To enable protective stops when generating a trade database please refer to the section in the previous chapter on [Using the Initial Stop as a Protective \(Money Management\) Stop](#) for more details on how to do this.

If a non-risk based position size model has been selected then *N/A* will be displayed indicating that the value is not applicable to the position size model used.

❑ **Column: Position Size**

This column entry represents the number of securities purchased.

❑ **Column: Position Value**

This column entry represents the position value for the trade. It is calculated by multiplying the *Position Size* by the *Target Entry Price*. This value does not include the transaction costs.

❑ **Column: PS Status Flags**

This column represents the PS (position size) status for the trade. The PS status specifies whether or not the position size has been recalculated according to additional trading rules that control the position size.

○ **Normal**

The position size is calculated according to the rules of the position size model such that no limiting or resizing of the position size has taken place.

If position size limiting has occurred then the PS status will be displayed as a combination of any of the following flags:-

○ **S**

An 'S' flag will be added to the PS status when the position size has been limited to an amount according to the Trade Volume Limit parameters in the Trade Preferences tab.

○ **P**

If the *Enable Partial Trades* option is selected in the *Trade Preferences* tab then a trade whose position value exceeds the available trading capital or a trade whose position size exceeds the available volume will be resized and a 'P' flag will be added to the PS status.

○ **V**

A 'V' flag will be added to the PS status when the position value has been limited to an amount according to the *Position Size Limit* parameter in the Trade Parameters window. Note that position size limiting only has an effect when the risk based position size models are used.

○ **R**

An 'R' flag will be added to the PS status when the *Round Lot Size* parameter in the *Trade Preferences* tab is greater than 1 and the position size has been rounded down to the nearest lot size boundary.

○ **L**

An 'L' flag will be added to the PS status when the position size has exceeded an amount specified by the *Maximum Position Size Limit* parameter in the Trade Preferences tab.

❑ **Column: Trans Cost {P,E}**

This column entry indicates the cost of the transaction for both the trade entry and exit records.

❑ **Column: Total Trans Cost {P,E}**

This column entry displays a running total of the transaction costs.

❑ **Column: Trade Interest {P,E}**

This column entry indicates the trade interest if relevant. A positive value (appended with 'D') means that interest is deducted from the trading account and a negative value (appended with 'C') means that interest is credited to the account.

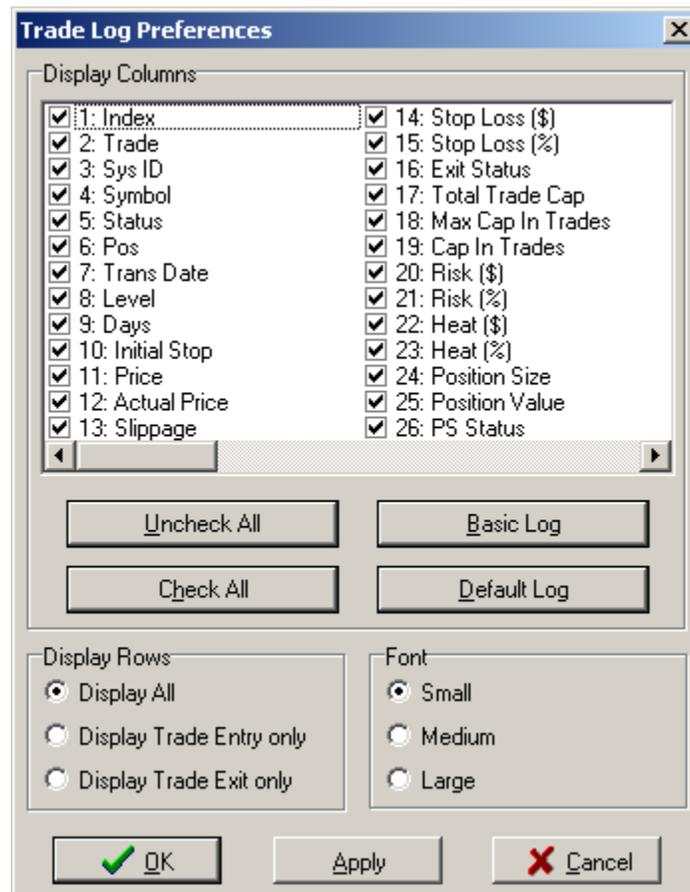
- ❑ **Column: Total Trade Interest {P,E}**
This column entry displays a running total of all of the trade interest costs. A positive value means that there has been a net deduction from the trading account and a negative value means that there has been a net credit to the account.
- ❑ **Column: Capital In Trades**
This column entry displays the total capital allocated to all trades.
- ❑ **Column: R-multiple (Reward to Risk ratio) {P,E}**
For risk-based position-size models, this column entry displays the R-multiple—or Reward to Risk ratio—of the trade at entry.
- ❑ **Column: Profit Status**
This column entry displays the status of the profit at trade exit. The three possible values are **LOSS**, **BREAKEVEN** and **GAIN**. The trade exit records are also color-coded depending on the profit status.
- ❑ **Column: Gross Trade Profit**
This column entry displays the trade profit at trade exit before transaction costs have been deducted.
- ❑ **Column: Net Trade Profit (Formerly - Trade Profit)**
This column entry displays the trade profit at trade exit after both the entry and exit transaction costs have been deducted.
- ❑ **Column: Gross Trade Profit (%)**
This column entry displays the trade profit at exit as a percentage of the position size for the trade before transaction costs have been deducted.
- ❑ **Column: Net Total Profit (%) (Formerly - Trade Profit)**
This column entry displays the trade profit at exit as a percentage of the position size for the trade after both the entry and exit transaction costs have been deducted.
- ❑ **Column: Total Capital**
This column entry displays a running total of the total capital. The total capital is equal to the **Total Profit** plus the initial capital.
- ❑ **Column: % Drawdown {P,E}**
This column entry displays the current relative drawdown as a percentage of retracement in equity from the previous equity high.
- ❑ **Column: \$ Drawdown {P,E}**
This column entry displays the current relative drawdown as a retracement in equity from the previous equity high.
- ❑ **Column: Trade Rank**
This column entry displays the trade rank.
- ❑ **Column: Point Value (Commodities only)**
This column displays the actual Point Value used in the trade and is only valid for commodities otherwise 'N/A' is displayed.
- ❑ **Column: Initial Margin (Commodities only)**
This column displays the actual Initial Margin used in the trade and is only valid for commodities otherwise 'N/A' is displayed.
- ❑ **Column: Max Loss (Commodities only)**
This column displays the actual Maximum Loss used in the trade and is only valid for commodities otherwise 'N/A' is displayed.
- ❑ **Column: Margin Requirement**
This column displays the actual Margin Requirement used in the trade and is only valid for stocks otherwise 'N/A' is displayed.
- ❑ **Column: MAE**
This column represents the Maximum Adverse Excursion (MAE) of the trade in dollar terms.
- ❑ **Column: MAE (%)**
This column represents the Maximum Adverse Excursion (MAE) of the trade in percentage terms.
- ❑ **Column: MFE**
This column represents the Maximum Favorable Excursion (MFE) of the trade in dollar terms.
- ❑ **Column: MFE (%)**
This column represents the Maximum Favorable Excursion (MFE) of the trade in percentage terms.

Sorting the columns

Clicking on the column headers activates a sorting routine, which resorts the list according to the information contained in the respective column. For example clicking on the **Entry Price** header will sort the list in ascending (descending) based on the numeric value of the entry price. Likewise clicking on the **Symbol** will sort the list based on the alphabetical ordering of the symbol column. Alternately clicking on the same column will resort the list in the opposite direction, i.e., Z to A instead of A to Z. To reset the ordering of the list back to the default just sort the list by the trade index column.

The Trade Log Preferences

You can customize the trade log to only display the information you are interested in. This reduces the amount of screen clutter, particularly on lower-resolution screens that can only display a small part of the trade log at the one time. To do this click the right mouse button on the **Trade Log** window and select **Preferences** from the popup menu. The following dialogue box should appear.



□ Display Columns

You can control which columns in the Trade Log are displayed or hidden by checking and unchecking the appropriate column checkbox. Alternatively you can click on the default set-up buttons, which quickly set-up the Trade Log to display a preset column arrangement. The four preset options are described below.

- **Uncheck All**
Hides all columns.
- **Check All**
Displays all columns.
- **Basic Log {P,E}**
Displays only a minimal amount of information.

- **Default Log {P,E}**
Displays a typical amount of information.
- **Display Rows**
This radio group allows you to control which rows are displayed or hidden. By default both trade entry and exit are displayed; however if you are only interested in viewing the trade entry or trade exit entries then you can select the appropriate option.
- **Font**
This radio group determines the font used in the Trade Log.
 - **Small**
Uses “Small Font” size 7.
 - **Medium**
Uses “Arial” size 8.
 - **Large**
Uses “Arial” size 9.

Jump to Trade Entry/Exit

Clicking on this menu item jumps to the matching trade entry or exit condition and brings the trade log entry into focus. This can also be achieved by clicking on the ‘j’ key.

Select all trades in the Trade Database

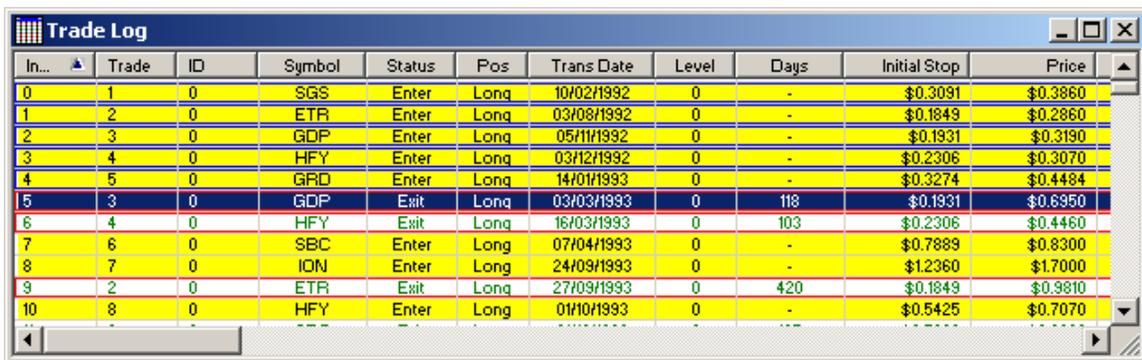
Clicking on this menu item selects all trades in the trade database manager that have been used in the current simulation and then brings the Trade Database Manager window to the foreground.

Locate in Trade Database

Clicking on this menu item locates and selects the corresponding trade in the trade database manager and then brings the Trade Database Manager window to the foreground.

Highlight all currently open trades

Highlights all currently open trades. To activate this feature right click on the trade of interest and select “Highlight all currently open trades” from the popup menu. All currently open trades that overlap the selected trade will be marked using rectangular markers. A blue rectangular border surrounding the trade indicates a trade entry condition whilst a red rectangular border surrounding the trade indicates a trade exit condition. Note that all trade entries will always match their trade exit and vice versa; however some marked open trades may not be visible unless the Trade Log is scrolled down or up. The marked trades are not permanently sticky, which means that the open trade markers will be reset as soon as you click on the Trade Log.



In...	Trade	ID	Symbol	Status	Pos	Trans Date	Level	Days	Initial Stop	Price
0	1	0	SGS	Enter	Long	10/02/1992	0	-	\$0.3091	\$0.3860
1	2	0	ETR	Enter	Long	03/08/1992	0	-	\$0.1849	\$0.2860
2	3	0	GDP	Enter	Long	05/11/1992	0	-	\$0.1931	\$0.3190
3	4	0	HFY	Enter	Long	03/12/1992	0	-	\$0.2306	\$0.3070
4	5	0	GRD	Enter	Long	14/01/1993	0	-	\$0.3274	\$0.4484
5	3	0	GDP	Exit	Long	03/03/1993	0	118	\$0.1931	\$0.6950
6	4	0	HFY	Exit	Long	16/03/1993	0	103	\$0.2306	\$0.4460
7	6	0	SBC	Enter	Long	07/04/1993	0	-	\$0.7889	\$0.8300
8	7	0	ION	Enter	Long	24/09/1993	0	-	\$1.2360	\$1.7000
9	2	0	ETR	Exit	Long	27/09/1993	0	420	\$0.1849	\$0.9810
10	8	0	HFY	Enter	Long	01/10/1993	0	-	\$0.5425	\$0.7070

Plot Open Trade Equity Chart

[Click here to see more information.](#)

Display Trade on Chart

[Click here to see more information.](#)

Exporting the Trade Log {P,E}

It is possible to export the data from the Trade Log in a variety of formats which include:-

- Hypertext Markup Language (*.html and .htm*) format
- Comma Separated Values file - long dates (.csv)

Note: In this instance dates are exported as decimal values, i.e., 20th-November-2000 is option below and the day and month are being transposed when importing into Excel®.

- Comma Separated Values file - formatted dates (.csv)

Note: In this instance dates are exported exactly as they appear in the trade database manager. You should use the long date format export option above if the day and month fields are being transposed when importing into Excel®.

To access this facility just right click on the Trade Log Window and select the **Export Trade Log** option from the popup menu. A file save dialogue box will appear asking you to select the appropriate file and file format. Select the appropriate file format from the **Save as Type:** drop-down menu and then select a file or use the optional filename given in the **File Name** field. You do not need to specify a file extension, as one will be automatically appended.

The Rejected Trades Window

Trade N...	Attempted Entry Date	Symbol	Trade rejected because...
1	10-02-92	SGS	Position value requested less than the minimum trade value
3	05-11-92	GDP	Position value requested less than the minimum trade value
8	01-10-93	HFY	Position value requested less than the minimum trade value
11	10-12-93	SDH	Position value requested less than the minimum trade value
14	22-03-94	KSM	Position value requested less than the minimum trade value
15	24-03-94	SDH	Position value requested less than the minimum trade value
23	17-06-94	FKP	Position value requested less than the minimum trade value
28	11-07-94	TOL	Insufficient capital to meet the position size requirements
29	12-07-94	HAH	Insufficient capital to meet the position size requirements
30	20-07-94	AHD	Position value requested less than the minimum trade value
31	05-08-94	ARL	Insufficient capital to meet the position size requirements
32	05-08-94	CRG	Insufficient capital to meet the position size requirements
33	23-08-94	USC	Position value requested less than the minimum trade value

When enabled during a simulation this window displays details about why a particular trade was rejected. It is enabled via the Main Toolbar or the Tools menu.



Click here on the Main Toolbar to enable the rejected trades report

The report displays information as to why an attempted trade was rejected. The report consists of four columns.

Column description

- ❑ **Trade Number**
This the trade number in the trade database manager.
- ❑ **Attempted Entry Date**
This column represents the date the trade was attempted.
- ❑ **Symbol**
The column represents the stock symbol.
- ❑ **Trade Rejected Because...**
This column gives a brief description as to why the trade was rejected.

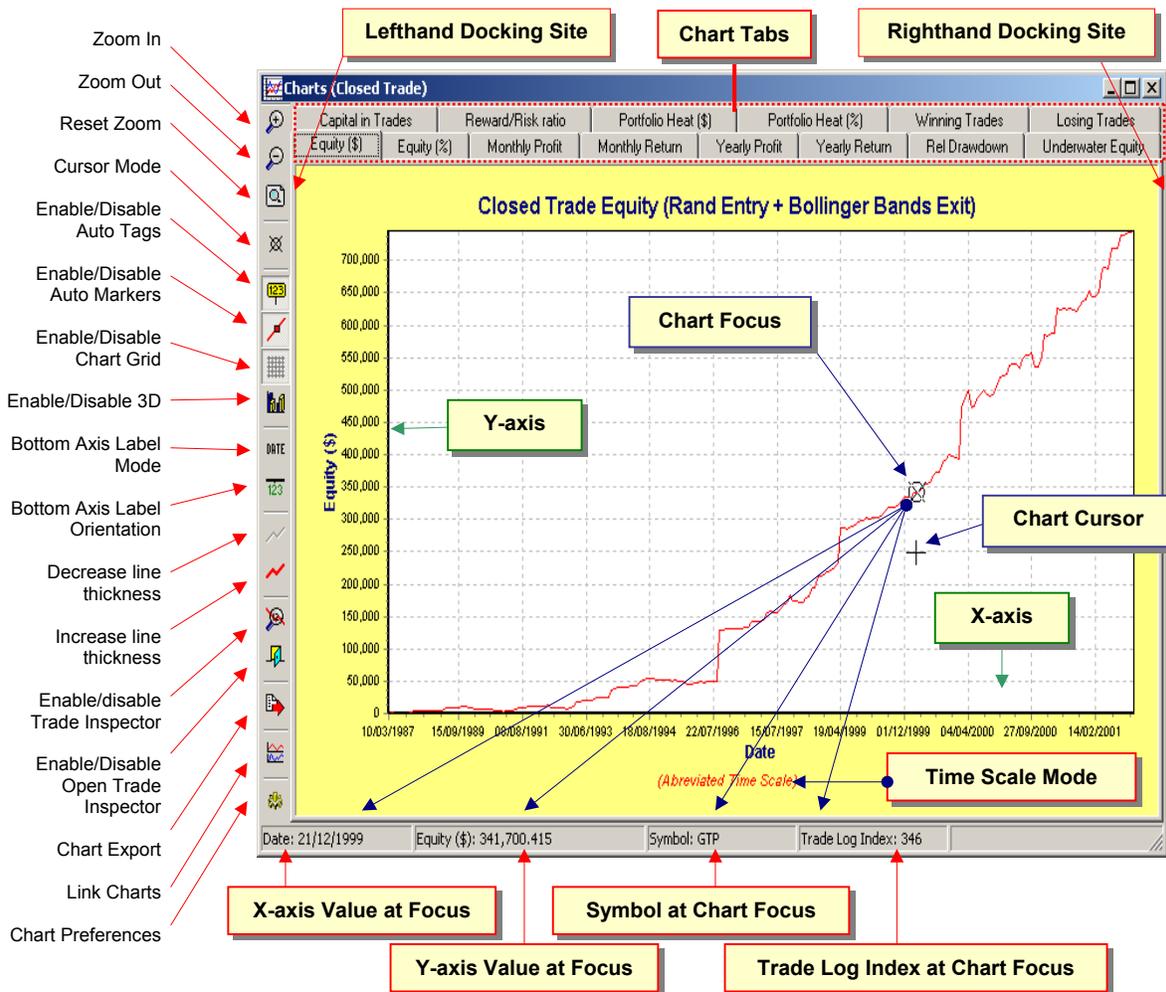
Column Description	Reason
“Market price requested above entry price”	When calculating the market price for limit orders the long trade is rejected when the Actual Entry Price is greater than the Limit Price, which is the entry price in the trade database. See the section Entry Order At Limit for more information on how limit orders are executed.
“Market price requested below entry price”	When calculating the market price for limit orders the short trade is rejected when the Actual Entry Price is lower than the Limit Price, which is the entry price in the trade database. See the section Entry Order At Limit for more information on how limit orders are executed.
“Position size requested is greater than limit”	The trade was rejected because the volume filter was enabled to reject trades if there was inadequate volume available.
“Insufficient capital to meet the position size requirements”	The trade was rejected because there was insufficient capital to meet the position size requirements.
“Risk is less than or equal to zero”	The trade was rejected because the risk was less than or equal to zero.
“Magnitude of risk is too small”	The trade was rejected because the risk was too small.
“Portfolio heat exceeded maximum limit”	The trade was rejected because the portfolio heat exceeded the maximum limit.
“Position size requested less than or equal to zero”	The trade was rejected because the Position size requested is less than or equal to zero.
“Position value requested less than the minimum trade value”	The trade was rejected because the position value requested is less than the Minimum Trade Value .

Dynamic Cross Referencing

To find out more details regarding any rejected trade you can easily cross reference the rejected trade to the trade database manager. To bring up the corresponding trade data information in the trade database manager just double click the left mouse button on the relevant entry in the “rejected trades window” and the “trade database manager” window will be brought to the foreground with the relevant trade entry highlighted.

The Charts Window

The Charts Window contains a number of charts that are plotted after the completion of a single trade simulation. Each chart can be viewed by clicking on the appropriate tab. Some charts may not be included depending on which Position Size model is chosen. For example, the R-multiple—or Reward/Risk—chart will not be present if a non-risk-based position-size model is used.



The Chart Focus

When the mouse cursor is moved over a chart a chart focus moves along the chart tracking the position of the mouse. The focus snaps onto the nearest point on the chart and the value of this point can be read below in the status bar as the date (trade number) and value of the actual focal point. The Trade Log Index is also displayed which corresponds to the Trade Log record with the same index value.

Note: For users of the Professional and Enterprise editions, double clicking on the actual chart point will jump to the corresponding record in the Trade Log provided that the Trade Log was enabled prior to the simulation.

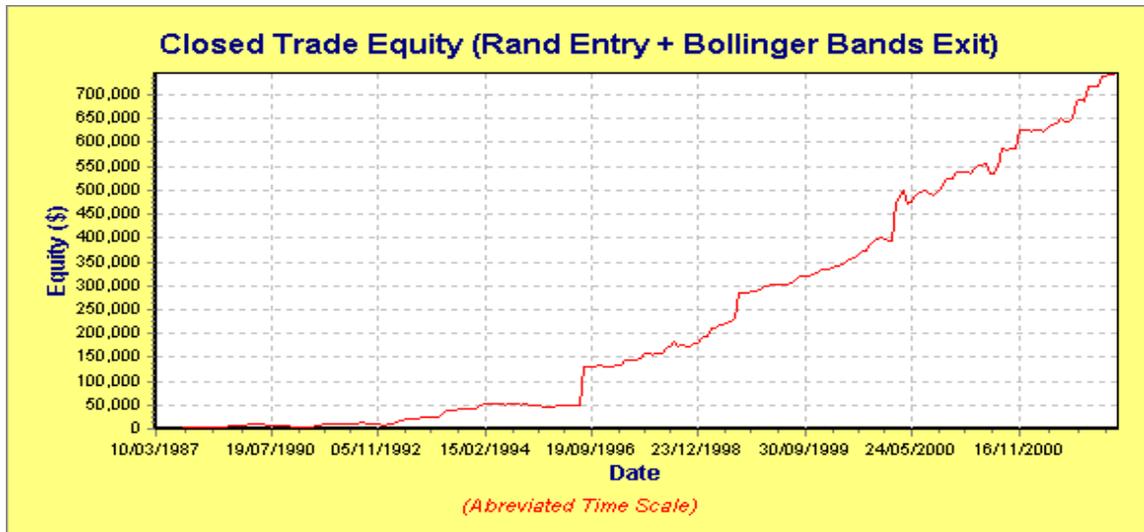
Changing the Chart Time Scale

Charts can be plotted with either of two time scales. These are the Compressed Time Scale and the Linear Time Scale. These two different time scale options control the way points are plotted on the chart. Both

options have their disadvantages and advantages regarding the way information can be displayed or extracted from the chart. For some charts that are time invariant—such as the monthly and yearly charts—the time scale makes no difference. The time scale can be changed from the “Closed Trade Charts” tab from the global preferences.

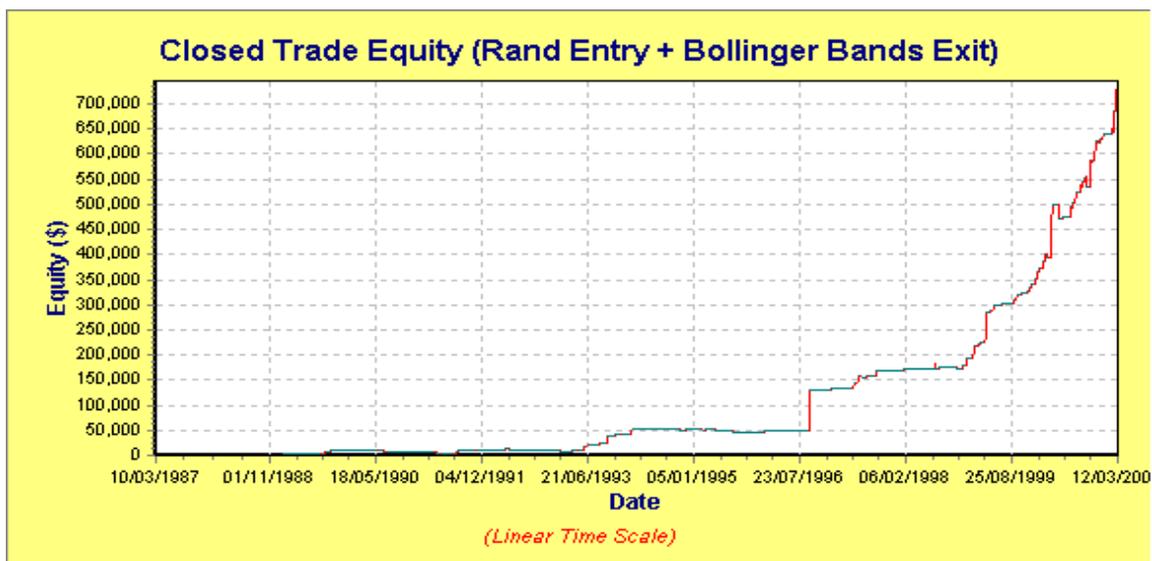
❑ Compressed Time Scale

In this mode every trade in the Trade Log is plotted on the chart as a separate point even if the dates of consecutive trades coincide with each other. Also the non-trading days between the trade entry point (if used) or trade exit points are not plotted. Because of this the time axis can be distorted. In this mode the Trade Inspector can be used to display the details of each trade.



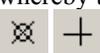
❑ Linear Time Scale

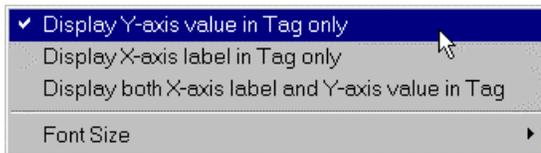
In this mode every trade in the Trade Log is plotted with a single point assigned to every date even if there is no trading activity on that day (weekends are always excluded from the plot). Points for which no trading activity exists are plotted with a dark green line. In this mode, because one point may represent the entry and exit points of many trades it is not possible to use the Trade Inspector to display the trade details. However the Open Trade Inspector can still be used to display all open trade information for each point on the chart.



The Charts Toolbar

The Charts window contains a toolbar that runs vertically along the left side of the window. These tools are used to control how the charts are displayed. In addition, the left and right mouse button each introduces two other features, which allow advanced panning and zooming of any part of the chart. First we will describe the basic function of each tool in the Charts toolbar.

-  **Zoom In**
 When this button is clicked the contents of the chart windowpane are zoomed in by a fixed amount.
-  **Zoom Out**
 When this button is clicked the contents of the chart windowpane are zoomed out by a fixed amount.
-  **Zoom All**
 When this button is clicked the contents of the chart windowpane are reset to their default state whereby the chart windowpane displays all of the chart points.
-  **Chart Cursor Mode**
 This buttons switches between a small round cross-haired cursor and a long cross-haired cursor.
-  **Toggle Auto Tags**
 This button enables and disables chart tags. When the chart tags are enabled (button down) and there is sufficient space to display the tags then a tag will be displayed at each point on the chart. Right clicking the mouse on this button will present a popup menu with a number of options.



- Display Y-axis value in Tag only**
 Displays the Y-axis value in the tag.
 - Display X-axis label in Tag only**
 Displays the X-axis label in the tag.
 - Display both X-axis label and Y-axis value in Tag**
 Displays both the X-axis label and Y-axis value in the tag.
 - Font Size**
 This submenu allows you to select from a small or normal size tag font. The default is normal size.
-  **Toggle Auto Markers**
 This button enables and disables chart markers. When the chart markers are enabled (button down) and there is sufficient space to display the markers then a marker will be displayed at each point on the chart.
 -  **Toggle Chart Grid**
 This button enables and disables the chart grid.
 -  **Toggle 3D-Attributes**
 When this button is clicked down all charts are displayed with 3D attributes.
 -  **Toggle Axis Mode**
 This button toggles between date and symbol labeling on the horizontal axis.
 -  **Increase line thickness**
 When this button is clicked the line thickness increases by one pixel. When the maximum line thickness of four pixels is reached, this button will be grayed out, so any attempt to increase the line

thickness above the maximum will have no effect. Note that changing the line thickness affects all line charts simultaneously; bar charts are unaffected.

- 
Decrease line thickness
 When the minimum line width of one pixel is achieved, this button will be grayed out, so any attempt to decrease the line thickness below the minimum will have no effect. Note that changing the line thickness affects all line charts simultaneously; bar charts are unaffected.

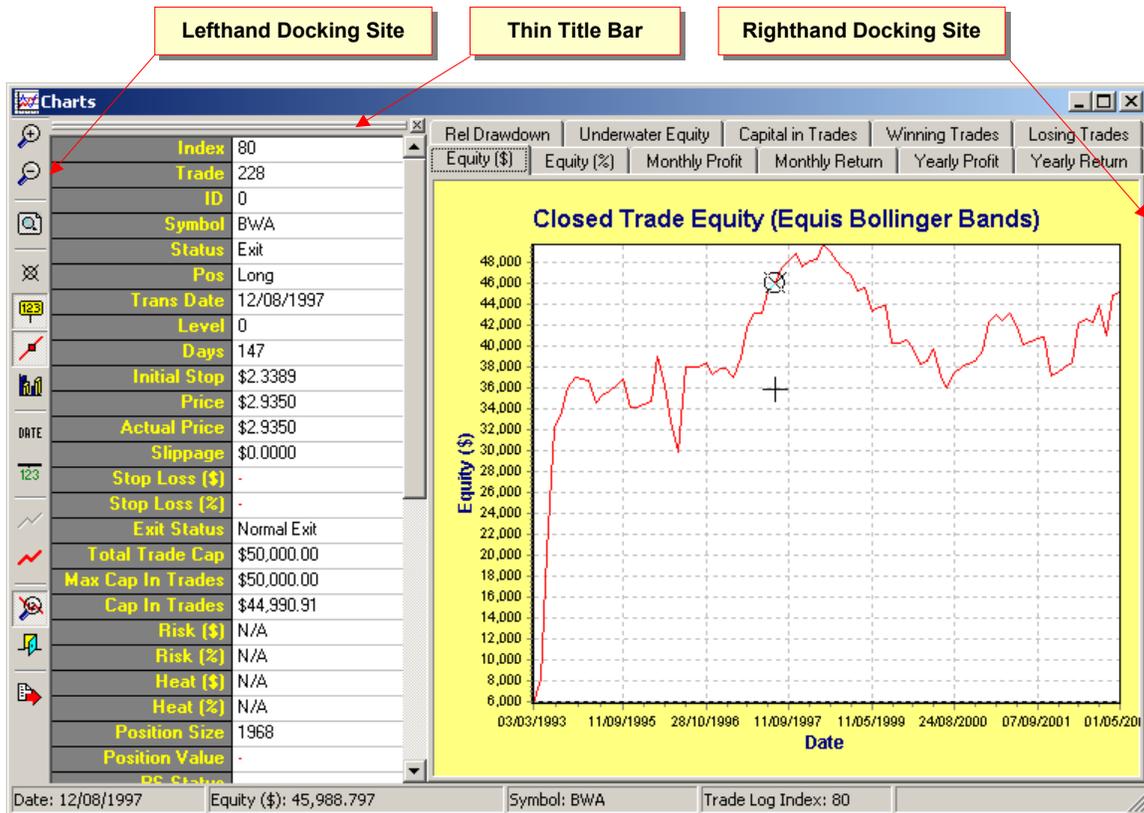
- 
Trade Inspector {P,E}
 This button enables and disables the Trade Inspector. If the Trade Log has been enabled during a simulation then this button will be enabled so that clicking on this button will enable and disable the Trade Inspector. The Trade Inspector is a separate floating window that contains a table that is a mirror of the corresponding entry in the Trade Log for each point on the chart so that detailed information can be viewed without having to jump between the charts and the Trade Log.

Trade Inspector	
Index	125
Trade	559
ID	0
Symbol	WMC
Status	Exit
Pos	Long
Trans Date	17/07/2000
Level	0
Days	129
Initial Stop	\$5.2313
Price	\$7.8100
Actual Price	\$7.8100
Slippage	\$0.0000
Stop Loss (\$)	-
Stop Loss (%)	-
Exit Status	Normal Exit
Total Trade Cap	\$50,000.00
Max Cap In Trades	\$50,000.00
Cap In Trades	\$39,995.56
Risk (\$)	N/A
Risk (%)	N/A
Heat (\$)	N/A
Heat (%)	N/A
Position Size	788
Position Value	-
PS Status	-
Trans Cost	\$0.00
Total Trans Cost	\$0.00
R-multiple	N/A
Profit Status	GAIN
Trade Profit	\$1,154.42
Trade Profit (%)	23.0890%
Total Profit	\$39,794.09
Total Profit (%)	79.59%
Total Capital	\$89,794.09
% Drawdown	0.0000%
\$ Drawdown	\$0.00
Rank	0.00
Point Value	N/A
Initial Margin	N/A
Max Loss	N/A
MAE	\$0.00
MAE (%)	-100.0000
MFE	\$0.00
MFE (%)	100.0000

The Trade Inspector is not available for charts that contain points or bars whose values are the combination of a number of trades such as the Monthly and Yearly Profit chart.

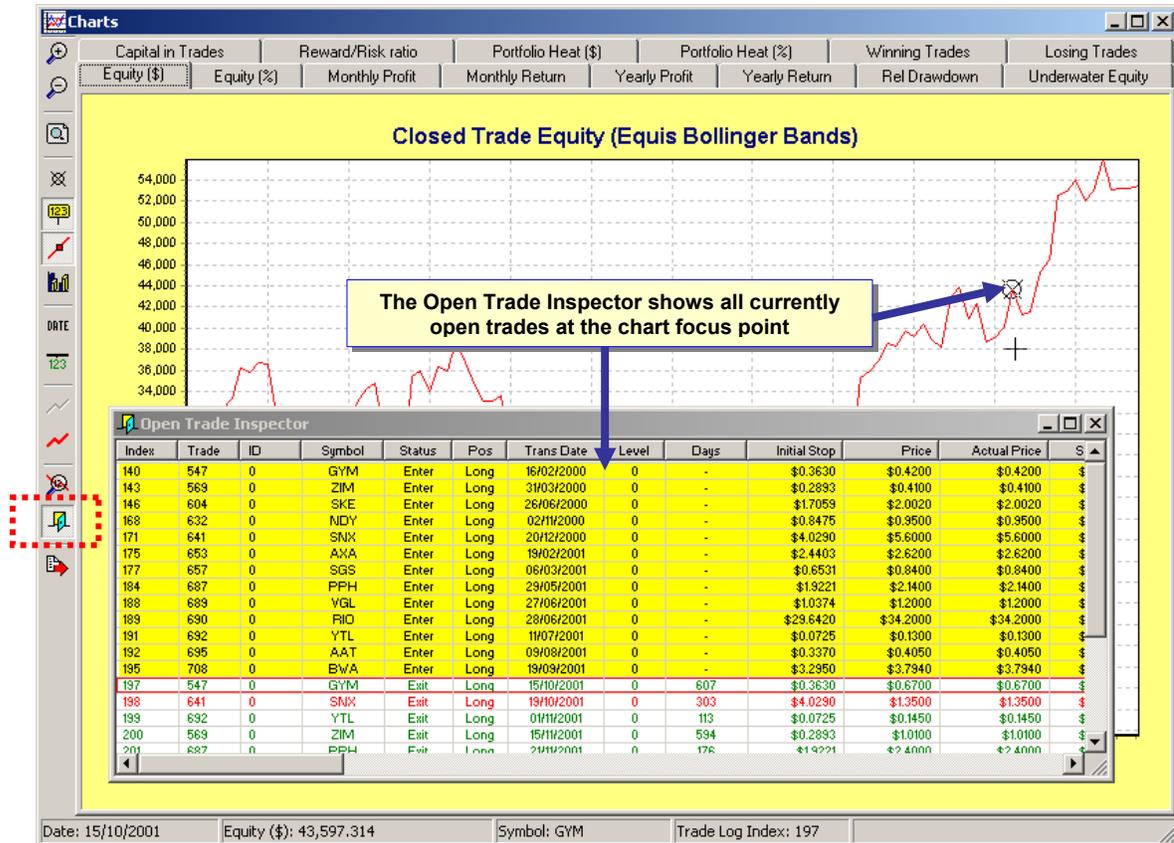
- **Docking and Undocking the Trade Inspector window**

The Trade Inspector window can be docked to the Chart Window by moving the Trade Inspector over the left or right hand docking sites and releasing the mouse button when the drag outline has locked into position. To undock the Trade Inspector so that is floating just drag the thin title bar at the top of the trade inspector whilst pressing the left mouse button and move the outline away from the docking point and release the mouse button so that the Trade Inspector window is now floating. Alternatively you can dock the Trade Inspector at the alternate docking site by undocking it and docking it at the alternate docking site.



-  **Open Trade Inspector {E}**

When clicked down displays the open trade inspector. The Open Trade Inspector shows all currently open trades at the chart focus point. A blue rectangular border surrounding the trade indicates an actual trade entry condition at the chart focus point whilst a red rectangular border surrounding the trade indicates an actual trade exit condition at the chart focus point. You can also enable the Trade Inspector at the same time as the Open Trade Inspector to give you details on the actual trade information at the chart focus point.



- 
Export Chart {P,E}
 You can export the chart graphics and information in a variety of formats. Please refer to [Appendix G](#) for more information regarding this feature.
- 
Linking Charts {E}
 This button brings up a drop-down menu (if appropriate) of available linkable charts. More information regarding linking charts can be found in the following section on [Linking Charts](#).
- 
Chart Preferences
 This button brings up the global preferences with the appropriate chart preferences tab selected. See [Chart Preferences](#) for more information.

Advanced Chart control using the Left and Right Mouse Buttons

The left and right mouse buttons offer advanced control over the display of information in the chart windowpane. The left mouse button supports zooming of a user-defined window. The right mouse button supports accurate panning of the chart pane. The operation of the buttons is described in more detail below.

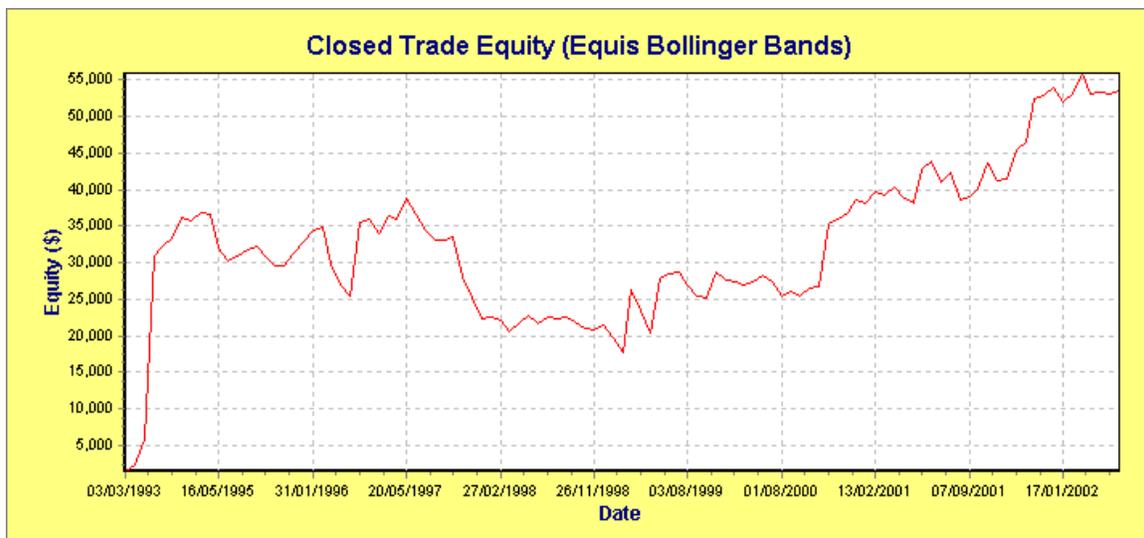
- Panning using the right mouse button function**
 When the mouse cursor is within the chart windowpane, clicking and holding down the right mouse button allows the chart to be panned by moving the mouse. This allows detailed viewing of any part of the chart without having to repeatedly click scroll bars.
- Zooming using the left mouse button function**
 When the mouse cursor is within the chart windowpane clicking and holding down the left mouse button and tracing out a rectangle on the chart by moving the mouse pointer downwards and to the right will zoom the contents in the rectangular window to fit the chart pane when the left mouse button is released. Dragging the mouse cursor in the opposite direction will reset the chart axis.

Chart Descriptions

Equity (\$) or (%) Charts

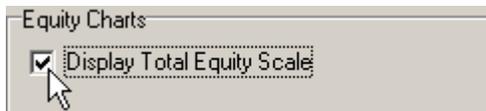
This chart displays the equity versus date (trade number). Compared to a single profit figure, the system's equity curve can provide additional insight into its performance. The equity curve plots the realized net profit per trade on a trade-by-trade basis. When inspecting this chart you should look for a fairly linear rising equity curve irrespective of time. A good trading system will generate a rising equity curve irrespective of market conditions. A trading system that produces an equity curve, which rises and falls above the zero line, should be avoided.

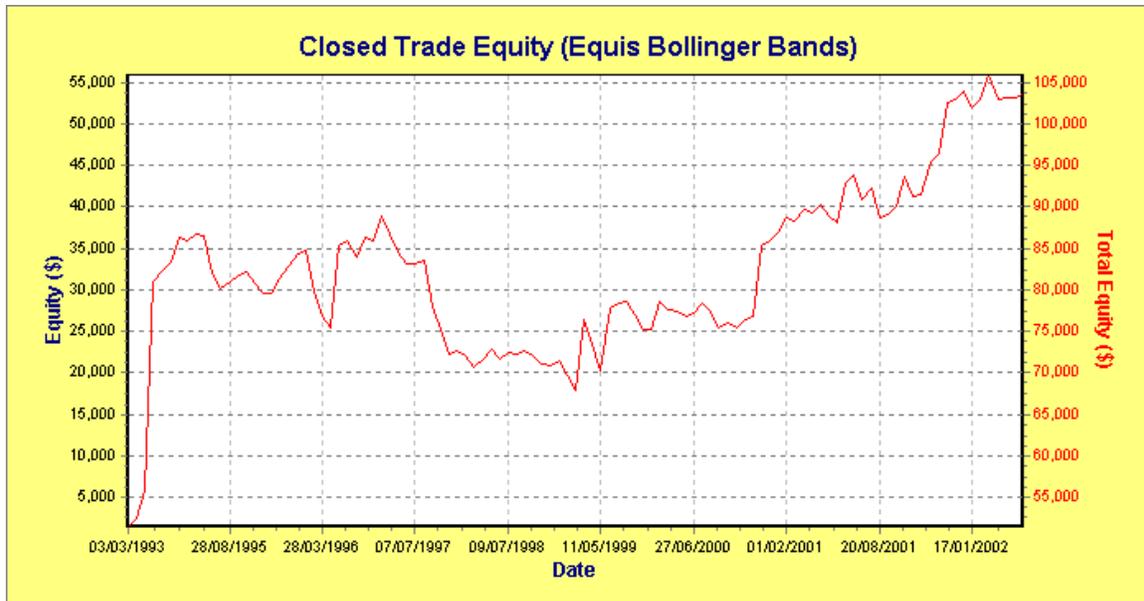
Note: The equity plots only include the time at which a trade or trades were exited and do not take into account any open profits/losses or any other days where no trading activity took place.



□ Total Equity Scale

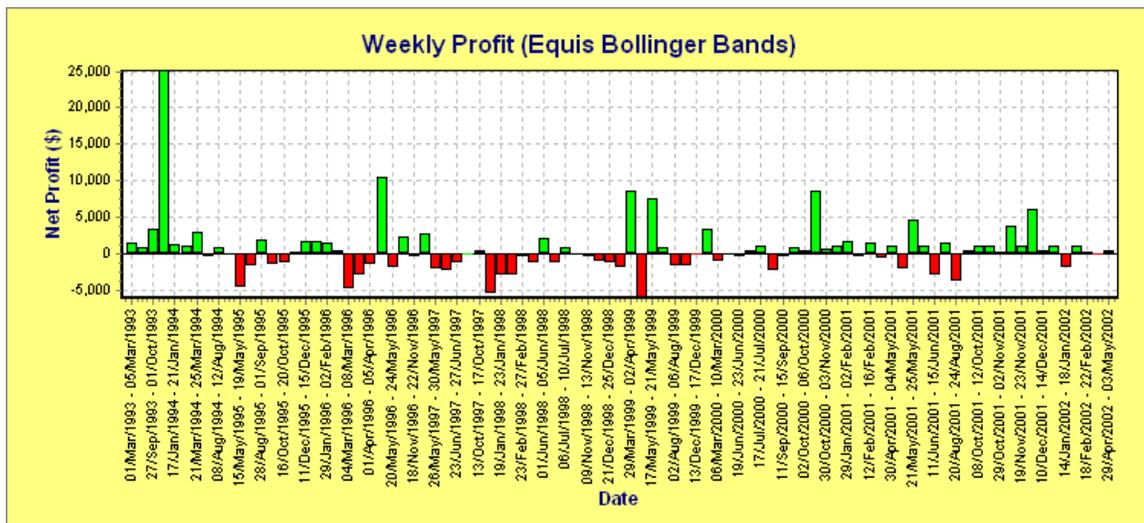
You can display the Total Equity Scale on the right-hand side of the 'Equity (\$)' chart and 'Equity (%)' chart. It is enabled from the global preferences dialog box. The Total Equity Scale incorporates the Initial Capital value.





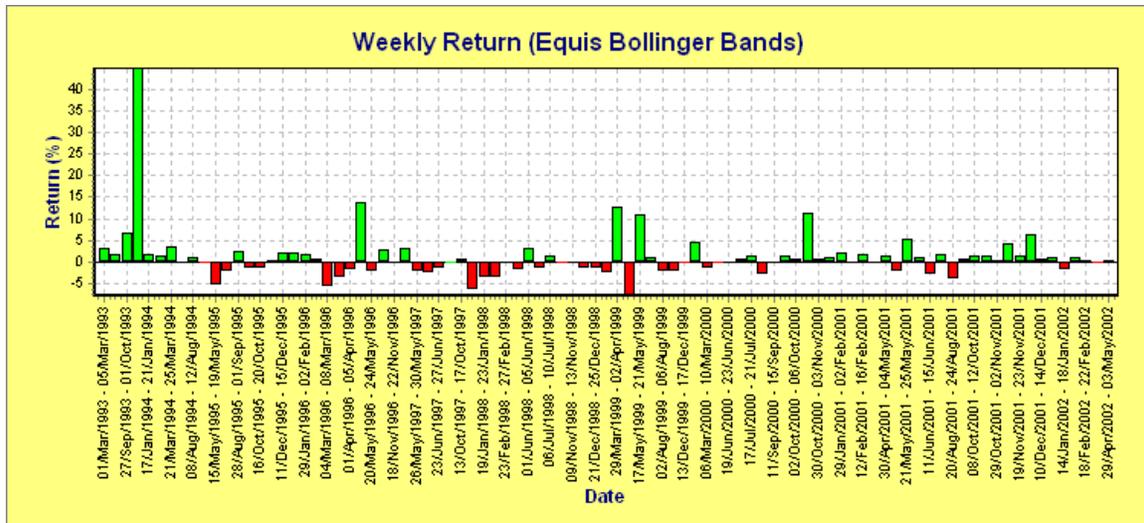
Weekly Profit ***

This chart displays the weekly profit versus week. Note that for simulations that ignore entry date, this chart is not produced. Green bars represent months that were profitable whereas red bars represent months that produced losses.



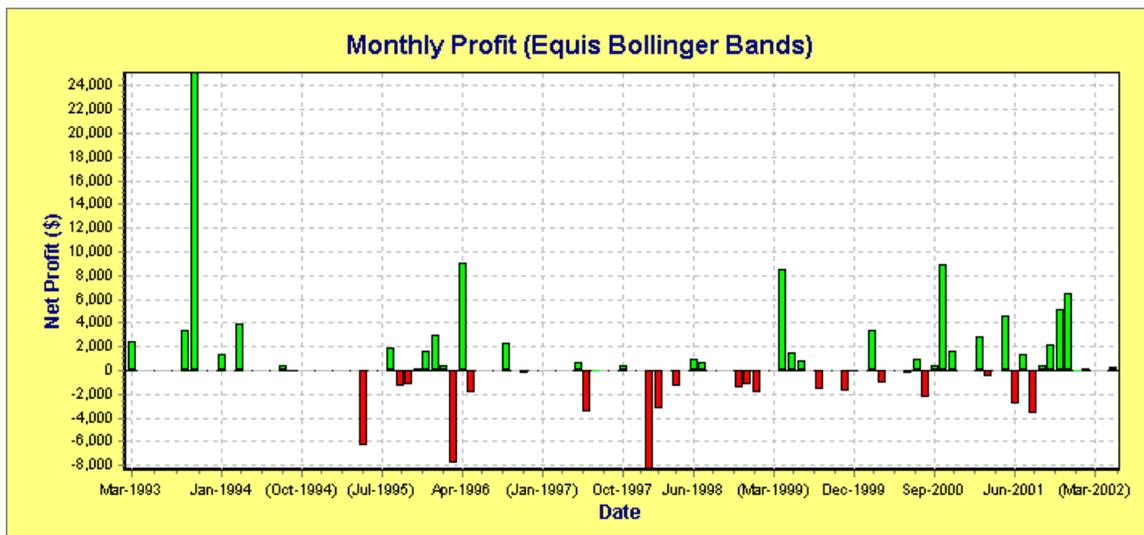
Weekly Return ***

The Weekly Return chart displays a cumulative profit return on a weekly-adjusted basis. Green bars represent months that were profitable whereas red bars represent months that produced losses.



Monthly Profit

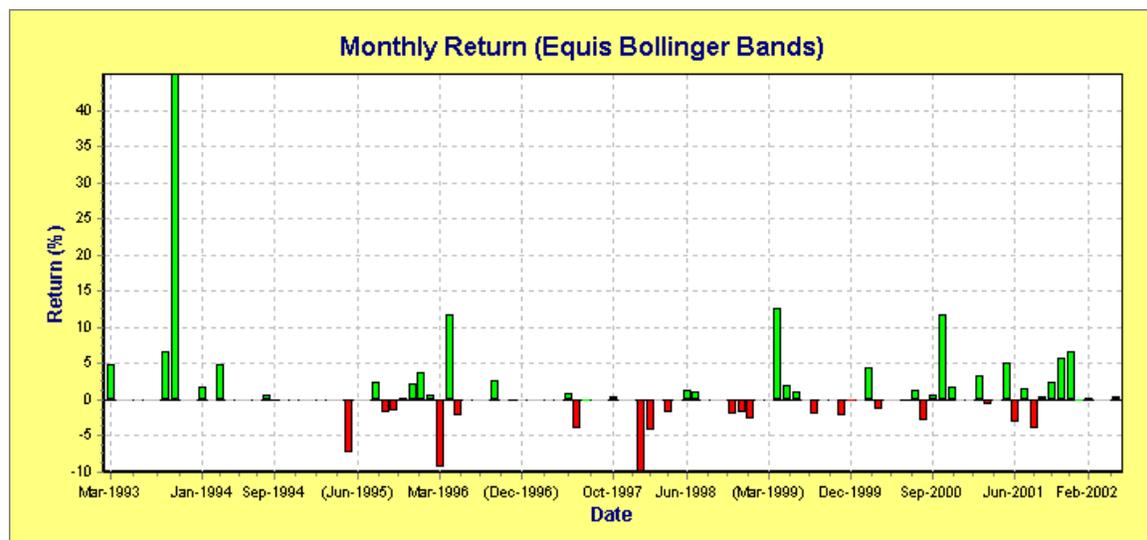
This chart displays the monthly profit versus month. Note that for simulations that ignore entry date, this chart is not produced. Green bars represent months that were profitable whereas red bars represent months that produced losses.



Monthly Return

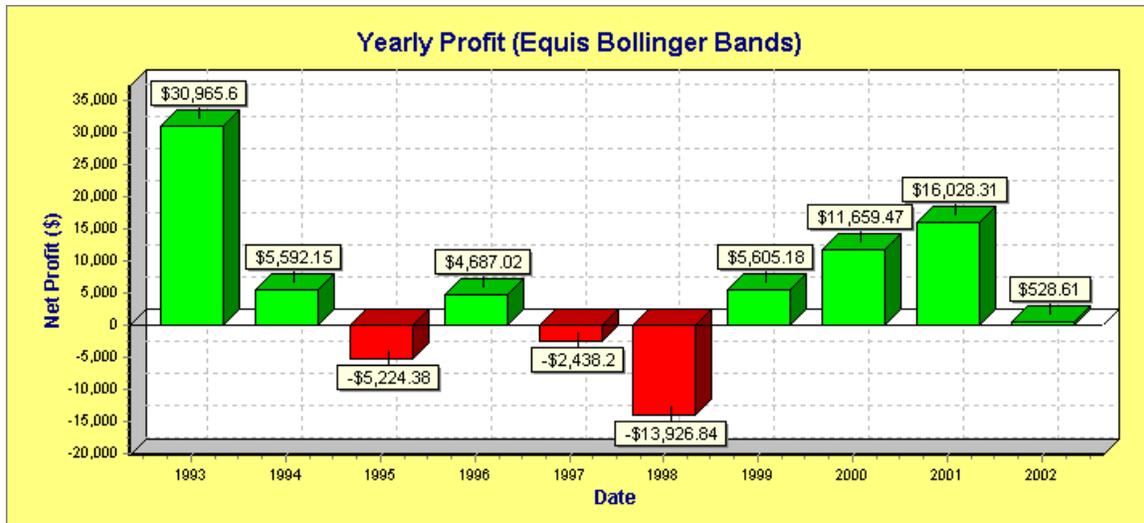
The Monthly Return chart displays a cumulative profit return on a monthly-adjusted basis. Green bars represent months that were profitable whereas red bars represent months that produced losses. Taking the monthly profit chart above, the monthly return values are calculated as follows for the first 7 months only.

Month	Monthly Profit	Cumulative Total	Monthly Return
March-1993	2402.75	2402.75	$2402.75/50000 = 4.8055\%$
April-1993	0	$0+2402.75 = 2402.75$	$0/(50000+2402.75) = 0\%$
May-1993	0	$0+2402.75 = 2402.75$	$0/(50000+2402.75) = 0\%$
June-1993	0	$0+2402.75 = 2402.75$	$0/(50000+2402.75) = 0\%$
July-1993	0	$0+2402.75 = 2402.75$	$0/(50000+2402.75) = 0\%$
Aug-1993	0	$0+2402.75 = 2402.75$	$0/(50000+2402.75) = 0\%$
Sep-1993	3437.47	$3437.47+2402.75 = 5840.22$	$3437.47/(50000+2402.75) = 6.5597\%$



Yearly Profit

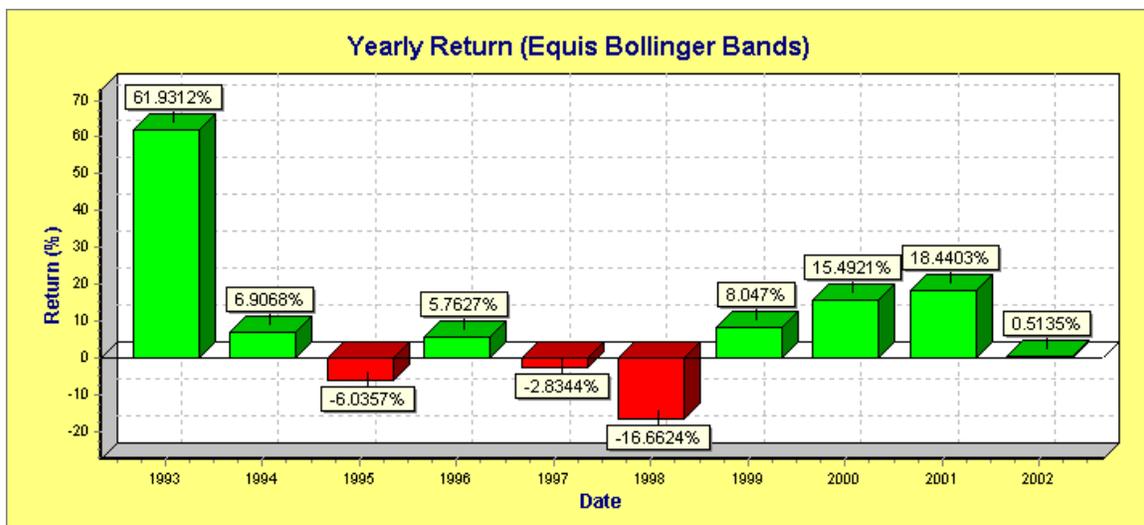
This chart displays the yearly profit versus year. Note that for simulations that ignore entry date, this chart is not produced. Green bars represent years that were profitable whereas red bars represent years that produced losses.



Yearly Return

The Yearly Return chart displays a cumulative profit return on a yearly-adjusted basis. Taking the yearly profit chart above, the yearly return values are calculated as follows for the first four years only.

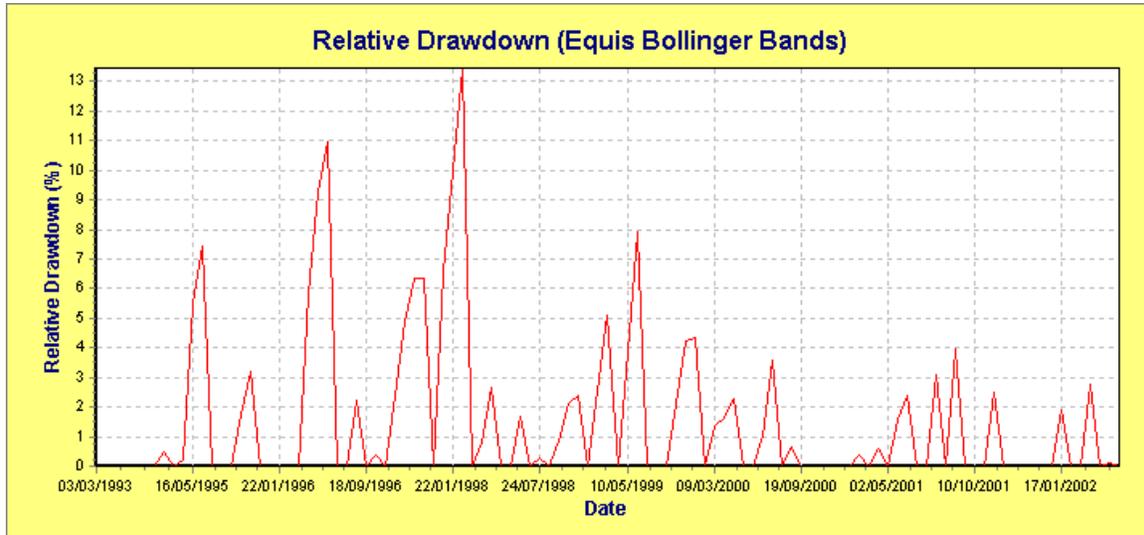
Year	Yearly Profit	Cumulative Total	Yearly Return
1993	30965.5	30965.5	$30965.5/50000 = 61.9312\%$
1994	5592.15	$5592.15+30965.5 = 36557.75$	$5592.15/(50000+30965.5) = 6.9068\%$
1995	-5224.38	$-5224.38+36557.75 = 31333.37$	$-5224.38/(50000+31333.37) = -6.0357\%$
1996	4687.02	$4687.02+31333.37 = 36020.39$	$4687.02/(50000+31333.37) = 5.7627\%$



Relative Drawdown Chart {P,E}

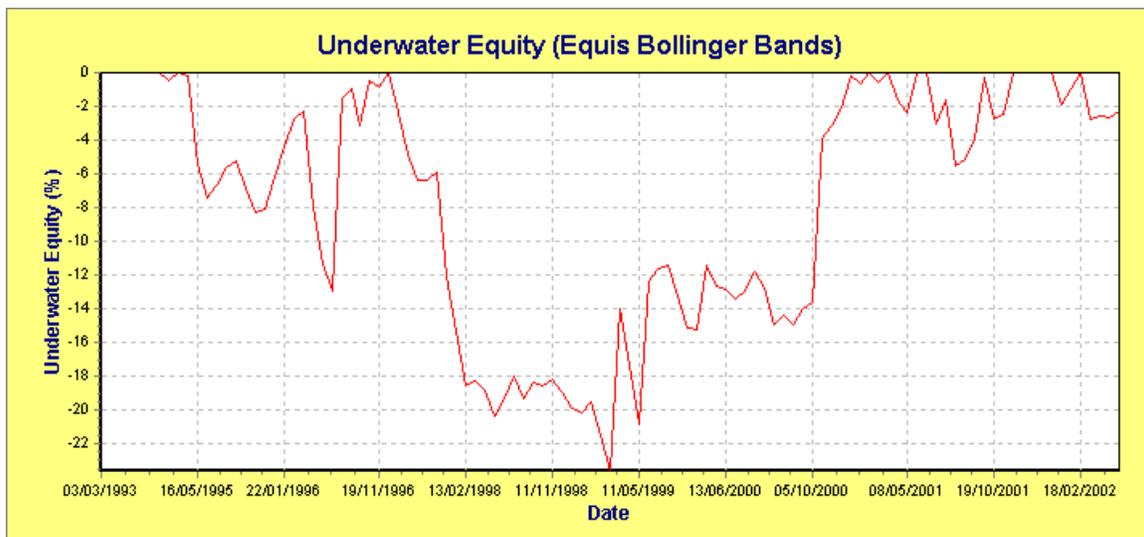
This chart displays the drawdown versus date (trade number). Drawdowns are retracements in equity from previous equity highs - in short, losing periods. [Relative Drawdown is described in more detail by clicking here](#). Ideally we would like to have no drawdown in equity but in reality this is part and parcel of trading. There will always be periods where traders experience a string of losses that outweigh any recent gains, thus producing a drawdown in equity. In the chart below there are various drawdown periods, with the

maximum drawdown being about 12%. This means that during the course of trading, the equity experienced a 12% decline in value. The main implication of drawdown is the psychological effect that this will have on the trader. A large string of losses may cause the trader to abandon his trading system in search of another system, which may even have a worse drawdown performance.



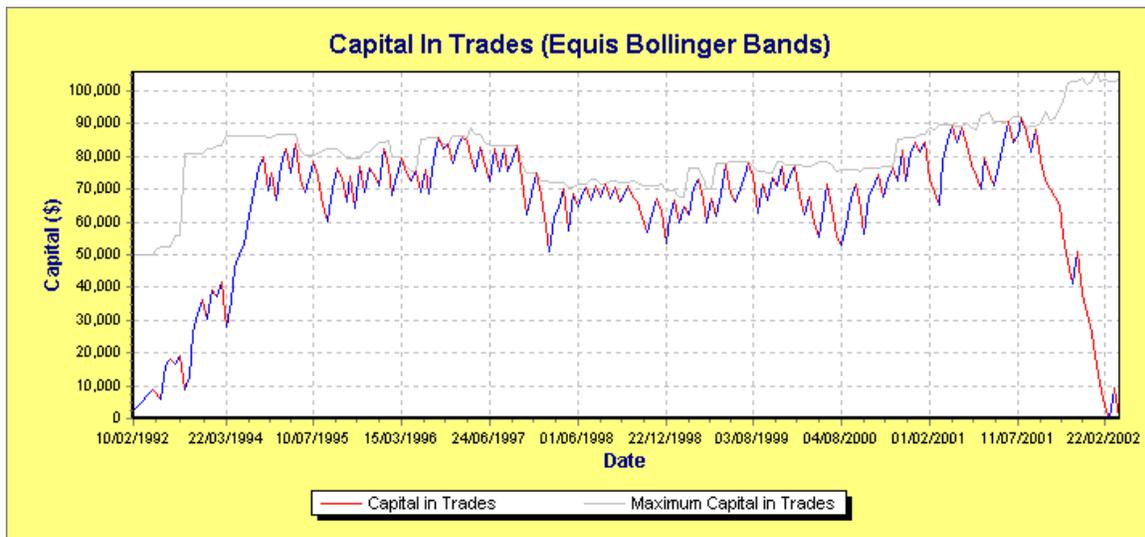
Underwater Equity {P,E}

The Underwater Equity curve displays the retracement of equity between equity peaks. The negative curve between equity peaks represents the percentage retracement from the previous high. A new high value must exceed the previous high in which case the underwater equity curve resets back to zero.



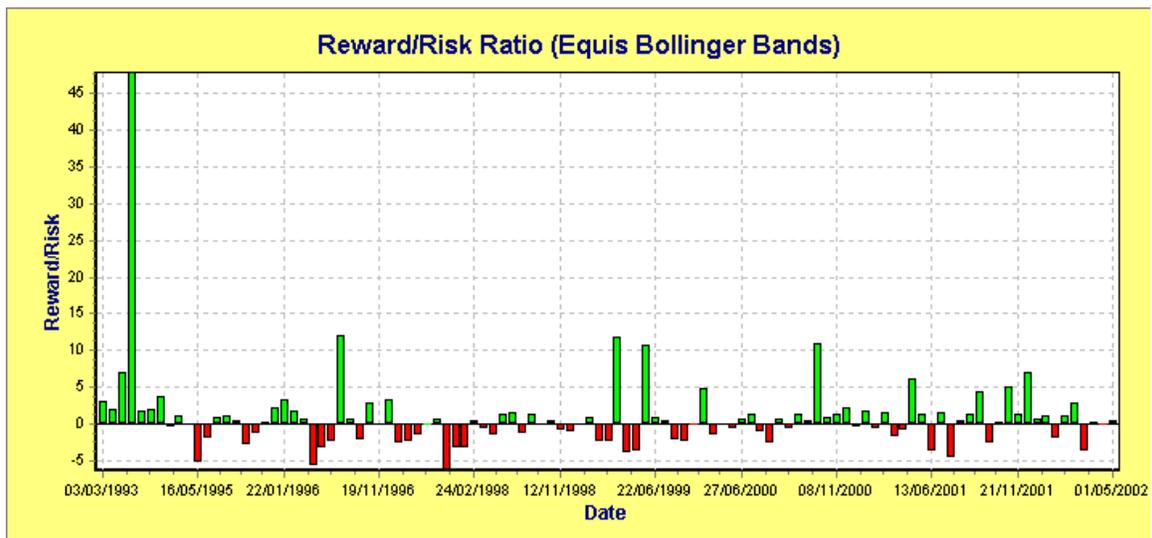
Capital In Trades Chart {P,E}

This chart displays the total capital in trades for all of the current trade positions versus date (trade number). Note that when *Pyramid Profit* is disabled the graph should never go above the *Initial Capital* line. A red line segment in the chart indicates a trade entry condition whilst a blue line indicates a trade exit condition. Also plotted on the same chart in a light grey color is the Maximum Trade Capital envelope according to the *Portfolio Limit* parameter. This represents the maximum allowable capital in trades and no point on the chart should exceed the envelope.



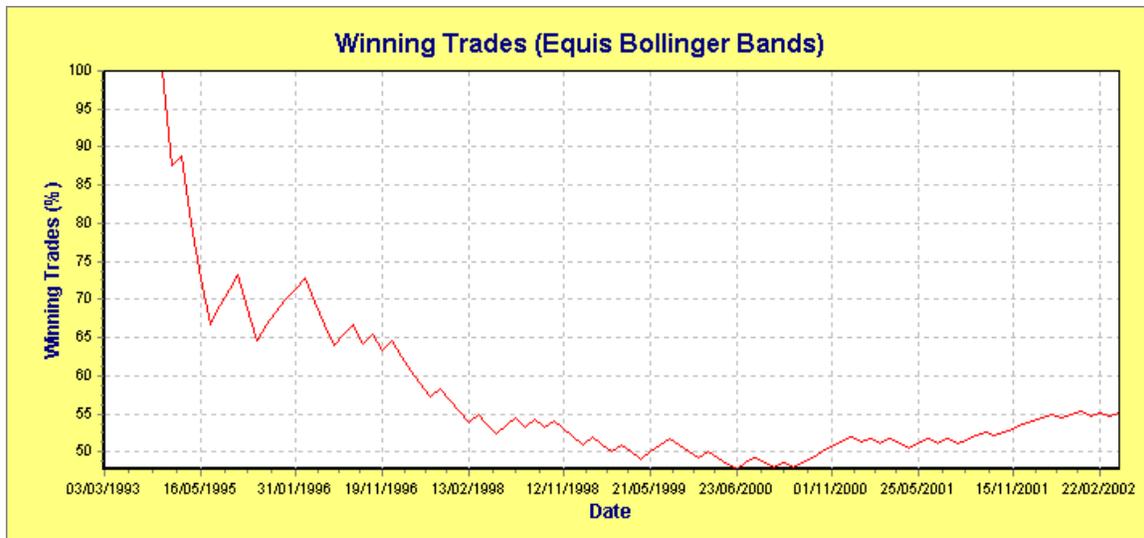
Reward/Risk Ratio Chart {P,E}

For risk-based position size models a Reward/Risk or R-multiple chart will be produced. This chart displays the Reward/Risk ratio for each trade. A positive R-multiple value will be displayed as a blue bar whilst a negative R-multiple value will be displayed as a red bar.



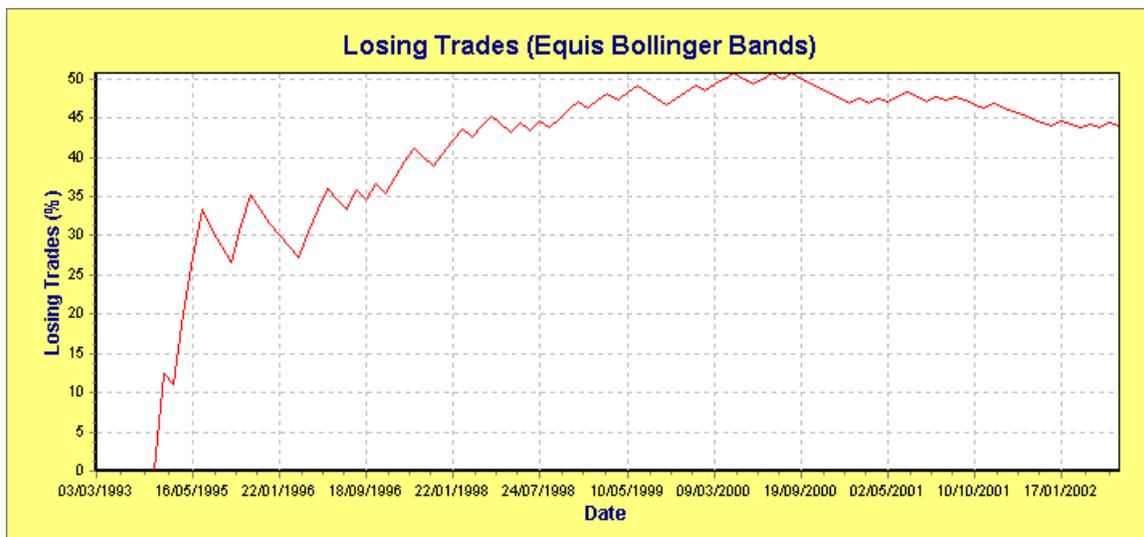
Winning Trades Chart {P,E}

The Winning Trades Chart represents the running percentage of winning trades on a trade-by-trade basis. Typically this chart will converge to a stable value after a significant number of trades.



Losing Trades Chart {P,E}

The Losing Trades Chart represents the running percentage of losing trades on a trade-by-trade basis. Typically this chart will converge to a stable value after a relatively large number of trades.



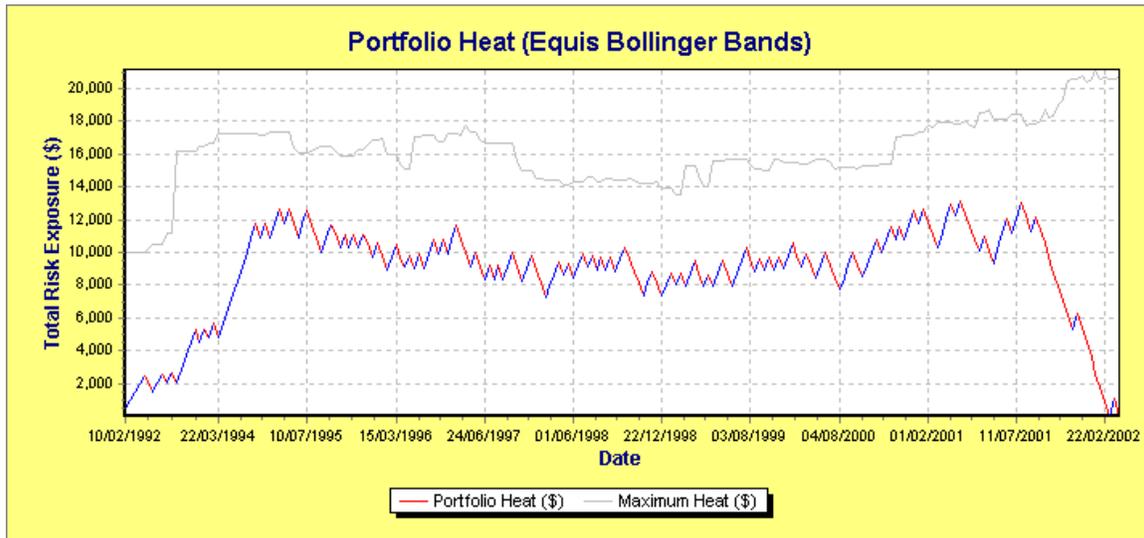
Portfolio Heat Charts {P,E}

The Portfolio Heat follows from Ed Seykota's definition of Portfolio Heat, which is a measure of the total risk of a portfolio at any given time. As trades are entered the portfolio heat increases, as there is more risk exposure. When trades are exited the portfolio heat decreases, as there is less risk exposure.

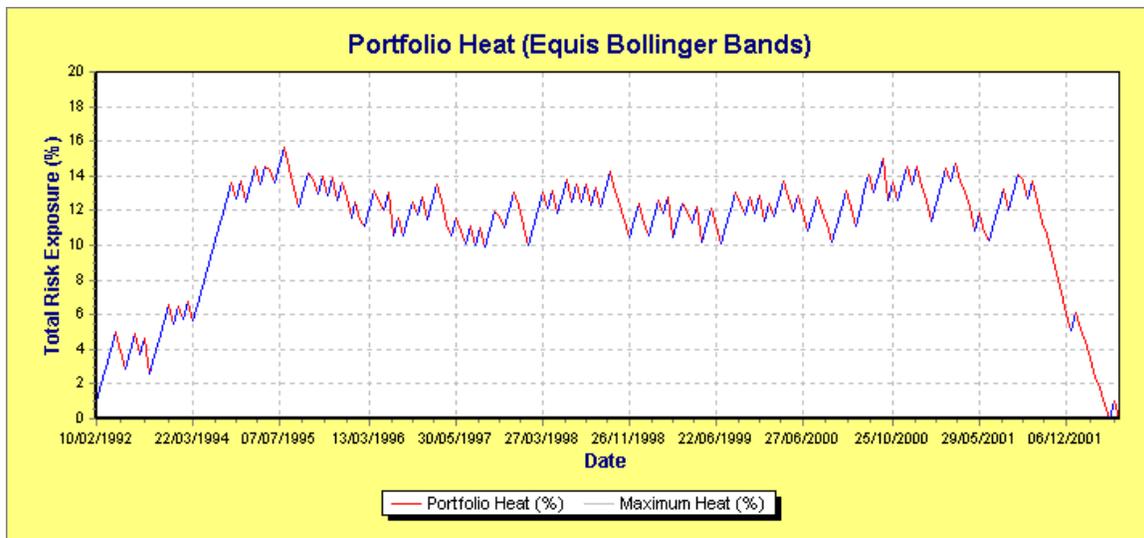
The Chart of Portfolio Heat (\$) plots the Total Risk Exposure in Dollars versus entry/exit date (trade number). When trades are entered the chart is plotted in red signifying an increase in the risk and hence an increase in 'heat'. When trades are exited the chart is plotted in blue signifying a reduction in risk and hence 'cooling off'. Also plotted in a light grey color on the same chart is the Portfolio Heat Limit Envelope, which is the maximum portfolio heat allowable according to the *Portfolio Heat Limit* parameter.

Note: Even though the initial stop value may be present in the trade database, the portfolio heat and trade risk only have relevance when a protective stop is used to exit a trade if the initial stop has been violated. To enable protective stops when generating a

trade database please refer to the section in the previous chapter on [Using the Initial Stop as a Protective \(Money Management\) Stop](#) for more details on how to do this.

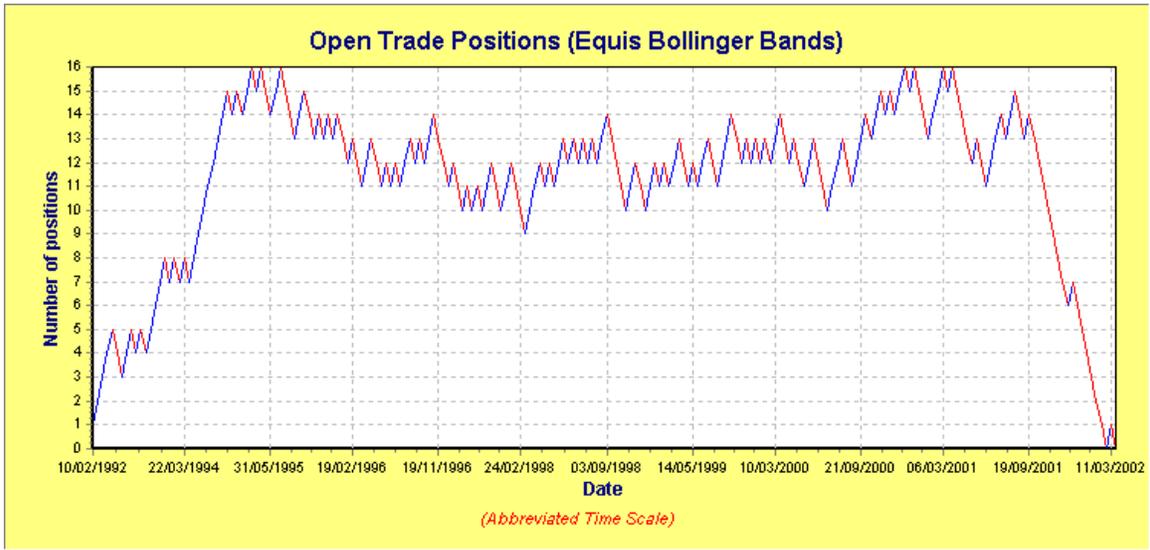


The Chart of Portfolio Heat (%) plots the Total Risk Exposure as a fraction of the total trade capital versus the entry/exit date (trade number). When trades are entered the chart is plotted in red signifying an increase in the risk and hence an increase in ‘heat’. When trades are exited the chart is plotted in blue signifying a reduction in risk and hence ‘cooling off’. Also plotted in a light grey color on the same chart is the Portfolio Heat Limit Envelope, which is the maximum portfolio heat allowable according to the Portfolio Heat Limit parameter.



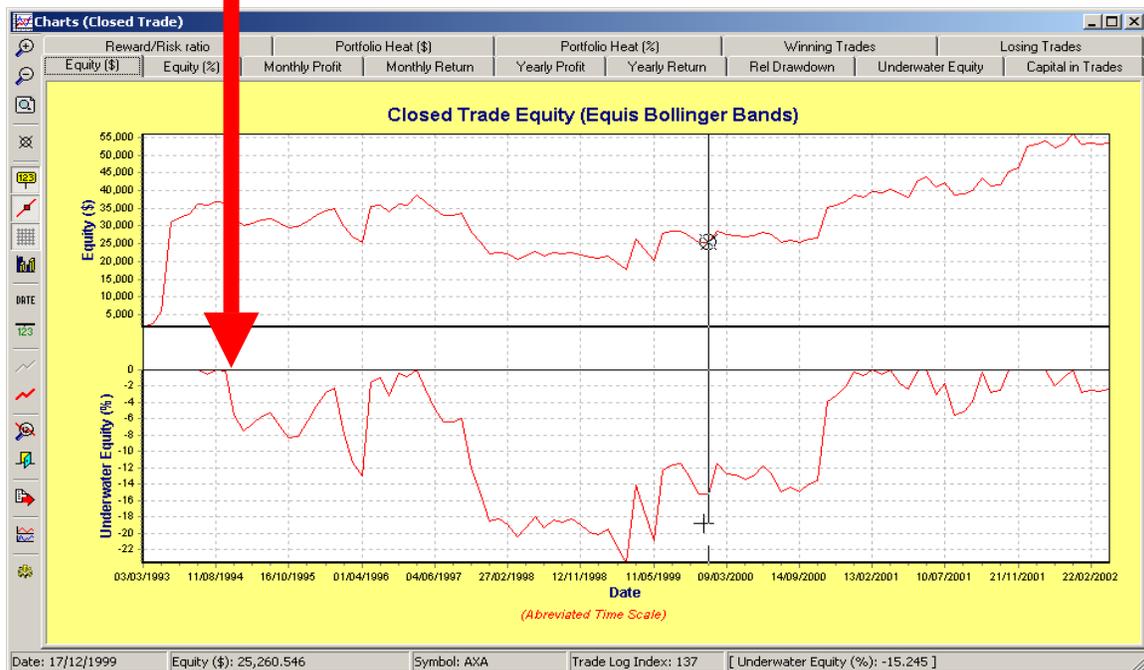
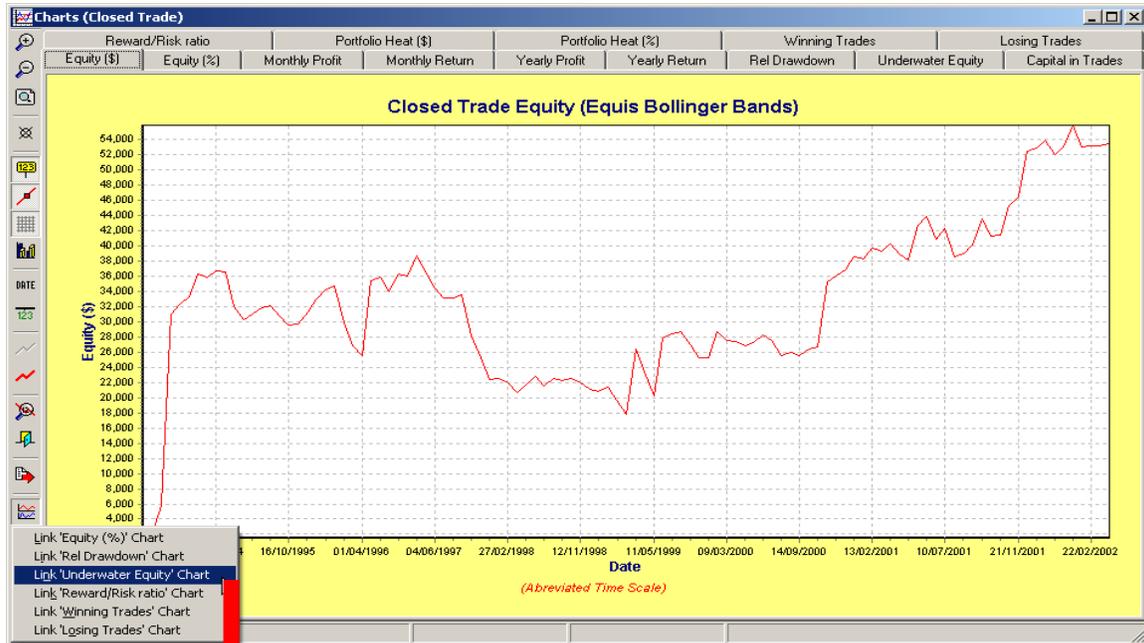
Open Trade Positions {P,E}

This chart displays the number of currently open trade positions at any one time. A blue line indicates an entry into a trade, which results in an increase in the number of open positions. A red line indicates an exit from a trade, which results in a decrease in the number of open positions.

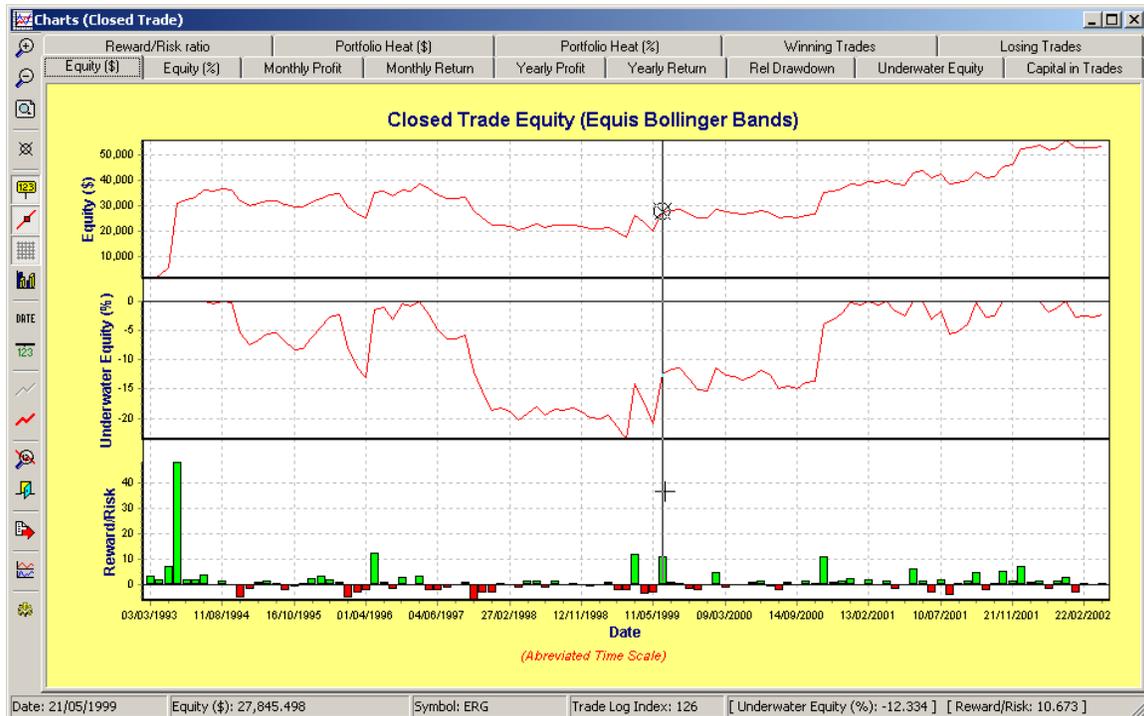


Linking Charts {E}

In some cases it is more convenient to stack or tile multiple charts on top of each other in order to visually associate points on different charts. Not all charts can be linked for obvious reasons. For example you cannot link charts with different time scales. For example it is not possible to link the Monthly Return chart to the Equity chart because of the different time scale. However it is possible to link the Monthly Profit to the Monthly Return chart and link the Equity Chart with the Underwater Equity chart. As an example, to link the Equity Chart with the Underwater Equity Chart first select the Equity chart tab and then left-click on the "Linked Chart" tool button and select the appropriate linked chart from the drop-down menu.



Note that a vertical cursor runs from top to bottom of the chart so that you can visually associate points on all charts. Also the linked chart values appear at the end of the status bar that automatically update as the cursor is moved along the chart. You can link additional charts or you can unlink existing charts.



To unlink an existing chart select the appropriate unlink option from the popup menu. To unlink all charts select “Remove all Linked Charts”.

Dynamic updating

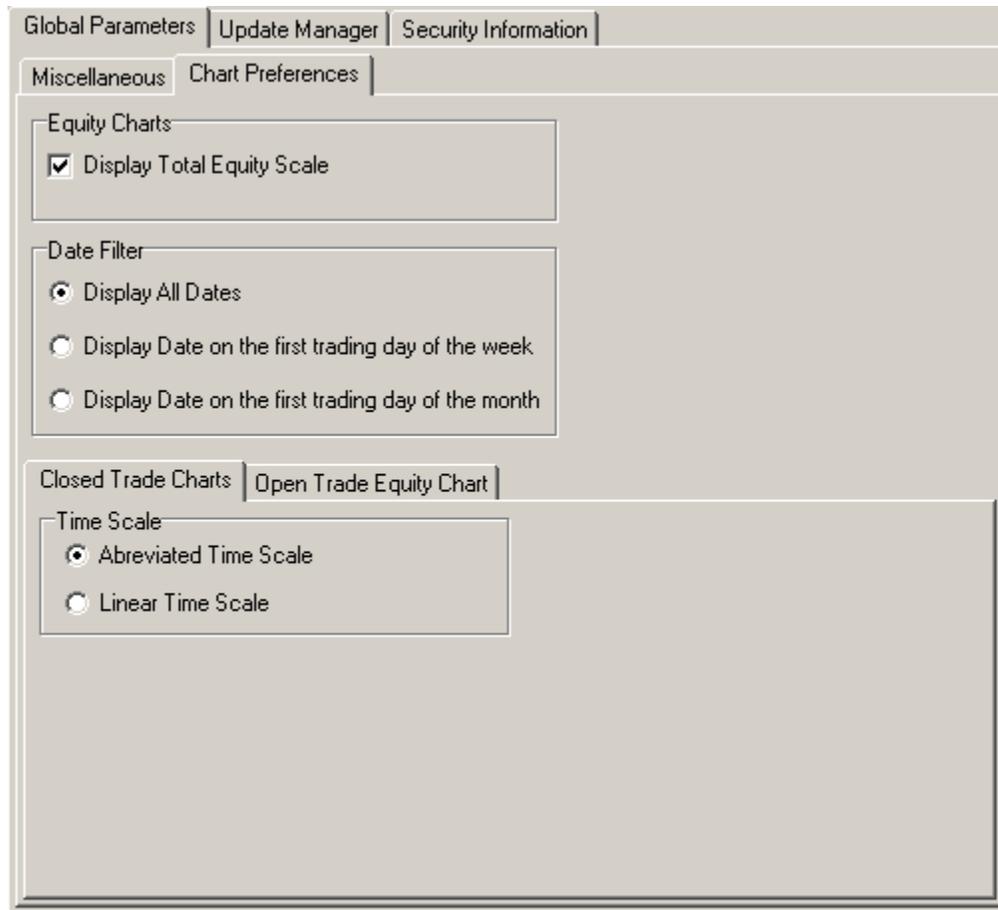
Because the linked charts are directly linked to the underlying charts from a different tab they will update automatically when the underlying chart updates. For example if you enable “Random Walk” in the trade parameters and rerun the simulation, not only will the base (top) chart update but all of the linked charts will update as well.

Panning and Zooming.

Panning the base (top) chart will also pan the linked charts below it so that they are always in correct alignment with each other. Zooming the base chart will zoom all charts however the linked charts will only zoom in the horizontal direction but still maintain correct alignment and sync with each other.

Closed Trade Chart Preferences

These are accessed from the tools menu or directly from the preferences chart tool button.



Common Parameters

The following parameters apply to both Closed Trade charts as well as the Open Trade equity charts.

□ Equity Charts

Controls the way the Equity Charts are plotted.

- **Display Total Equity**
See [Total Equity Scale](#).

□ Date Filter

Controls the frequency at which dates are displayed on the date axis of a chart.

- **Display All dates**
Attempts to display all dates as long as there is enough room to display them.
- **Only display date on the first trading day of the week.**
Attempts to display the date only on the first trading day of the week and only if there is enough room to display it.
- **Only display date on the first trading day of the month.**
Attempts to display the date only on the first trading day of the month and only if there is enough room to display it.

Specific Parameters

The following parameters apply to the Closed Trade charts only.

□ Time Scale

This option selects which time scale to use when plotting the Closed Trade charts.

- **Compressed Time Scale**
See [Compressed Time Scale](#) for more information.
- **Linear Time Scale**
See [Linear Time Scale](#) for more information.

Dynamic Object Cross-Referencing {P,E}

TradeSim provides dynamic object cross-referencing between the Charts, the Trade Log and the Trade Database provided that the Trade Log has been enabled throughout the course of a trade simulation. This allows trading entities to be easily cross-referenced from one data display to another although there are some restrictions to this. A typical use for this facility would be for excluding certain trades from a trade simulation once it has been established that these trades should not be included in the simulation.

For example you may want to exclude a particular trade from appearing in a simulation because it is producing a rather large profit gain on the equity chart and is affecting or masking the trading system's true performance. To do this, simply line up the chart focus on the chart in question and then double click on the chart, which will bring the Trade Log window to the foreground with the trade in question highlighted in the Trade Log window. You can easily cross-reference this particular trade back to the Trade Database window and disable it by unchecking it from the list.

Cross-Referencing from the Trade Log

The Trade Log window is the central focus for referencing one object to another. From the Trade Log window you can link a particular trade to any chart or the trade database. To do this, simply right click on the Trade Log window and a popup menu will appear allowing you to select a chart or trade database you wish to reference to.

In...	Trade	ID	Symbol	Status	Pos	Trans Date	Level	Days	Initial Stop	Price	Actu...
0	1	0	SGS	Enter	Long	10/02/1992	0	-	\$0.3091	\$0.3860	
1	2	0	ETR	Enter	Long	03/08/1992	0	-	\$0.1849	\$0.2960	
2	3	0	GDP	Enter	Long	05/11/1992	0	-	\$0.1931	\$0.3190	
3	4	0	HFY	Enter	Long	03/12/1992	0	-	\$0.2306	\$0.3070	
4	5	0	GRD	Enter	Long	14/01/1993	0	-	\$0.3274	\$0.4484	
5	3	0	GDP	Exit	Long	03/09/1992	0	118	\$0.1931	\$0.6950	
6	4	0	HFY	Exit	Long	03/09/1992	0	103	\$0.2306	\$0.4460	
7	6	0	SBC	Exit	Long	03/09/1992	0	-	\$0.7889	\$0.8300	
8	7	0	ION	Exit	Long	03/09/1992	0	-	\$1.2360	\$1.7000	
9	2	0	ETR	Exit	Long	03/09/1992	0	420	\$0.1849	\$0.9810	
10	8	0	HFY	Exit	Long	03/09/1992	0	-	\$0.1931	\$0.7070	
11	6	0	SBC	Exit	Long	03/09/1992	0	-	\$0.7889	\$2.8000	
12	9	0	ETR	Exit	Long	03/09/1992	0	-	\$1.2360	\$0.7770	
13	10	0	TEL	Exit	Long	03/09/1992	0	-	\$0.1849	\$3.7610	
14	11	0	SOH	Exit	Long	03/09/1992	0	-	\$0.1931	\$1.2220	
15	12	0	SFL	Exit	Long	03/09/1992	0	-	\$0.2306	\$0.3470	
16	11	0	SOH	Exit	Long	03/09/1992	0	-	\$0.1931	\$1.5120	
17	13	0	TGG	Exit	Long	03/09/1992	0	-	\$0.2306	\$1.2110	
18	7	0	ION	Exit	Long	03/09/1992	0	-	\$1.2360	\$2.5800	
19	14	0	KSM	Exit	Long	03/09/1992	0	-	\$0.3274	\$0.3290	
20	10	0	TEL	Exit	Long	03/09/1992	0	-	\$0.1849	\$4.5800	
21	15	0	SOH	Enter	Long	24/03/1994	0	-	\$0.1931	\$1.2490	
22	16	0	BDL	Enter	Long	30/03/1994	0	-	\$0.2306	\$0.6480	
23	17	0	HDR	Enter	Long	31/03/1994	0	-	\$0.1420	\$0.1779	
24	18	0	PAL	Enter	Long	26/04/1994	0	-	\$0.1161	\$0.1555	
25	19	0	PAS	Enter	Long	02/05/1994	0	-	\$1.4669	\$1.6370	
26	20	0	TMS	Enter	Long	10/05/1994	0	-	\$0.3937	\$0.4450	
27	21	0	DOW	Enter	Long	11/05/1994	0	-	\$0.4405	\$0.5000	
28	22	0	SHL	Enter	Long	11/05/1994	0	-	\$0.4056	\$0.5500	
29	16	0	BDL	Exit	Long	03/08/1994	0	126	\$0.5927	\$0.6200	

Cross-Referencing options

A number of options are available from the popup menu. These are: -

□ Jump to Trade Entry/Exit

Finds and jumps to the matching 'trade entry' or 'trade exit' trade log entry. If you have right clicked on a 'trade entry' then you will have the option of jumping to the matching 'trade exit' trade log entry. Alternatively if you have right clicked on a 'trade exit' then you will have the option of jumping to the matching 'trade entry' trade log entry. You can also quickly toggle between the trade entry and exit log entries by clicking on the 'j' key.

❑ **Locate in Trade Database**

Selecting this menu item will highlight the corresponding trade in the Trade Database window and bring it to the foreground. The trade can then be unchecked from the list so that it won't appear in any of the simulations.

❑ **Locate in Chart (Submenu)**

Note: If any items are disabled in the menu it is because the Position Size Model does not support this charting option or the chart does not contain trade entry data.

- **Equity (\$)**
If enabled, locates the corresponding trade in the \$ Equity Chart.
- **Equity (%)**
If enabled, locates the corresponding trade in the % Equity Chart.
- **Drawdown**
Locates the corresponding trade in the Drawdown Chart.
- **Underwater Equity** 
Locates the corresponding trade in the Underwater Equity Chart.
- **Capital In Trades**
If enabled, locates the corresponding trade in the Capital In Trades Chart.
- **Reward/Risk Ratio**
If enabled, locates the corresponding trade in the Reward/Risk ratio Chart.
- **Portfolio Heat (\$)**
If enabled, locates the corresponding trade in the Portfolio Heat (\$) Chart.
- **Portfolio Heat (%)**
If enabled, locates the corresponding trade in the Portfolio Heat (%) Chart.
- **Winning Trades**
If enabled, locates the corresponding trade in the Winning Trades Chart.
- **Losing Trades**
If enabled, locates the corresponding trade in the Losing Trades Chart.

Note You cannot cross reference a trade in the Trade Log to the Monthly or Yearly Profit Charts.

Cross-Referencing from the Charts to the Trade Log

If you have previously run a simulation with the Trade Log enabled then you can cross-reference any point on a chart back to the Trade Log. The only exception to this rule is that you cannot cross-reference from the Monthly and Yearly profit charts to the Trade Log. To cross-reference from a chart to the Trade Log just move the chart focus to a point of interest and then double click the left mouse button. If the Trade Log has been previously generated then the Trade Log window will be brought to the front and the relevant trade event will be highlighted.

Cross-Referencing from the Charts to the Trade Database Manager

You cannot directly cross-reference a point on a chart directly to an entry in the trade database manager. However you can first cross-reference a point on a chart to a trade event in the Trade Log and then cross-reference the trading event in the Trade Log to an entry in the Trade Database manager.

Cross Referencing Summary

Trade Database Window

T	Pos	Symbol	Entry Date	Exit Date	Entry Price	Initial Stop	Exit Price	% Change
1	Long	BHP	18/02/1987	19/03/1987	\$7,190	\$6,723	\$7,330	1.95%
2	Long	BHP	20/03/1987	14/05/1987	\$7,570	\$7,180	\$9,430	11.36%
3	Long	BHP	15/05/1987	05/04/1988	\$9,260	\$7,510	\$6,330	-23.27%
4	Long	BHP	06/04/1988	15/04/1988	\$6,260	\$5,955	\$6,510	3.66%
5	Long	BHP	16/04/1988	20/04/1988	\$6,560	\$6,120	\$6,510	-0.75%
6	Long	BHP	21/04/1988	23/04/1988	\$6,540	\$6,138	\$7,410	-2.75%
7	Long	AFI	25/11/1988	21/12/1988	\$1,227	\$1,170	\$1,243	1.62%
8	Long	CAA	01/12/1988	19/12/1988	\$2,600	\$2,491	\$2,700	3.85%
9	Long	NDY	02/12/1988	28/09/1989	\$1,200	\$1,080	\$1,100	-48.36%
10	Long	ADP	09/12/1988	15/09/1989	\$2,740	\$2,620	\$2,810	2.58%
11	Long	CTX	12/12/1988	30/12/1988	\$2,300	\$2,203	\$2,300	0.00%
12	Long	SGP	15/12/1988	23/12/1988	\$2,100	\$2,043	\$2,100	0.00%
13	Long	QFS	19/12/1988	01/11/1989	\$2,550	\$2,431	\$2,000	-21.57%
14	Long	AGL	20/12/1988	05/01/1990	\$2,250	\$2,196	\$1,850	-17.28%
15	Long	WFT	20/12/1988	24/05/1989	\$1,800	\$1,739	\$1,760	-2.22%
16	Long	CAA	21/12/1988	21/12/1988	\$2,750	\$2,625	\$2,750	0.00%
17	Long	SPP	21/12/1988	23/06/1989	\$1,960	\$1,884	\$2,600	32.65%
18	Long	BIR	21/12/1988	01/02/1989	\$0,540	\$0,540	\$0,540	16.95%
19	Long	CAA	22/12/1988	22/12/1988	\$2,750	\$2,653	\$2,750	0.00%
20	Long	AFI	22/12/1988	22/12/1988	\$1,243	\$1,205	\$1,243	0.00%
21	Long	AFI	23/12/1988	23/12/1988	\$1,227	\$1,184	\$1,227	0.00%
22	Long	SGP	28/12/1988	20/06/1989	\$2,000	\$2,026	\$1,900	-8.65%
23	Long	CAA	30/12/1988	29/11/1989	\$2,750	\$2,686	\$1,650	-40.00%
24	Long	AFI	30/12/1988	23/01/1989	\$1,227	\$1,195	\$1,265	5.60%
25	Long	SPP	03/01/1989	20/01/1989	\$0,340	\$0,302	\$0,520	52.94%
26	Long	CTX	09/01/1989	15/05/1989	\$2,080	\$1,916	\$2,150	4.37%
27	Long	ANZ	09/01/1989	01/02/1989	\$5,340	\$5,035	\$5,490	2.31%
28	Long	ARG	11/01/1989	19/01/1989	\$2,076	\$2,040	\$2,076	0.00%
29	Long	ILJ	12/01/1989	09/08/1989	\$2,700	\$2,587	\$3,200	18.52%
30	Long	CML	13/01/1989	27/01/1989	\$4,000	\$3,825	\$4,040	1.00%

Only a single direction link exists between the Trade Log and the Trade Database Window.

- To jump to a record in the Trade Database Window from a record in the Trade Log Window first click the right mouse button over the appropriate record in the Trade Log Window and then select the **Locate in Trade Database** menu item.

No direct link exists between the Charts and the Trade Database Windows. To cross-reference a point on the chart to an entry in the trade database you first need to jump to a record in the Trade Log and then jump to the corresponding record in the Trade Database.

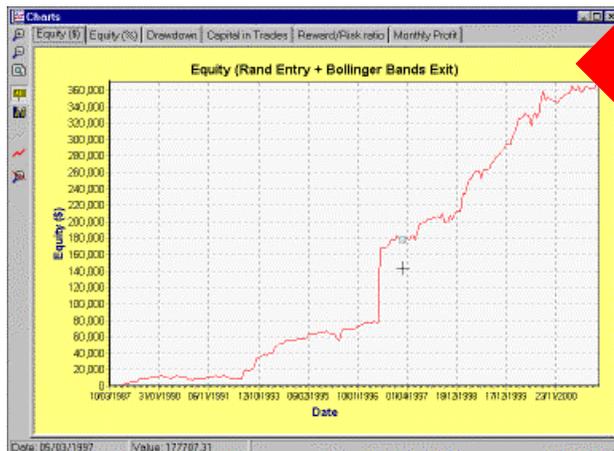


Trade Log Window

T	Trade	Symbol	Status	Pos	Trade Date	Entry Price	Stop Loss	Exit Price	Trade Cap	Trade P/L	Purchased
1	1	BHP	Enter	Long	18/03/1987	\$7,190	\$6,726	\$7,330	\$93,000.00	\$500.00	10/2
1	1	BHP	Exit	Long	19/03/1987	\$7,190	\$6,726	\$7,330	\$93,150.89	-	10/2
2	2	BHP	Enter	Long	20/03/1987	\$7,570	\$7,180	\$9,430	\$96,150.08	\$501.90	13/2
2	2	BHP	Exit	Long	14/05/1987	\$7,570	\$7,180	\$9,430	\$91,275.40	-	13/2
3	3	BHP	Enter	Long	15/05/1987	\$9,260	\$7,510	\$6,330	\$91,275.40	\$512.78	8/8
3	3	BHP	Exit	Long	05/04/1988	\$9,260	\$7,510	\$6,330	\$43,945.63	-	6/9
4	4	BHP	Enter	Long	06/04/1988	\$6,260	\$5,955	\$6,510	\$43,945.63	\$436.41	11/2
4	4	BHP	Exit	Long	15/04/1988	\$6,260	\$5,955	\$6,510	\$50,218.11	-	11/2
5	5	BHP	Enter	Long	16/04/1988	\$6,560	\$6,120	\$6,510	\$50,218.11	\$502.19	11/2
5	5	BHP	Exit	Long	20/04/1988	\$6,560	\$6,120	\$6,510	\$50,218.11	-	11/2
6	6	BHP	Enter	Long	21/04/1988	\$6,540	\$6,138	\$7,410	\$50,161.01	\$501.61	12/2
6	6	BHP	Exit	Long	23/04/1988	\$6,540	\$6,138	\$7,410	\$50,161.01	-	12/2
7	7	AFI	Enter	Long	25/11/1988	\$1,227	\$1,170	\$1,243	\$501.61	\$501.61	8/28
7	7	AFI	Exit	Long	21/12/1988	\$1,227	\$1,170	\$1,243	\$501.61	-	8/28
8	8	CAA	Enter	Long	01/12/1988	\$2,600	\$2,491	\$2,700	\$501.61	\$501.61	47/8
8	8	CAA	Exit	Long	19/12/1988	\$2,600	\$2,491	\$2,700	\$501.61	-	47/8
9	9	NDY	Enter	Long	02/12/1988	\$1,200	\$1,080	\$1,100	\$501.61	\$501.61	3/80
9	9	NDY	Exit	Long	28/09/1989	\$1,200	\$1,080	\$1,100	\$501.61	-	3/80
10	10	ADP	Enter	Long	09/12/1988	\$2,740	\$2,620	\$2,810	\$501.61	\$501.61	6/46
10	10	ADP	Exit	Long	15/09/1989	\$2,740	\$2,620	\$2,810	\$501.61	-	6/46
11	11	CTX	Enter	Long	12/12/1988	\$2,300	\$2,203	\$2,300	\$501.61	\$501.61	47/8
11	11	CTX	Exit	Long	30/12/1988	\$2,300	\$2,203	\$2,300	\$501.61	-	47/8
12	12	SGP	Enter	Long	15/12/1988	\$2,100	\$2,043	\$2,100	\$501.61	\$501.61	7/78
12	12	SGP	Exit	Long	23/12/1988	\$2,100	\$2,043	\$2,100	\$501.61	-	7/78
13	13	QFS	Enter	Long	19/12/1988	\$2,550	\$2,431	\$2,000	\$501.61	\$501.61	47/8
13	13	QFS	Exit	Long	01/11/1989	\$2,550	\$2,431	\$2,000	\$501.61	-	47/8
14	14	AGL	Enter	Long	20/12/1988	\$2,250	\$2,196	\$1,850	\$501.61	\$501.61	7/78
14	14	AGL	Exit	Long	05/01/1990	\$2,250	\$2,196	\$1,850	\$501.61	-	7/78
15	15	WFT	Enter	Long	20/12/1988	\$1,800	\$1,739	\$1,760	\$501.61	\$501.61	47/8
15	15	WFT	Exit	Long	24/05/1989	\$1,800	\$1,739	\$1,760	\$501.61	-	47/8
16	16	CAA	Enter	Long	21/12/1988	\$2,750	\$2,625	\$2,750	\$501.61	\$501.61	47/8
16	16	CAA	Exit	Long	21/12/1988	\$2,750	\$2,625	\$2,750	\$501.61	-	47/8
17	17	SPP	Enter	Long	21/12/1988	\$1,960	\$1,884	\$2,600	\$501.61	\$501.61	7/78
17	17	SPP	Exit	Long	23/06/1989	\$1,960	\$1,884	\$2,600	\$501.61	-	7/78
18	18	BIR	Enter	Long	21/12/1988	\$0,540	\$0,540	\$0,540	\$501.61	\$501.61	47/8
18	18	BIR	Exit	Long	01/02/1989	\$0,540	\$0,540	\$0,540	\$501.61	-	47/8
19	19	CAA	Enter	Long	22/12/1988	\$2,750	\$2,653	\$2,750	\$501.61	\$501.61	47/8
19	19	CAA	Exit	Long	22/12/1988	\$2,750	\$2,653	\$2,750	\$501.61	-	47/8
20	20	AFI	Enter	Long	22/12/1988	\$1,243	\$1,205	\$1,243	\$501.61	\$501.61	47/8
20	20	AFI	Exit	Long	22/12/1988	\$1,243	\$1,205	\$1,243	\$501.61	-	47/8
21	21	AFI	Enter	Long	23/12/1988	\$1,227	\$1,184	\$1,227	\$501.61	\$501.61	47/8
21	21	AFI	Exit	Long	23/12/1988	\$1,227	\$1,184	\$1,227	\$501.61	-	47/8
22	22	SGP	Enter	Long	28/12/1988	\$2,000	\$2,026	\$1,900	\$501.61	\$501.61	47/8
22	22	SGP	Exit	Long	20/06/1989	\$2,000	\$2,026	\$1,900	\$501.61	-	47/8
23	23	CAA	Enter	Long	30/12/1988	\$2,750	\$2,686	\$1,650	\$501.61	\$501.61	47/8
23	23	CAA	Exit	Long	29/11/1989	\$2,750	\$2,686	\$1,650	\$501.61	-	47/8
24	24	AFI	Enter	Long	30/12/1988	\$1,227	\$1,195	\$1,265	\$501.61	\$501.61	47/8
24	24	AFI	Exit	Long	23/01/1989	\$1,227	\$1,195	\$1,265	\$501.61	-	47/8
25	25	SPP	Enter	Long	03/01/1989	\$0,340	\$0,302	\$0,520	\$501.61	\$501.61	47/8
25	25	SPP	Exit	Long	20/01/1989	\$0,340	\$0,302	\$0,520	\$501.61	-	47/8
26	26	CTX	Enter	Long	09/01/1989	\$2,080	\$1,916	\$2,150	\$501.61	\$501.61	47/8
26	26	CTX	Exit	Long	15/05/1989	\$2,080	\$1,916	\$2,150	\$501.61	-	47/8
27	27	ANZ	Enter	Long	09/01/1989	\$5,340	\$5,035	\$5,490	\$501.61	\$501.61	47/8
27	27	ANZ	Exit	Long	01/02/1989	\$5,340	\$5,035	\$5,490	\$501.61	-	47/8
28	28	ARG	Enter	Long	11/01/1989	\$2,076	\$2,040	\$2,076	\$501.61	\$501.61	47/8
28	28	ARG	Exit	Long	19/01/1989	\$2,076	\$2,040	\$2,076	\$501.61	-	47/8
29	29	ILJ	Enter	Long	12/01/1989	\$2,700	\$2,587	\$3,200	\$501.61	\$501.61	47/8
29	29	ILJ	Exit	Long	09/08/1989	\$2,700	\$2,587	\$3,200	\$501.61	-	47/8
30	30	CML	Enter	Long	13/01/1989	\$4,000	\$3,825	\$4,040	\$501.61	\$501.61	47/8
30	30	CML	Exit	Long	27/01/1989	\$4,000	\$3,825	\$4,040	\$501.61	-	47/8

A bi-directional link exists between the Charts Window and the Trade Log Window.

- To jump to a record in the Trade Log from the Charts Window just double click the left mouse button on the chart window when the chart focus is over the correct point.
- To jump to a point on the Charts from the Trade Log Window click the right mouse button over the record in the Trade Log and select the appropriate chart from the **Locate in Chart** submenu.



Charts Window

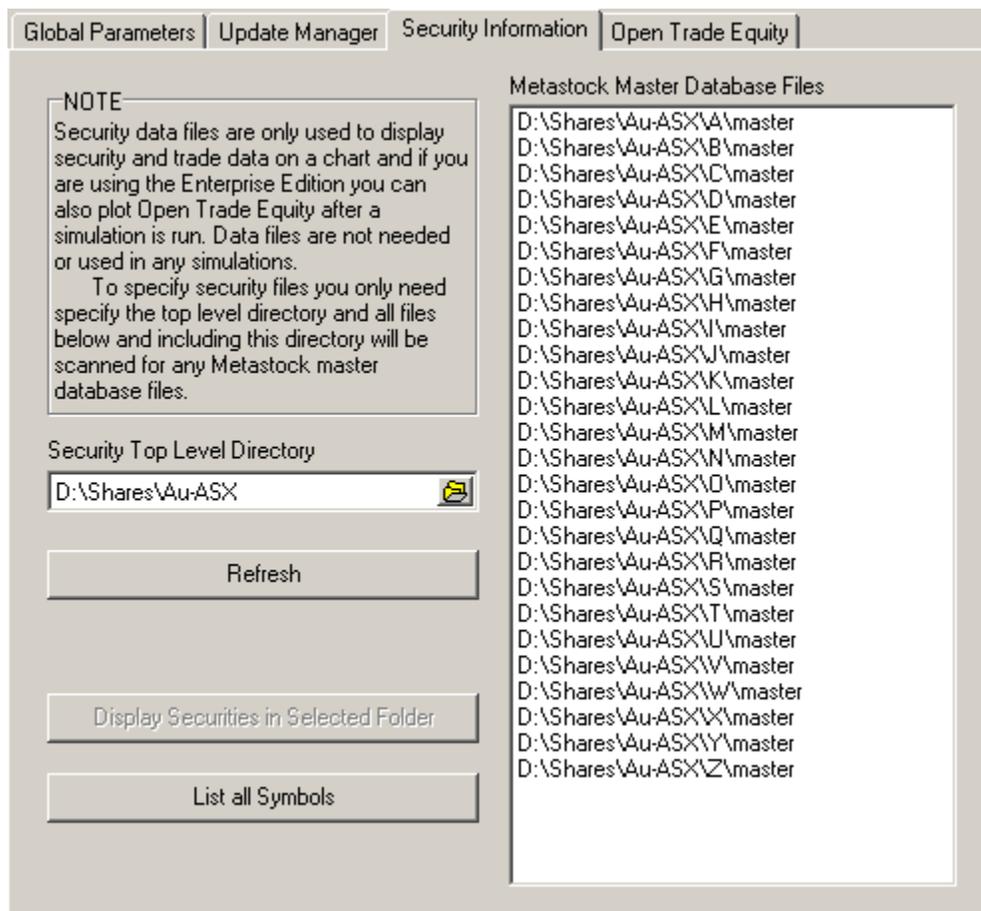
Displaying Security Charts {E}

The Enterprise Edition of TradeSim allows you to display the trading information of any trade in the trade database or Trade Log on a bar chart of the underlying security. To do this requires that TradeSim have access to security data for the relevant stock in MetaStock binary format. Typically the security data that TradeSim uses to display the bar chart is the same security data that MetaStock uses to generate the trade database. In this way there can be no problems with out-of-sync data.

Security Information

To direct TradeSim where to find all of the security data, you need to specify this in the 'Security Information' tab in the global preferences. TradeSim provides a simple method of accessing security data by only requiring the top level security directory upon which TradeSim will search out all of the MetaStock 'master' index files.

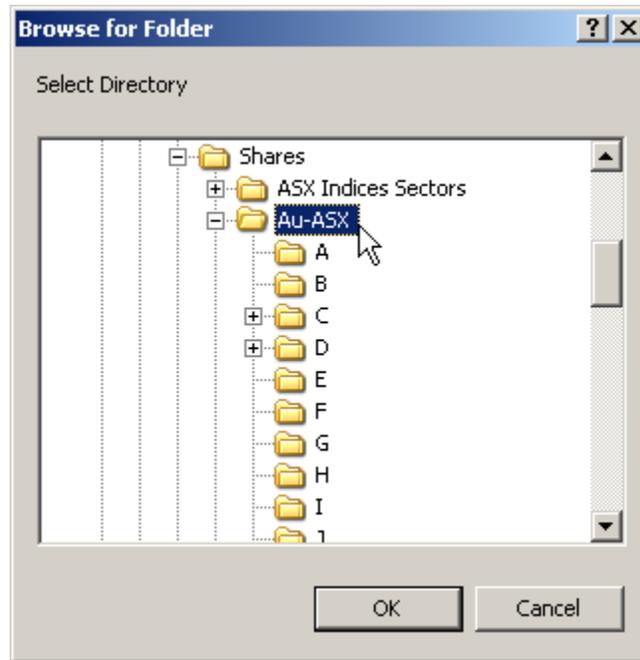
Note: TradeSim currently only supports security data in MetaStock data format.



Click on the file specification icon.



Select the top-level directory from the appropriate drive.



Click 'OK' and TradeSim will scan all directories below for any MetaStock index (master) files.

Displaying all securities in a folder

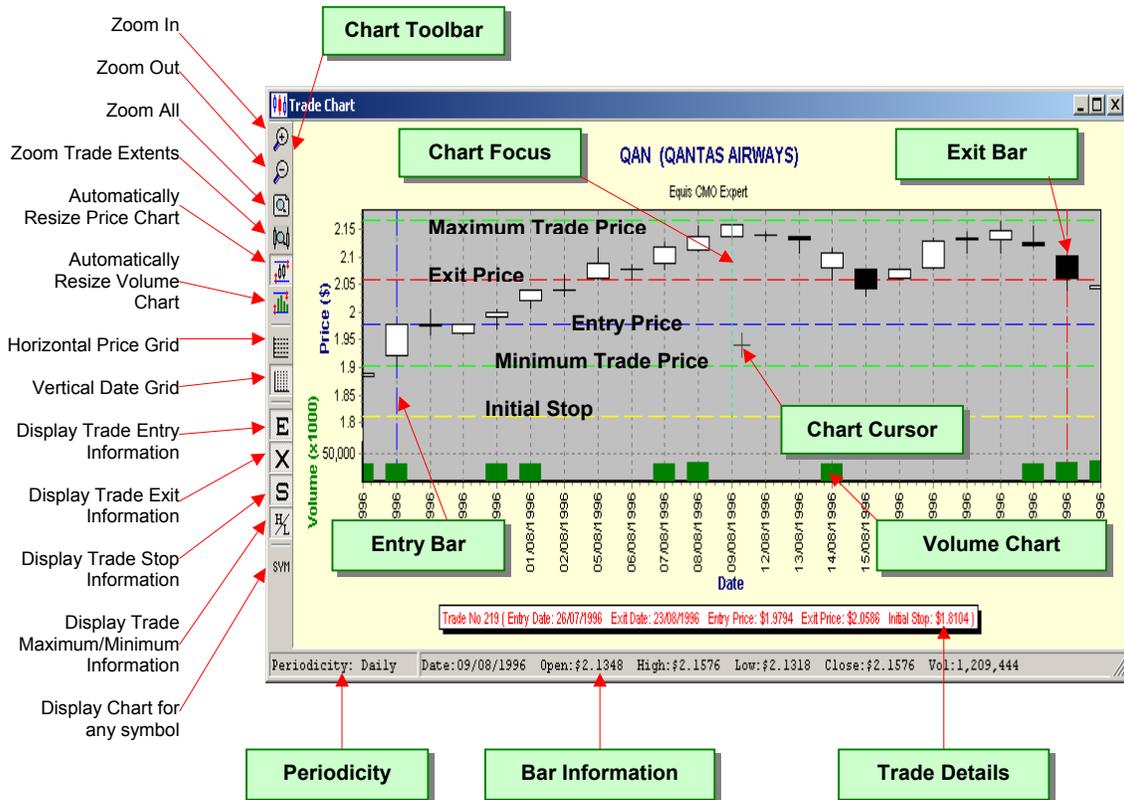
You can display all securities in a folder by selecting a master file from the master file list and then clicking on 'Display Securities in Selected Folder'.

Index	Symbol	Name	Start Date	End Date
1	TBL	3D GLOBAL LIMITED	02/01/1998	28/11/2003
2	TAB	TAB LIMITED	22/06/1998	21/06/2004
3	TABIDH	TAB LIMITED DBAJN04RW	10/10/2003	02/06/2004
4	TABDDH	TAB LIMITED DBAJN04RW	02/06/2003	02/06/2003
5	TABEMG	TAB LIMITED MQBENDWMT	21/12/1999	21/06/2004
6	TQL	TAB QUEENSLAND	16/11/1999	03/12/2002
7	TAH	TABCORP HOLDINGS LTD	26/08/1994	21/06/2004
8	TAHIZO	TABCORP HOLDINGS LTD ABNJN0...	09/10/2003	16/06/2004
9	TAHIZG	TABCORP HOLDINGS LTD ABNMY...	24/10/2002	27/05/2004
10	TAHIZA	TABCORP HOLDINGS LTD ABNOC...	20/06/2001	08/10/2002
11	TAHIAA	TABCORP HOLDINGS LTD ANZJN0...	27/06/2001	18/06/2003
12	TAHWAC	TABCORP HOLDINGS LTD ANZOC...	11/04/2002	24/10/2002
13	TAHIPD	TABCORP HOLDINGS LTD BNPDE...	11/01/2002	19/12/2002
14	TAHIPA	TABCORP HOLDINGS LTD BNPSE0...	18/12/2001	27/05/2004

In...	Trade	ID	Symbol	Status	Pos	Trans Date	Level	Days	Initial Stop	Price
0	1	0	WSF	Enter	Long	13/12/1995	0	-	-	\$3.3500
1	1	0	WSF					1	-	\$3.2760
2	2	0	WSF					-	-	\$3.2300
3	3	0	AMC					-	-	\$7.5784
4	4	0	WBC					-	-	\$6.0500
5	5	0	ANZ					-	-	\$6.5600
6	5	0	ANZ					6	-	\$6.5200
7	6	0	ANZ					-	-	\$6.8300
8	7	0	CBA					-	-	\$11.4900
9	8	0	NAB					-	-	\$12.8200
10	9	0	CML					-	-	\$4.2814
11	10	0	SGB					-	-	\$7.5374
12	11	0	RIO					-	-	\$19.2100
13	10	0	SGB					6	-	\$7.3939
14	4	0	WBC					22	-	\$6.2200
15	3	0	AMC					-	-	\$7.7704
16	8	0	NAB					-	-	\$12.7800
17	6	0	ANZ	Exit	Long	07/02/1996	0	-	-	\$6.6100
18	7	0	CBA	Exit	Long	09/02/1996	0	11	-	\$11.7000
19	14	0	BHP	Enter	Long	13/02/1996	0	-	-	\$8.2746

The Security Chart

The security chart displays a candle or bar chart of the security data. If you have chosen to display the trade data superimposed on the chart then the chart will automatically zoom to the date extents of the trade so that all bar information relevant to the trade will be displayed within the chart window.



The Chart Toolbar

The Chart window contains a toolbar that runs vertically along the left side of the window. These tools are used to control how the charts are displayed. In addition, the left and right mouse button each introduces two other features, which allow advanced panning and zooming of any part of the chart. First we will describe the basic function of each tool in the Charts toolbar.

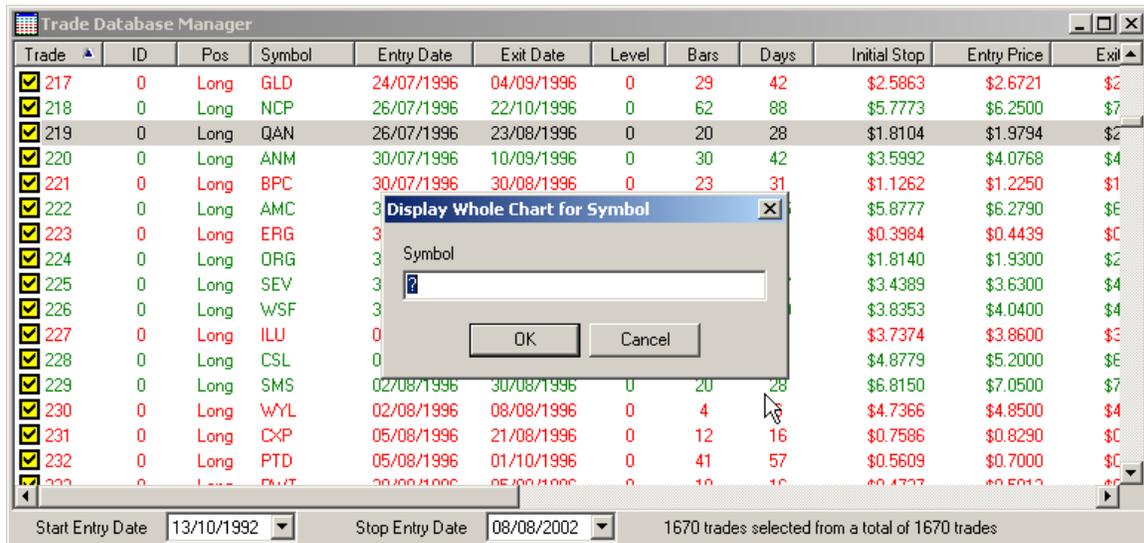
-  **Zoom In**
 When this button is clicked down the contents of the chart windowpane are zoomed in a horizontal direction by a fixed amount.
-  **Zoom Out**
 When this button is clicked down the contents of the chart windowpane are zoomed out in a horizontal direction by a fixed amount.
-  **Zoom All**
 When this button is clicked down the contents of the chart windowpane are zoomed out so that all of the chart data is displayed within the chart window.
-  **Zoom Trade Extents**
 When this button is clicked down the contents of the chart windowpane are zoomed out so that all of the chart data within the trade is displayed within the chart window.
-  **Automatically Resize Price Chart**
 When this button is clicked down the contents of the price chart are automatically resized to fit within the vertical extents of the price chart.
-  **Automatically Resize Volume Chart**
 When this button is clicked down the contents of the volume chart are automatically resized to fit within the vertical extents of the volume chart.
-  **Horizontal Price Grid**
 When this button is clicked down a horizontal price grid is displayed at fixed price intervals.
-  **Vertical Date Grid**
 When this button is clicked down a vertical date grid is displayed at fixed date intervals, which is dependent on the density of the chart data.
-  **Display Trade Entry Information**
 When this button is clicked down a blue horizontal dashed line is displayed at the entry price level when the entry price is within the range of the chart price axis.
-  **Display Trade Exit Information**
 When this button is clicked down a red horizontal dashed line is displayed at the exit price level when the exit price is within the range of the chart price axis.
-  **Display Initial Stop Information**
 When this button is clicked down and a valid initial stop value is available a yellow horizontal dashed line is displayed at the initial stop level when the initial stop price is in range of the chart price axis.
-  **Display Trade Maximum/Minimum Information**
 When this button is clicked down, two light-green-colored horizontal dashed lines are displayed at the minimum and maximum price points of the trade only when the respective price points are within the range of the chart price axis.

? **Display Chart for any Symbol**

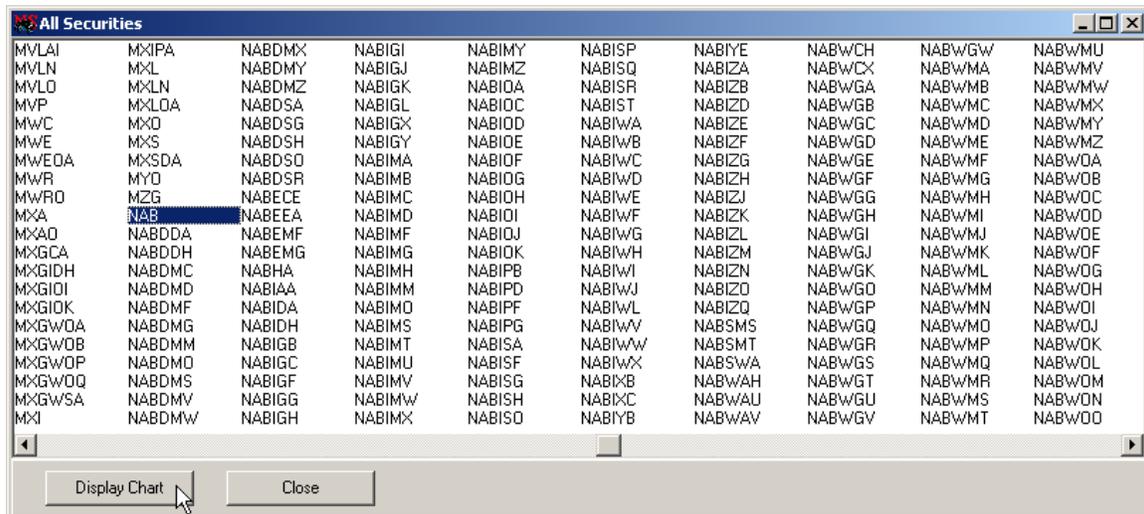
When this button is clicked it allows you to display the whole security chart for any symbol even if it is not used in the trade database. (See next section.)

Displaying any security

If the security that you are interested in is not in the Trade Database Manager you can still display it on a bar chart, albeit without any additional trading information. To do this right click on the trade database manager window and select “Display chart for symbol...” from the popup menu. Type in the symbol name and click ‘OK’ or alternatively if you would like to select the security from a list then type in a question mark if it is not already displayed and then click on ‘OK’.



Select and click the appropriate symbol from the symbol list.



Click ‘Display Chart’ button and then click ‘Yes’ from the following message box.



Displaying Open-Trade Equity {E}

Up until now, all of the charting has been plotted on trade boundaries. That is, either at the entry of a trade or, more usually, at the exit of a trade. The disadvantage of this is that it does not show the bar-to-bar price variations of the non-trading days. This may or may not be relevant, particularly if you are a position trader only concerned with strictly adhering to your trading rules so that the only trade decisions are made when a valid entry or exit trigger has been determined by your trading system.

However there may be some instances where it is important to know what is happening to your trade equity on a bar-by-bar basis. The Enterprise Edition of TradeSim facilitates this by being able to plot the Equity chart on a bar-by-bar basis. It does this by using the underlying security data for each of the trades in the Trade Log. TradeSim uses an efficient algorithm to plot the open-trade equity so that memory requirements and resources are minimized by not requiring that the security data be kept in memory.

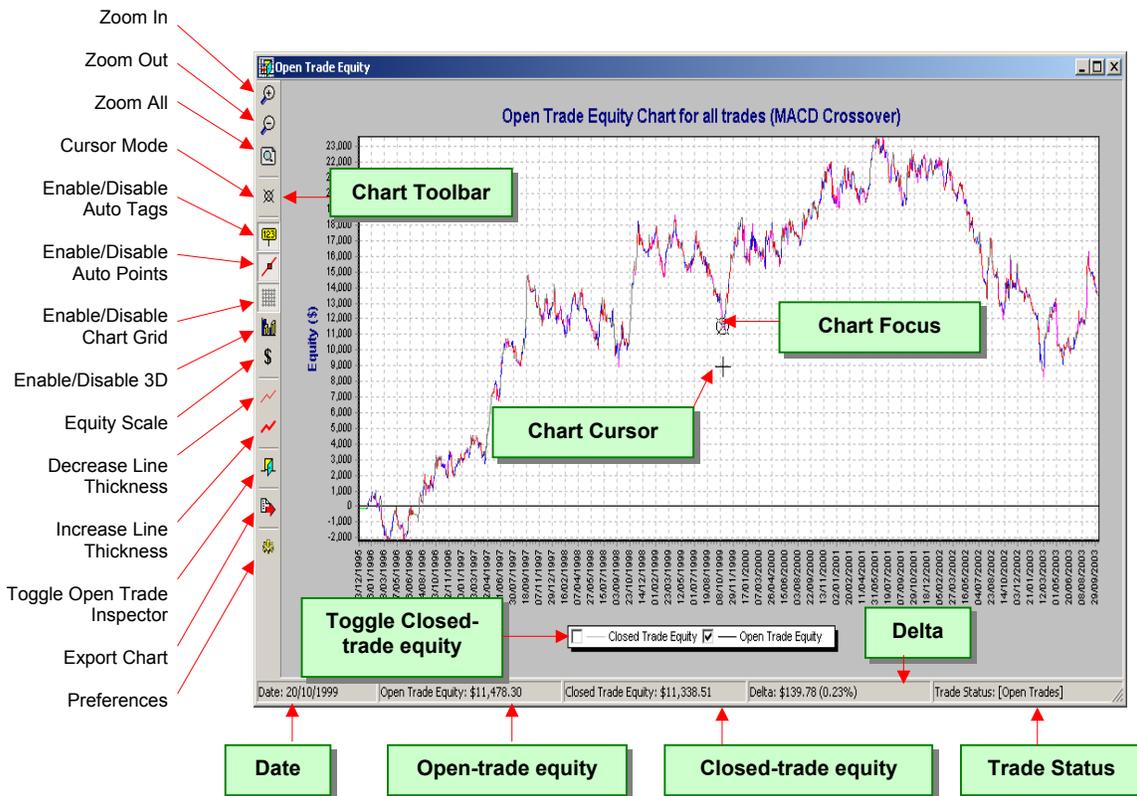
To plot the open trade equity TradeSim needs to have access to the security data files. To set this up please refer to the section on [Security Information](#).

Note: It is best to generate the trade database using the same security data used to plot the open trade equity. If this is not adhered to then it is possible that there could be some situations where trade data is missing or inconsistent for a given trade in the trade database. TradeSim can alert you to these inconsistencies and will either report it as an error or warning to the Message Log.

To plot the bar-by-bar equity you need to first create a Trade Log by running a simulation then right click on the Trade Log and select “Plot Open Equity Chart for” followed by “All trades in the Trade Log”.

In...	Trade	ID	Symbol	Status	Pos	Trans Date	Level	Days	Initial Stop	Price	Actual Price	Slippage
0	1	0	WSF	Enter	Long	13/12/1995	0	-	-	\$3.3500	\$3.3500	\$0.0000
1	1	0	WSF	Exit	Long	14/12/1995	0	1	-	\$3.2760	\$3.2760	\$0.0000
2	2	0	WSF	Enter	Long	10/1/1996	0	-	-	\$3.2300	\$3.2300	\$0.0000
3	3	0	WSF	Exit	Long	11/1/1996	0	-	-	\$3.2300	\$3.2300	\$0.0000
4	4	0	WSF	Enter	Long	12/1/1996	0	-	-	\$6.0500	\$6.0500	\$0.0000
5	5	0	WSF	Exit	Long	13/1/1996	0	-	-	\$6.5600	\$6.5600	\$0.0000
6	5	0	WSF	Enter	Long	14/1/1996	0	6	-	\$6.5200	\$6.5200	\$0.0000
7	6	0	WSF	Exit	Long	15/1/1996	0	-	-	\$6.8300	\$6.8300	\$0.0000
8	7	0	WSF	Enter	Long	16/1/1996	0	-	-	\$11.4900	\$11.4900	\$0.0000
9	8	0	WSF	Exit	Long	17/1/1996	0	-	-	\$12.8200	\$12.8200	\$0.0000
10	9	0	WSF	Enter	Long	18/1/1996	0	-	-	\$4.2814	\$4.2814	\$0.0000
11	10	0	WSF	Exit	Long	19/1/1996	0	-	-	\$7.5974	\$7.5974	\$0.0000
12	11	0	WSF	Enter	Long	20/1/1996	0	-	-	\$19.2100	\$19.2100	\$0.0000
13	10	0	WSF	Exit	Long	21/1/1996	0	6	-	\$7.3939	\$7.3939	\$0.0000
14	4	0	WSF	Enter	Long	22/1/1996	0	22	-	\$6.2200	\$6.2200	\$0.0000
15	3	0	WSF	Exit	Long	23/1/1996	0	-	-	\$7.704	\$7.704	\$0.0000
16	8	0	WSF	Enter	Long	24/1/1996	0	-	-	\$12.7800	\$12.7800	\$0.0000
17	6	0	WSF	Exit	Long	25/1/1996	0	-	-	\$6.100	\$6.100	\$0.0000
18	7	0	CBA	Exit	Long	09/02/1996	0	-	-	\$7.000	\$11.7000	\$0.0000
19	14	0	BHP	Enter	Long	13/02/1996	0	-	-	\$8.2746	\$8.2746	\$0.0000
20	15	0	NCP	Enter	Long	13/02/1996	0	-	-	\$7.2500	\$7.2500	\$0.0000
21	16	0	WPI	Enter	Long	14/02/1996	0	-	-	\$7.0437	\$7.0437	\$0.0000

Once a security map has been created then the open equity chart will be generated and displayed.



The Open-trade equity Line

The following color-coding convention is used to display the trade status at the chart focus point on the chart.

- Blue Line** = Trade Entry Condition (+ currently open trades)
- Red line** = Trade Exit Condition (+ currently open trades)
- Purple Line** = Simultaneous Trade Entry and Exit Condition (+ currently open trades)
- Lime Line** = No trading activity

Gray Line = Currently Open Trades only

The Closed-trade equity Line

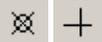
You can enable the closed-trade equity line by clicking the appropriate option on the chart legend that appears below the date axis. The closed-trade equity line appears in a light gray color and is very similar to the normal Closed-trade equity Chart except that it is plotted for all trading and non-trading days.

The Status Bar

The status bar displays the status of the equity at any point on the chart.

The Chart Toolbar

The Chart window contains a toolbar that runs vertically along the left side of the window. These tools are used to control how the charts are displayed. In addition the left and right mouse button each introduces two other features, which allow advanced panning and zooming of any part of the chart. First we will describe the basic function of each tool in the Charts toolbar.

-  **Zoom In**
 When this button is clicked down the contents of the chart windowpane are zoomed in a horizontal direction by a fixed amount.
-  **Zoom Out**
 When this button is clicked down the contents of the chart windowpane are zoomed out in a horizontal direction by a fixed amount.
-  **Zoom All**
 When this button is clicked down the contents of the chart windowpane are zoomed out so that all of the chart data is displayed within the chart window.
-  **Chart Cursor Mode**
 This buttons switches between a small round cross-haired cursor and a long cross-haired cursor.
-  **Toggle Auto Tags**
 This button enables and disables chart tags. When the chart tags are enabled (button down) and there is sufficient space to display the tags then a tag will be displayed at each point on the chart.
-  **Toggle Auto Markers**
 This button enables and disables chart markers. When the chart markers are enabled (button down) and there is sufficient space to display the markers then a marker will be displayed at each point on the chart.
-  **Toggle 3D-Attributes**
 Toggles between standard 2D display and 3D perspective display mode.
-  **Toggle Equity Scale**
 Toggles between relative equity and percentage equity scales.
-  **Decrease line thickness**
 When this button is clicked the line thickness decreases by one pixel. When the minimum line width of one pixel is achieved, this button will be grayed out, so any attempt to decrease the line thickness below the minimum will have no effect. Note that changing the line thickness affects all line charts simultaneously; bar charts are unaffected.
-  **Increase line thickness**
 When this button is clicked the line thickness increases by one pixel. When the maximum line width of four pixels is reached, this button will be grayed out, so any attempt to increase the line thickness

above the maximum will have no effect. Note that changing the line thickness affects all line charts simultaneously; bar charts are unaffected.

- Open Trade Inspector**
 When clicked down displays the Open Trade Inspector. The Open Trade Inspector shows all currently open trades at the chart focus point. A blue rectangular border surrounding the trade indicates the actual trade entry condition at the chart focus point whilst a red rectangular border surrounding the trade indicates a trade exit condition at the chart focus point. [For more information please refer to the Open Trade Inspector.](#)
- Export Chart**
 You can export the chart graphics and information in a variety of formats. Please refer to [Appendix G](#) for more information regarding this feature.
- Preferences**
 Opens up the global preferences at the “Open Equity tab”.

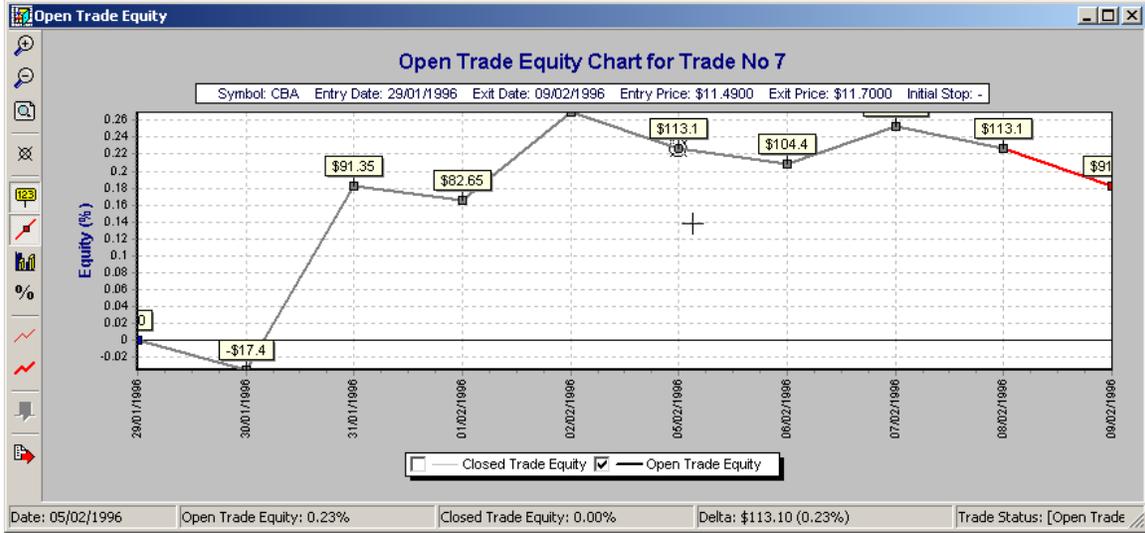
Plotting the Open (and Closed) Trade Equity Chart for one Symbol only

You can plot the open (and closed) trade equity chart for any symbol from the Trade Log. This plot only consists of the contribution to equity from all of the trades in the Trade Log with that symbol name. To plot this chart from the Trade Log right click on the trade with the relevant symbol of interest and then select “Plot Open Equity Chart for” → “All trades with symbol XXX” from the popup menu.



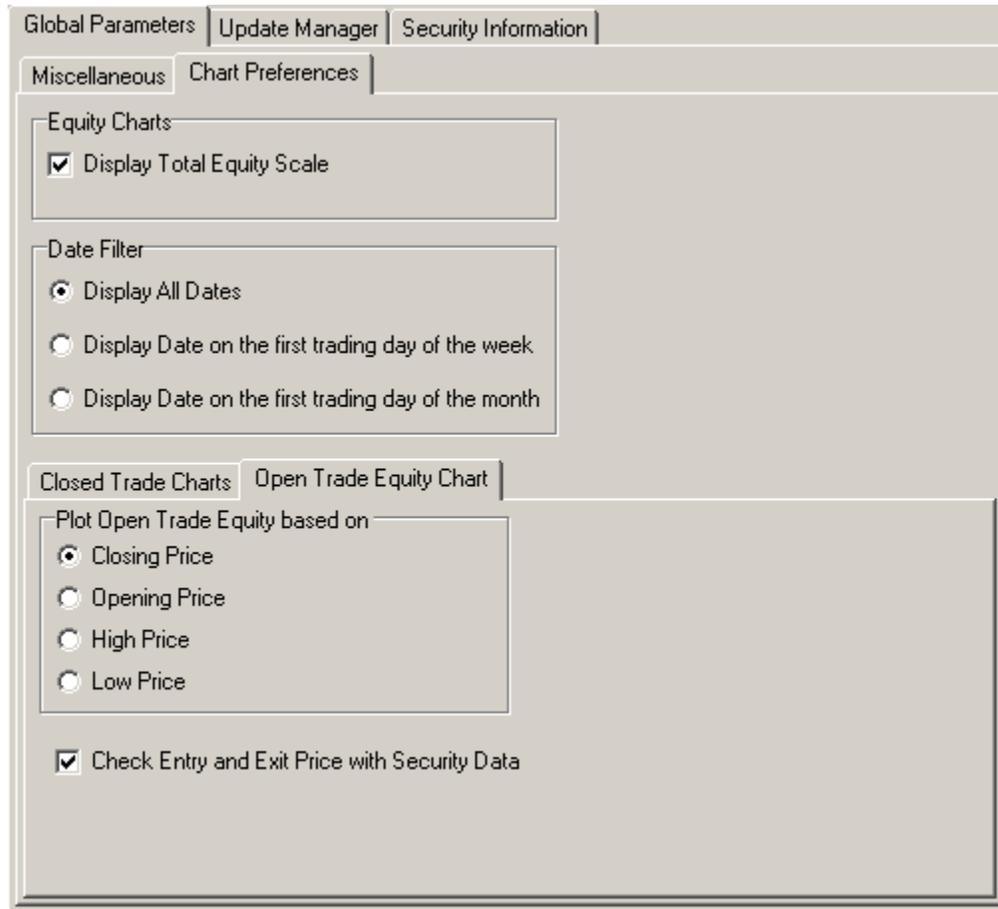
Plotting the Open (and Closed) Trade Equity Chart for one Trade only

You can plot the open (and closed) trade equity chart for any single trade from the Trade Log. This plot only consists of the contribution to equity from this one trade in the Trade Log. To plot this chart from the Trade Log right click on the trade of interest and then select “Plot Open Equity Chart for” → “The currently highlighted trade only” from the popup menu.



Preferences

The Open Equity preferences can be accessed through the Tools menu or you can click the Preferences icon on the tool bar. From the preferences page you have some options that control the way the open equity is calculated.



Common Parameters

The following parameters apply to both closed trade charts as well as the open-trade equity charts. More information can be found at [Common Parameters](#).

Specific Parameters

□ Plot Open-trade equity Based on

This radio group controls the way that open-trade equity is calculated between the entry and exit points of each trade.

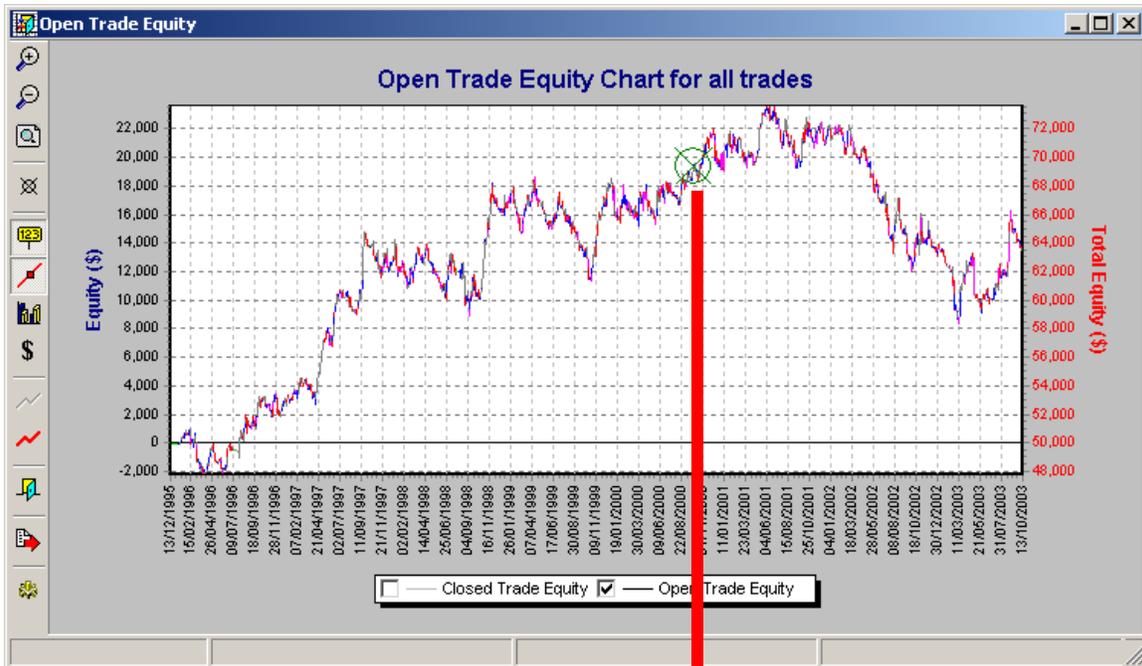
- **Closing Price**
When not entering or exiting a trade the daily closing price is used to calculate the trade equity.
- **Opening Price**
When not entering or exiting a trade the daily opening price is used to calculate the trade equity.
- **High Price**
When not entering or exiting a trade the daily high price is used to calculate the trade equity.
- **Low Price**
When not entering or exiting a trade the daily low price is used to calculate the trade equity.

❑ Check Entry and Exit Price with Security Data

When this option is enabled then a check is made so that the entry and exit price of each trade falls within its respective daily range. When a discrepancy is found the user is notified and a message is written to the Message Log.

Dynamic Cross Referencing

Similar to the closed-trade equity chart the open-trade equity chart supports dynamic cross referencing to the Trade Log. However unlike the Closed Trade equity chart, double clicking on any point on the Open Trade Equity chart will not just highlight the one respective associated trade but will mark all open trades at that point in time.

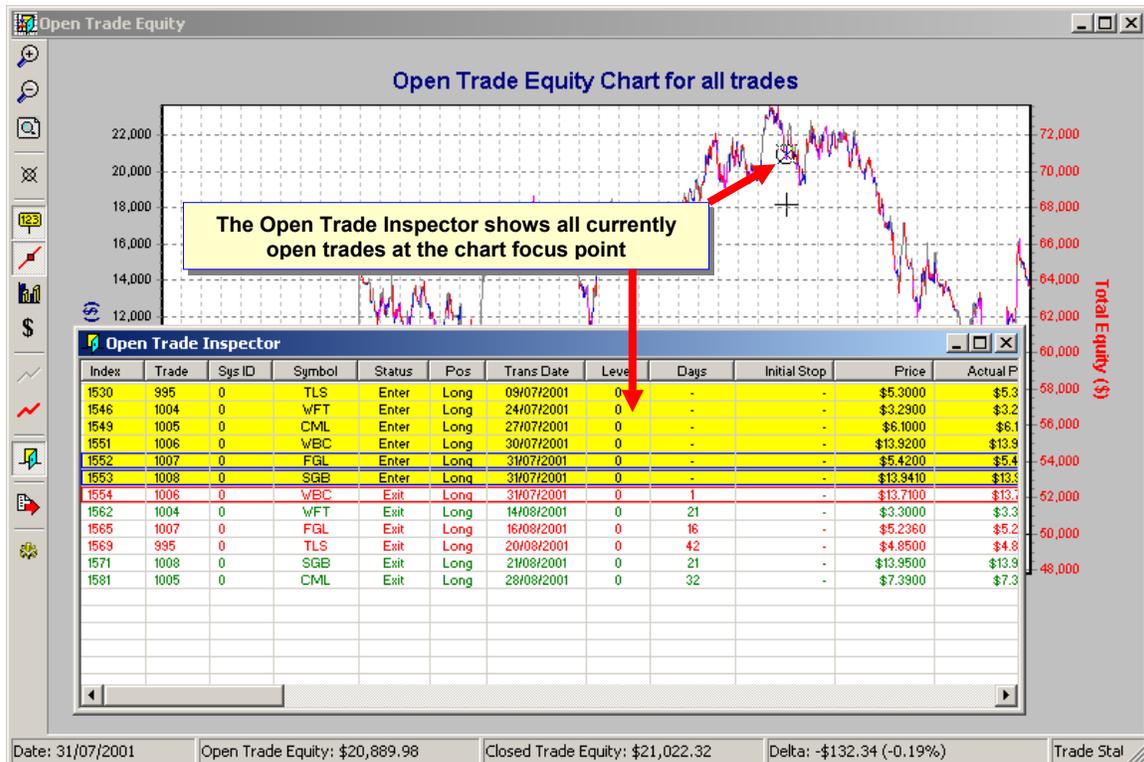


In...	Trade	Sys ID	Symbol	Status	Pos	Trans Date	Level	Days	Initial Stop	Price	Actual Price	Slipp:
1281	814	0	WOW	Exit	Long	14/09/2000	0	37	-	\$6.9830	\$6.9830	\$0.00
1282	832	0	FGL	Enter	Long	18/09/2000	0	-	-	\$4.0900	\$4.0900	\$0.00
1283	812	0	NCP	Exit	Long	20/09/2000	0	43	-	\$24.0000	\$24.0000	\$0.00
1284	831	0	BHP	Exit	Long	25/09/2000	0	17	-	\$8.7285	\$8.7285	\$0.00
1285	833	0	CBA	Enter	Long	26/09/2000	0	-	-	\$27.1750	\$27.1750	\$0.00
1286	834	0	WFT	Enter	Long	26/09/2000	0	-	-	\$3.1600	\$3.1600	\$0.00
1287	835	0	NAB	Enter	Long	27/09/2000	0	-	-	\$25.0000	\$25.0000	\$0.00
1288	836	0	AMC	Enter	Long	28/09/2000	0	-	-	\$5.1232	\$5.1232	\$0.00
1289	837	0	ANZ	Enter	Long	28/09/2000	0	-	-	\$13.2000	\$13.2000	\$0.00
1290	838	0	CML	Enter	Long	28/09/2000	0	-	-	\$6.9844	\$6.9844	\$0.00
1291	839	0	NCP	Enter	Long	28/09/2000	0	-	-	\$26.0500	\$26.0500	\$0.00
1292	840	0	NCPDP	Enter	Long	28/09/2000	0	-	-	\$22.1000	\$22.1000	\$0.00
1293	841	0	TLS	Enter	Long	28/09/2000	0	-	-	\$6.0000	\$6.0000	\$0.00
1294	840	0	NCPDP	Exit	Long	04/10/2000	0	6	-	\$21.0500	\$21.0500	\$0.00
1295	839	0	NCP	Exit	Long	04/10/2000	0	6	-	\$24.8600	\$24.8600	\$0.00
1296	847	0	AMP	Enter	Long	06/10/2000	0	-	-	\$17.2880	\$17.2880	\$0.00
1297	848	0	RIO	Enter	Long	06/10/2000	0	-	-	\$25.2050	\$25.2050	\$0.00
1298	838	0	CML	Exit	Long	13/10/2000	0	15	-	\$6.5306	\$6.5306	\$0.00
1299	850	0	WES	Enter	Long	17/10/2000	0	-	-	\$14.0400	\$14.0400	\$0.00
1300	834	0	WFT	Exit	Long	19/10/2000	0	23	-	\$3.2300	\$3.2300	\$0.00
1301	848	0	RIO	Exit	Long	20/10/2000	0	14	-	\$24.2730	\$24.2730	\$0.00
1302	851	0	CML	Enter	Long	24/10/2000	0	-	-	\$7.0041	\$7.0041	\$0.00
1303	852	0	RIO	Enter	Long	24/10/2000	0	-	-	\$24.8500	\$24.8500	\$0.00
1304	836	0	AMC	Exit	Long	26/10/2000	0	28	-	\$5.2525	\$5.2525	\$0.00
1305	835	0	NAB	Exit	Long	30/10/2000	0	33	-	\$26.9400	\$26.9400	\$0.00
1306	854	0	NCPDP	Enter	Long	31/10/2000	0	-	-	\$17.3000	\$17.3000	\$0.00
1307	851	0	CML	Exit	Long	31/10/2000	0	7	-	\$6.8956	\$6.8956	\$0.00
1308	855	0	AMC	Enter	Long	01/11/2000	0	-	-	\$5.4416	\$5.4416	\$0.00
1309	856	0	CML	Enter	Long	01/11/2000	0	-	-	\$6.9844	\$6.9844	\$0.00
1310	837	0	ANZ	Exit	Long	02/11/2000	0	35	-	\$13.8900	\$13.8900	\$0.00
1311	858	0	NAB	Enter	Long	03/11/2000	0	-	-	\$27.8300	\$27.8300	\$0.00

A blue marker indicates the entry to a trade that is currently open. A red marker indicates the exit to a trade that is currently open.

Open Trade Inspector

When this button is clicked down it enables the Open Trade Inspector. The Open Trade Inspector shows all currently open trades at the chart focus point. A blue rectangular border surrounding the trade indicates an actual trade entry condition at the chart focus point whilst a red rectangular border surrounding the trade indicates an actual trade exit condition at the chart focus point.



More Open Trade Charts

Version 6 introduces 8 new open trade charts. These are:-

Bar by Bar Detailed Drawdown Chart

Same as the [Closed Trade Drawdown Chart](#) but takes into account the daily movements of price rather than just at the exit position.

Bar by Bar Detailed Underwater Equity

Same as the [Closed Trade Underwater Equity Chart](#) but takes into account the daily movements of price rather than just at the exit position.

Weekly Profit Chart

Same as the [Closed Trade Weekly Profit Chart](#) but takes into account the daily movements of price rather than just at the exit position.

Weekly Return

Same as the [Closed Trade Weekly Return Chart](#) but takes into account the daily movements of price rather than just at the exit position.

Monthly Profit Chart

Same as the [Closed Trade Monthly Profit Chart](#) but takes into account the daily movements of price rather than just at the exit position.

Monthly Return

Same as the [Closed Trade Monthly Return Chart](#) but takes into account the daily movements of price rather than just at the exit position.

Yearly Profit Chart

Same as the [Closed Trade Yearly Profit Chart](#) but takes into account the daily movements of price rather than just at the exit position.

Yearly Return

Same as the [Closed Trade Yearly Return Chart](#) but takes into account the daily movements of price rather than just at the exit position.

Advanced System Testing using TradeSim (Enterprise Edition)

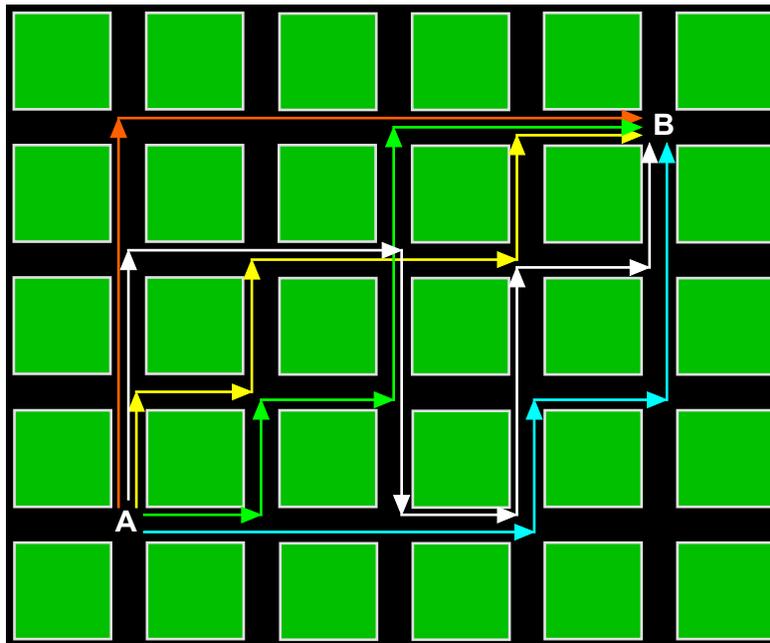
Introduction

In the previous chapter we used TradeSim to objectively simulate a trading system using trade data that was generated using MetaStock and the external RecordTrades function. We used the RecordTrades external function along with MetaStock to generate trade data from a portfolio of securities and then ran trade simulations using TradeSim. This gave us a much better and conclusive picture of the trading system's capability compared to the results of simulators or back testers that only used one security. However we also learnt that running simulations with random stock selection produced different results at the end of every simulation illustrating the point that using a portfolio instead of a single security produced varying results. Running many simulations on our trade data gave us some idea of the performance of our trading system.

A single trade simulation of our trading system on a portfolio can only give us limited information regarding the performance of our trading system even though we have traded it across a large portfolio of securities. It is just a single snapshot of one of the many possible outcomes of our trading system. In statistical terms the outcome of our trading system can be considered to be a random variable because our trade simulation is a random process. In fact we can now consider trading a system using a portfolio of securities to be a random process.

The traveling salesman problem

To fully explore the capabilities of any trading system we need to look at it from a statistical point of view. As an analogy consider the road map below.



There are many different ways for our salesman to get from point A to point B, thus giving rise to various different routes; the number of routes being dependent on the total number of permutations of roads and streets. Similarly when trading a portfolio of securities we may have many different trading entities on a

given day depending on our portfolio and trading criteria defined by our trading system. This gives rise to many different trading opportunities. As time progresses there are many possible trading combinations or 'routes' – each resulting in a different outcome in terms of profits, drawdown, number of trades, etc. Of course all of this varies too, depending on our trading parameters.

Advanced statistical analysis

The non-unique outcome when trading a system using a portfolio of securities gives rise to the need for proper statistical analysis in order to exhaustively test a trading system. The Enterprise edition of TradeSim incorporates proper statistical analysis through exhaustive testing using a Monte Carlo analysis where we aim to evaluate every possible trading 'route' and then analyze and correlate the resulting data. This is done by repeatedly simulating a trading system where each simulation uses a random selection of trades that satisfy our trading rules. Because the outcome of each simulation will be different, we can say that the outcome of each simulation is a random event that has a mean value and other associated statistical parameters. As a result of this, a statistical profile of the trading system can be generated.

In the end, the user is presented with a tabulated and graphical representation of their trading system in terms of profit and trade statistics - thus an objective evaluation of the trading system can now be achieved.

This trade analysis is like a footprint or signature of the trading system. It gives us a multi-dimensional view of our trading system. Rather than display a rat's nest of equity curves overlaid on top of each other, it makes more sense to do a proper statistical analysis and display the results in terms of a frequency distribution of total equity, winning and losing trades, as well as trade expectation if it is applicable to the position size model used.

Deducing a correct statistical hypothesis

As stated in the introduction, one of the biggest myths in trading is an incorrect hypothesis regarding the outcome of a trading system. When we trade a system using a portfolio of securities we are dealing with a random process so that we can no longer use the outcome of a single trading event in isolation and then try and deduce a correct hypothesis for our trading system. We cannot say that this trading system is historically profitable because we traded the system once and it yielded a profit for that one time only. The converse is equally true where we cannot assume that a trading system will always produce losses just because we experience losses trading the system once.

Actually trading a system once using real money does not give us any more information about the trading system than simulating it. If in the process of actually trading a system you have made a loss, your next-door neighbor may have made a profit trading the same system over the same period of time using the same portfolio of securities. You can save the effort and heartbreak of losing money before actually trading a system that you really know nothing about by using TradeSim's advanced statistical analysis to thoroughly investigate a trading system's historical performance.

For a given portfolio, every trading system will have a so-called footprint or signature, which is a way of categorizing the trading system's performance.

Looking for the Holy Grail

Most inexperienced traders starting out using technical analysis usually jump on the so-called 'Holy Grail' bandwagon. These people believe that the Holy Grail of trading systems means trying to find indicators and trading systems that yield a high percentage of profitable trades. The bad news for these people is that there are no Holy Grail indicators according to their definition of the Holy Grail. However the good news is that the Holy Grail of trading systems does not have to be one that produces a large proportion of winning trades. In fact, seasoned traders often trade systems that yield a smaller proportion of profitable trades compared to unprofitable trades. The reason they are successful has to do with the overall trading system performance rather than looking at a system on a trade-by-trade basis.

If you have read Van Tharp's book *Trade Your way to Financial Freedom*, this notion should be one that is familiar to you. Van Tharp talks about the Holy Grail being a trading system that is statistically profitable in the long run rather one that necessarily produces a high percentage of winning trades. As is explained, trading systems with high winning-to-losing trade ratios can and often do yield substantial

losses. The reason for this behavior has to do with the trade expectation rather than the ratio of winning to losing trades.

Having said all of this it is not hard to produce a trading system that is historically speaking unconditionally profitable and has a high winning number of trades in the vicinity of 70%. However, without using TradeSim (Enterprise Edition) it would be virtually impossible to measure this performance.

Not all Monte Carlo analyzers provide useful results. **NEW**

The TradeSim Monte Carlo analysis is unique in that it provides a true portfolio Monte Carlo analysis rather than a Monte Carlo analysis based on time series shuffling or synthesis of trades using random generators and price distributions. When thousands of simulations are run in a TradeSim Monte Carlo analysis each simulation represents a real world portfolio-trading scenario, which uses real trades that occurred from the historical trade databases. Unlike other software TradeSim does not synthesize trades by time series shuffling or price synthesis using questionable price distributions.

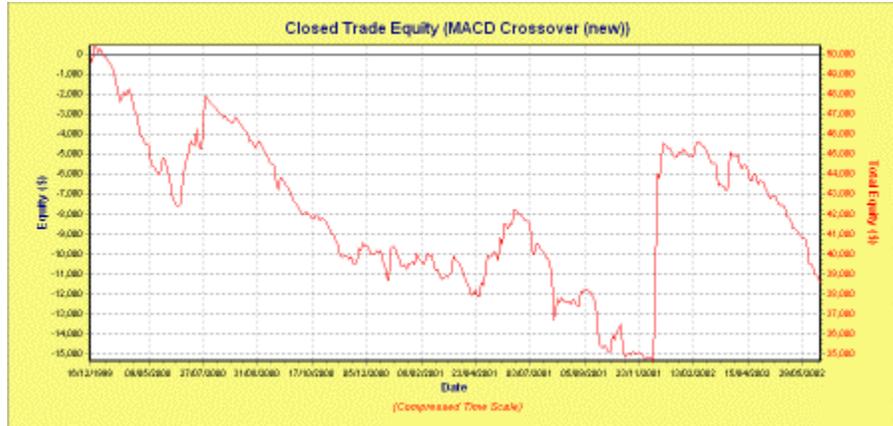
Looked at it another way when TradeSim runs a 10,000 run Monte Carlo simulation on the top 200 stocks it is like having 10,000 traders trading from the same portfolio or universe of securities, and using the same trading rules. If there are a large number of trades with the same entry dates then you would expect each trader to come up with a different result as each trader would not choose exactly the same trades even though they are obeying the same set of trading rules. Because of this capability we believe our Monte Carlo analysis is unique and stands alone compared to any other offering from any other vendor.

The Portfolio Optimization Myth !! **NEW**

Some vendors of charting and trading software offer trading system optimizers. Essentially an optimizer steps through a set of trading system values and runs a simulation for each set of values and plots a performance metric in a table or on chart. From this it is possible to see which set of trading parameters produce the most optimum results. Apart from the issues of curve fitting and unrealistic expectations of trading a real world system there are some potentially hidden traps especially when it comes to trying to optimize a portfolio trading system.

We often get emails asking whether or not TradeSim offers optimization of a portfolio trading system. My response to this is that to do it properly you would have to run a full TradeSim Monte Carlo analysis every time you stepped a trading parameter. The reason for this stems from the fact that it is not possible to characterise a portfolio trading system with one simulation and set of results. This is because there are many different valid trading possibilities as one trades a trading system from a universe or portfolio of securities. For example the two equity charts shown below obtained from consecutive simulations of the same trading system, same portfolio hence same trade database show that just by selecting different trades can have a significant impact on the final result !! Which one do you use to determine the performance of the trading system ??





Depending on the complexity of the trading system and the size of the trade database you may have to run a 10,000 run Monte Carlo analysis each time you stepped a trading parameter. This may mean running 100 Monte Carlo runs or 1,000,000 simulations !! Even then it is not a simple matter of inspecting a simple performance metric such as average net profit as each Monte Carlo run will be characterized by a complete set of statistics, data histograms and distributions. Again compounding the problem even further is the fact that not all statistical distributions produced by TradeSim exhibit a regular distribution. Some distributions have double humps whilst others are completely irregular and trying to characterize this using a single metric is totally misleading and thwart with danger for any trader who takes it on face value !!!

Any vendor of a charting package who claims that their software performs portfolio optimization without proper statistical analysis obviously only runs one portfolio simulation for each set of trading parameters. Trying to characterize the performance of a portfolio trading system from the results of one portfolio simulation is totally misleading and pointless !!

Vendors who claim their software offers portfolio optimization as some sort of fancy 3D color-coded surface chart either does not understand the problem or are purposely misleading the public with their hyped up claims !!!

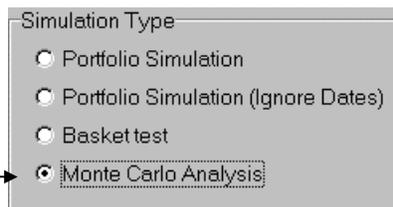
Advanced Statistical Analysis using TradeSim {E}

The Enterprise edition of TradeSim allows you to evaluate the statistical performance of a trading system. TradeSim (Enterprise Edition) automates the process of running multiple trade simulations on the same trading system and then using the results of each simulation to build up a statistical profile of the system. This statistical profile is like a signature or footprint of the trading system. It is a way of fully characterising the historic performance of a trading system.

Setting up a Monte Carlo Simulation

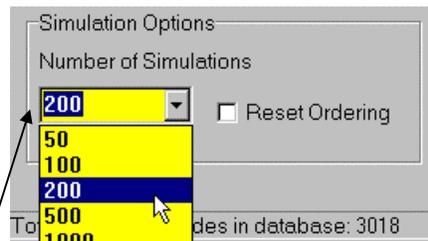
To enable Monte Carlo analysis just select the appropriate option in the *Simulation Type* group box on the *Trade Parameters* window as shown below.

To enable Monte Carlo analysis select this Radio Group item
Group item
Checkbox



Simulation Options

This group box contains two parameters as shown below.



❑ Number of Simulations

This parameter is a numeric value and represents the number of trade simulations to be performed during a Monte Carlo Analysis. During each analysis a random number generator is used to select stocks based on the same entry date. As a result, no two simulations will produce the same results unless the number of security permutations is small. You can either type in a value that is greater than 1 or select a value from the drop down combo box.

❑ Reset Ordering

When this option is checked the ordering of securities is reset to the same ordering as displayed in the Trade Database Window before a Monte Carlo analysis is run. When this option is unchecked then the last ordering used in the last simulation is used.

A Monte Carlo Simulation using TradeSim {E}

As an example, we will use TradeSim (Enterprise Edition) to build a profile of our earlier example MACD crossover trading system. Later we will use these results and make some simple modifications to the system that will make dramatic improvements to the system performance. The trading system can be specified using the following indicators.

```
EntryTrigger := Cross(MACD(), Mov(MACD(), 9, E));
```

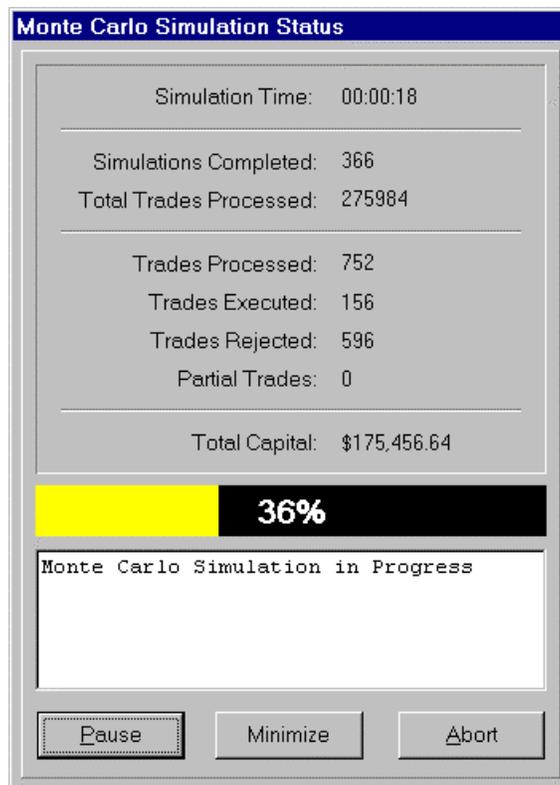
```

EntryPrice := CLOSE;
ExitTrigger := Cross(Mov(MACD(), 9, E), MACD());
ExitPrice := CLOSE;

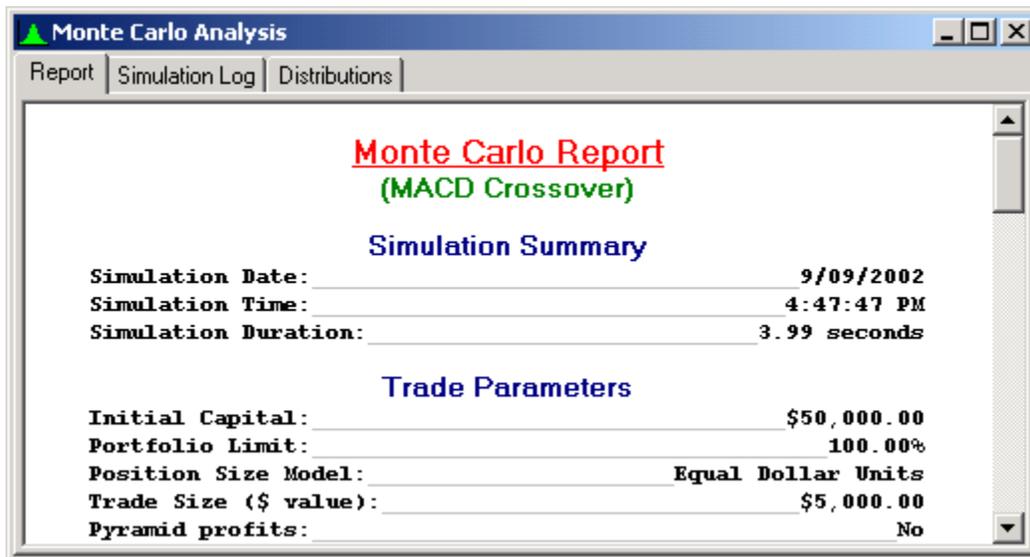
```

Trade Parameter	Value
System Type	MACD Crossover
Initial Stop Used	No
Portfolio	ASX 200
Earliest Entry Date	6-Dec-1996
Latest Entry Date	9-March-2001
Position Size Model	Equal Dollars Model
Pyramid Profits	No
Initial Trade Capital	\$50000
Portfolio Limit	100%
Transaction Cost	0
Capital per Trade	\$5000
Position Size Limit	100%
Simulation Type	Monte Carlo Analysis
Number of Simulations	200

First load up the example trade database “MACD Crossover.trb”. Now click on the **Start Monte Carlo Simulation** button to start a simulation. When a Monte Carlo simulation is in progress, the Simulation Status screen will pop up over the top of everything else like it did in the single simulation. However all of the status information is now updated at the end of each simulation, not as each trade is processed. The **Simulations Completed** indicates the total number of simulations completed and the **Total Trades Processed** now indicates the total tally of all of the trades processed for all of the simulations currently completed. This can add up to millions of trades depending on the total number of simulations and the total number of trades selected in the trade database.



At the end of the analysis we will be presented with a comprehensive report window as shown in the screen snapshot below.



Before we talk about the *Statistics Summary* Report we shall take a look at the Simulation Log by clicking on the *Simulation Log* Tab.

Simulation Log

The results of the Simulation Log are shown in the table below. This table contains summary information for each of the simulations. Instead of generating a single report page for each simulation, all of the results are recorded in tabular form. Note that only a portion of the columns and lines in the table are displayed in the report below. To see the other columns and lines, you need to scroll the window using the horizontal or vertical scroll bars, respectively.

The screenshot shows the "Simulation Log" tab active, displaying a table with the following data:

Simulat...	Trades Executed	Winning Trades	Winning Trades (%)	Variance	Losing
1	768	247	32.16%	0.22	50
2	744	237	31.85%	0.22	48
3	765	217	28.37%	0.21	53
4	602	177	29.40%	0.21	40
5	738	229	31.03%	0.22	48
6	755	209	27.68%	0.20	53
7	724	233	32.18%	0.22	47
8	743	209	28.13%	0.21	51
9	675	204	30.22%	0.21	45
10	689	206	29.90%	0.22	45
11	755	235	31.13%	0.22	49
12	738	230	31.17%	0.22	48
13	706	207	29.32%	0.21	48
14	755	235	31.13%	0.22	49

Column Description

The following are descriptions for each of the columns in the *Simulation Log*. Note that descriptions are given to columns even though they are not visible in the example above.

- ❑ **Simulation**
This column represents the actual simulation index. That is, it is a numerical representation of the ordering of the simulations.
- ❑ **Total Trades**
This column represents the total number of trades executed during a simulation.
- ❑ **Winning Trades**
This column represents the number of winning trades during a simulation.
- ❑ **Winning Trades (%)**
This column represents the percentage of winning trades during a simulation.
- ❑ **Variance**
This column represents the winning trades variance.
- ❑ **Losing Trades**
This column represents the number of losing trades during a simulation.
- ❑ **Losing Trades (%)**
This column represents the percentage of losing trades during a simulation.
- ❑ **Variance**
This column represents the losing trades variance.
- ❑ **Net Profit**
This column represents the total net profit at the end of a simulation.
- ❑ **Profit (%)**
Same as the above but expressed as a percentage of the initial capital.
- ❑ **Int Rate (%)**
This column represents the equivalent annualized (yearly) compound interest rate based on the *Net Profit* and the *Total Trade Duration* for each simulation. It is calculated based on 365 days in each year.
- ❑ **Largest Win**
This column represents the largest winning trade.
- ❑ **Largest Loss**
This column represents the largest losing trade.
- ❑ **Expectation**
This column represents the normalized trade expectation and is expressed in the number of dollars returned for every dollar risked.
- ❑ **Maximum Relative Drawdown**
This column represents the maximum relative trade drawdown in dollars during the course of the trade simulation.

Sorting the columns

Clicking on the column headers activates a sorting routine that resorts the list according to the information contained in the respective column. For example, clicking on the *Net Profit* header will sort the list in ascending (or descending) order based on the numeric value of the net profit. Likewise clicking on the *Maximum Drawdown* column header will sort the list based on the numeric value of that particular column. Alternately clicking on the same column will resort the list in the opposite direction. To reset the ordering of the list back to the default just sort the list by the simulation index column.

Exporting the Simulation Log

It is possible to export the data from the Simulation Log in a variety of formats, which include: -

- Hypertext Markup Language (.html and .htm) format
- Comma Separated Values file (.csv)

To access this facility just right click on the Simulation Log Window and select the Export file option. A file save dialogue box will appear asking you to select the appropriate file and file format. Select the appropriate file format from the *Save as Type*: drop-down menu and then select a file or use the optional

filename given in the **File Name** field. You do not need to specify a file extension, as one will be automatically appended.

Statistics Summary Report Tab

Clicking on the statistics summary tab will reveal the *Statistics Summary* report. The summary is grouped into a number of categories, which are described in detail below. The following is an example of the Monte Carlo Report.

Monte Carlo Report (Equis Bollinger Bands)

Simulation Summary

Simulation Date:	9/09/2002
Simulation Time:	5:00:04 PM
Simulation Duration:	3.86 seconds

Trade Parameters

Initial Capital:	\$50,000.00
Portfolio Limit:	100.00%
Position Size Model:	Equal Dollar Units
Trade Size (\$ value):	\$5,000.00
Pyramid profits:	No
Transaction cost (Trade Entry):	\$0.00
Transaction cost (Trade Exit):	\$0.00

Trade Preferences

Trading Instrument:	Stocks
Break Even Trades:	Process separately
Trade Position Type:	Process all trades
Entry Order Type:	Default Order
Exit Order Type:	Default Order
Minimum Trade Size:	\$500.00
Accept Partial Trades:	No
Volume Filter:	Ignore Volume Information

Simulation Stats

Number of trade simulations:	1000
Trades processed per simulation:	720
Maximum Number of Trades Executed:	97
Average Number of Trades Executed:	86
Minimum Number of Trades Executed:	76
Standard Deviation:	3.49

Profit Stats

Maximum Profit:	\$86,728.99 (173.46%)
Average Profit:	\$51,962.21 (103.92%)
Minimum Profit:	\$19,888.14 (39.78%)
Standard Deviation:	\$10,981.34 (21.96%)
Probability of Profit:	100.00%
Probability of Loss:	0.00%

% Winning Trade Stats

Maximum percentage of winning trades:	72.09%
Average percentage of winning trades:	64.57%
Minimum percentage of winning trades:	55.70%
Standard Deviation:	2.77%

% Losing Trade Stats

Maximum percentage of losing trades:	43.04%
Average percentage of losing Trades:	34.81%
Minimum percentage of losing trades:	27.91%
Standard Deviation:	2.53%

Average Relative % Drawdown Stats

Maximum of the Average Relative Percent Drawdown:	1.60%
Average of the Average Relative Percent Drawdown:	0.91%
Minimum of the Average Relative Percent Drawdown:	0.60%
Standard Deviation:	0.17%

Average Relative \$ Drawdown Stats

Maximum of the Average Relative Dollar Drawdown: \$1,407.58
 Average of the Average Relative Dollar Drawdown: \$866.01
 Minimum of the Average Relative Dollar Drawdown: \$577.75
 Standard Deviation: \$143.20

Maximum Absolute \$ Drawdown Stats

Maximum Absolute Dollar Drawdown: \$28,722.31
 Average Absolute Dollar Drawdown: \$11,946.76
 Minimum Absolute Dollar Drawdown: \$9,177.45
 Standard Deviation: \$3,620.72

Average Relative \$ Drawdown Stats

Maximum of the Average Relative Dollar Drawdown: \$982.52
 Average of the Average Relative Dollar Drawdown: \$715.10
 Minimum of the Average Relative Dollar Drawdown: \$510.79
 Standard Deviation: \$95.57

Maximum Absolute \$ Drawdown Stats

Maximum Absolute Dollar Drawdown: \$36,117.43
 Average Absolute Dollar Drawdown: \$21,326.65
 Minimum Absolute Dollar Drawdown: \$12,763.91
 Standard Deviation: \$4,255.58

Report Description**Simulation Summary**

- **Simulation Date**
This is the date at which the Monte Carlo Simulation was carried out.
- **Simulation Time**
This is the time at which the Monte Carlo Simulation was carried out.
- **Simulation Duration**
This is time for the complete duration of the Monte Carlo analysis.

Trade Parameters and Preferences

These parameters mirror the parameters setup in the *Trade Parameters* and *Trade Preferences* window.

Simulation Stats

- **Number of trade simulations**
This is the total number of complete trade simulations carried out.
- **Trades Processed per simulation**
This is the number of trades processed per simulation, which is always the same number for each simulation.
- **Average Number of Trades executed**
This is the average value of all of the values in the *Trades Executed* column of the *Simulation Log*. The equivalent percentage value is shown in parentheses.
- **Maximum Number of Trades executed**
This is the maximum value of all of the values in the *Trades Executed* column of the *Simulation Log*. The equivalent percentage value is shown in parentheses.
- **Minimum Number of Trades executed**
This is the minimum value of all of the values in the *Trades Executed* column of the *Simulation Log*. The equivalent percentage value is shown in parentheses.

Profit Stats

- **Average Profit**
This is the average value of all of the values in the *Net Profit* column of the *Simulation Log*. The equivalent percentage value is shown in parentheses.
- **Maximum Profit**
This is the maximum value of all of the values in the *Net Profit* column of the *Simulation Log*. The equivalent percentage value is shown in parentheses.

- **Minimum Profit**
This is the minimum value of all of the values in the *Net Profit* column of the *Simulation Log*. The equivalent percentage value is shown in parentheses.
 - **Standard Deviation** **UPDATED**
This is the Standard Deviation of the profit distribution for both dollar and (percentile) profits. For a normally distributed population, the one-standard-deviation limits correspond to 68% of the population as the sample size approaches infinity. However not all frequency distributions show normality so the 68% rule does not necessarily apply.
 - **Probability of Profit**
This value represents the probability that this trading system will yield a profit. It is calculated by taking the ratio of the number of profitable outcomes to the total number of simulations and is expressed as a percentage. Ideally one should aim for a 100% probability of profit. This means that no matter what securities are chosen the system will always be profitable. A 50% probability of profit means that the odds of achieving a profit with this trading system is 1 to 1—or equivalent to the outcome of tossing a coin. It should be noted that this figure does not give any indication as to the size of the profit, but rather it is an indication of the trading system's potential to yield a profit.
 - **Probability of Loss**
This value represents the probability that this trading system will yield a loss. It is calculated by taking the ratio of the number of losing outcomes to the total number of simulations and is expressed as a percentage. Ideally one should aim for a 0% probability of loss. This means that no matter what securities are chosen the system will always be profitable.
- **% Winning Trade Stats**
 - **Average percentage of winning trades**
This is the average value of all of the values in the *Winning Trades (%)* column of the *Simulation Log*.
 - **Maximum percentage of winning trades**
This is the maximum value of all of the values in the *Winning Trades (%)* column of the *Simulation Log*.
 - **Minimum percentage of winning trades**
This is the minimum value of all of the values in the *Winning Trades (%)* column of the *Simulation Log*.
 - **Standard Deviation**
This is the standard deviation of all of the values in the *Winning Trades (%)* column of the *Simulation Log*. For a normally distributed population, the one-standard-deviation limits correspond to 68% of the population as the sample size approaches infinity. However not all frequency distributions show normality so the 68% rule does not necessarily apply.
 - **% Losing Trades Stats**
 - **Average percentage of losing trades**
This is the average value of all of the values in the *Losing Trades (%)* column of the *Simulation Log*.
 - **Maximum percentage of losing trades**
This is the maximum value of all of the values in the *Losing Trades (%)* column of the *Simulation Log*.
 - **Minimum percentage of losing trades**
This is the minimum value of all of the values in the *Losing Trades (%)* column of the *Simulation Log*.
 - **Standard Deviation**
This is the standard deviation of all of the values in the *Losing Trades (%)* column of the *Simulation Log*. For a normally distributed population, the one-standard-deviation limits correspond to 68% of the population as the sample size approaches infinity. However not all frequency distributions show normality so the 68% rule does not necessarily apply.
 - **Drawdown Stats**
Versions 2.4.0 and later include drawdown stats. Please see the [Addendum to TradeSim Enterprise](#) at the end of this chapter for more details

Exporting the Reports

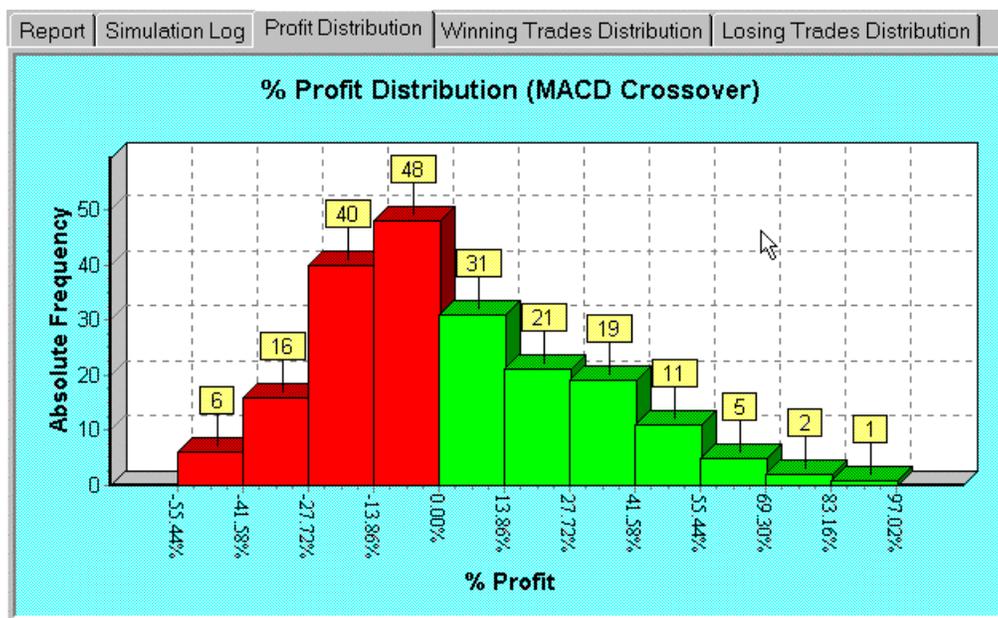
[See Appendix 'F' for more details.](#)

Statistics and Frequency Distributions

Before we discuss probability distributions we need to talk about some basic concepts regarding random events and frequency distributions. For those that are unfamiliar with the concepts of statistics and frequency distributions we suggest that you read [Appendix D](#).

Profit Distribution

The Simulation Log produced a tabular representation of the results from the Monte Carlo analysis. To gain more insight into the behaviour of the trading system using the results obtained it is often helpful to look at the distribution of profit data in graphical form. We can do this by using the data from the *Simulation Log* to construct a frequency distribution chart. To view the profit distribution chart just click on the **Profit Distribution** tab on the Monte Carlo report window. The profit distribution should look something like the following:



The horizontal axis of the distribution chart represents the net profit. The horizontal axis is divided up into a number of regions that represent a range of percentage net profit values. The vertical axis of distribution chart is a measure of the number of samples in the population that produce an outcome that lies in a specific range of net profit. For example, out of the 200 simulations in the example, only 31 produced a profit between 0% and 13.86%. Similarly, only one simulation produced a profit between 83.16% and 97.02% whilst 48 simulations produced profits that ranged between -13.86% and 0%. Like any frequency distribution chart for any random process the area under the curve is a representation of the probability of obtaining an outcome that falls within that region. For example if we wanted to work out the probability of the system generating a profit then we would add up all of the samples that produced positive net profit results (the green part of the distribution chart). In this example we have:

$$\begin{aligned}
 &\text{Total number of profitable simulations} \\
 &= 31+21+19+11+5+2+1 \\
 &= 90
 \end{aligned}$$

Probability of a profit

$$\begin{aligned}
 &= \text{Total number of profitable simulations/Total number of simulations} \\
 &= 90/200 \\
 &= 0.45 \\
 \text{or} &= 45 \%
 \end{aligned}$$

This is the exact figure that is reported in the *Summary Statistics* report. Likewise, for the simulations with a net loss the probability can be calculated in a similar way to the profits by adding up the total number of simulations that produced a loss (the red part of the distribution chart). So repeating the exercise we have:

Total number of losing simulations

$$\begin{aligned}
 &= 48+40+16+6 \\
 &= 110
 \end{aligned}$$

Probability of loss

$$\begin{aligned}
 &= \text{Total number of losing simulations/Total number of simulations} \\
 &= 110/200 \\
 &= 0.55 \\
 \text{or} &= 55 \%
 \end{aligned}$$

This is exactly the same as the figure that is reported in the *Summary Statistics* report. An easier way to calculate the probability of a loss once the probability of a profit is known is to subtract the probability of profit from 1, i.e.,

$$\begin{aligned}
 \text{Probability of loss} &= 1 - \text{Probability of Profit} \\
 &= 1 - 0.45 \\
 &= 0.55 \\
 &= 55 \%
 \end{aligned}$$

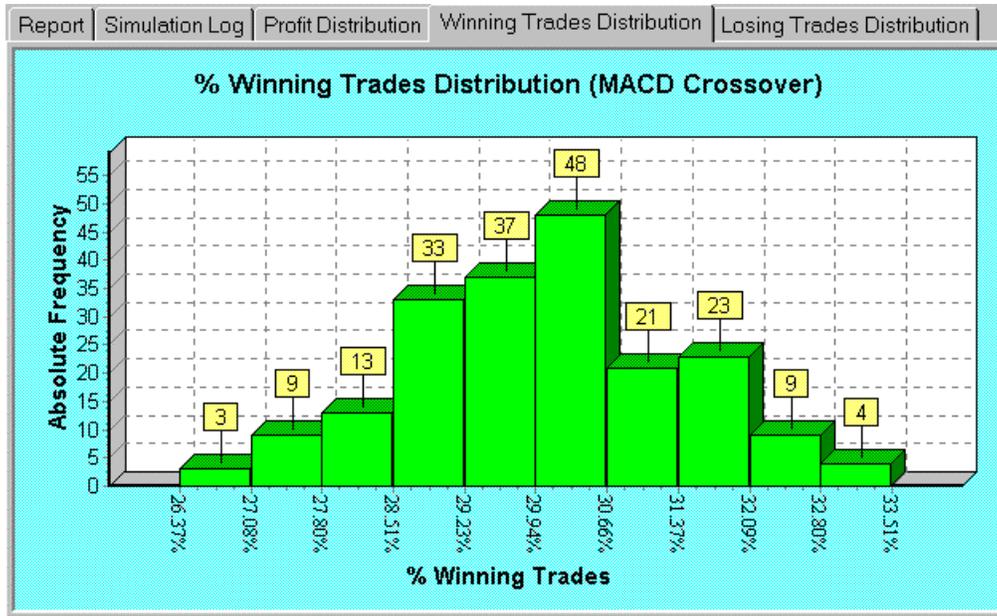
What are we looking for?

Ideally we would like to develop a system that is 100% profitable. This means that we would be confident in trading with a profitable system. Although there is no guarantee of future performance we can only really talk in terms of the most likely outcome rather than the absolute outcome. In terms of the % Profit Distribution chart, we are looking for a distribution that lies exclusively on the right side of the 0% mark with all green-colored bars.

In the MACD example above we can see that there are more outcomes for simulations which lie on the left side of the zero mark than there are on the right side. This is also reflected in the larger probability of loss figure compared with the probability of a profit. What this ultimately tells us is that if we trade this system we may end up with a net profit or net loss, with the bias toward a net loss since we have a larger probability of loss. Even worse is the fact that we have not even taken into account trade commissions, which we set to zero for this example. Including trade commissions in our trading simulations will only reduce the net profitability and will have the effect of shifting the distribution chart to the left, thus further reducing the probability of achieving a net profit after trading this system.

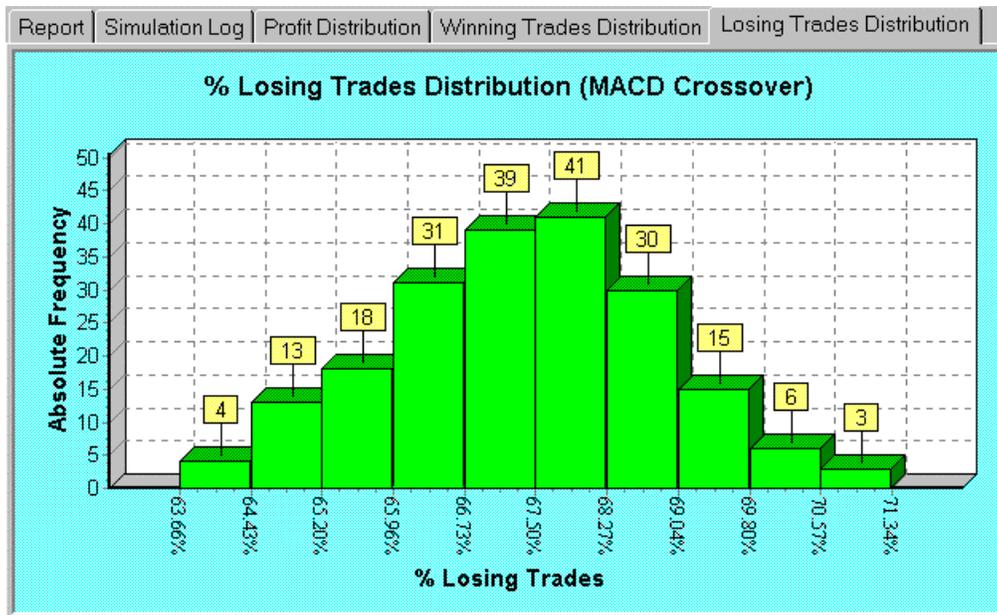
Winning Trades Distribution

The % Winning Trades Distribution chart illustrates the way that the percentage of winning trades per simulation is distributed. The distribution is usually distributed about a mean value and falls off on both sides of the mean value.



Losing Trades Distribution

The % Losing Trades Distribution chart illustrates the way that the percentage of losing trades per simulation is distributed. The distribution chart is usually distributed about a mean value and falls off on both sides of the mean value.



What to look for

Ideally we would like to maximize the percentage of winning trades and minimize the percentage of losing trades even though this is not a prerequisite for a winning trading strategy. The % Winning Trades Distribution chart along with the % Losing Trades Distribution chart can give us further insight into why a trading system may not be performing very well. In the case of the MACD example above, we can see that

it has a relatively low percentage of winning trades and a high percentage of losing trades. Later on in this chapter we will see how we can improve this aspect of the trading system by using a simple modification.

Changing the Distribution Chart display defaults

Right clicking on any of the distribution charts will produce a popup menu like the one shown below.



Frequency Display

You can change the distribution chart display format by selecting the *Frequency Display* submenu item.

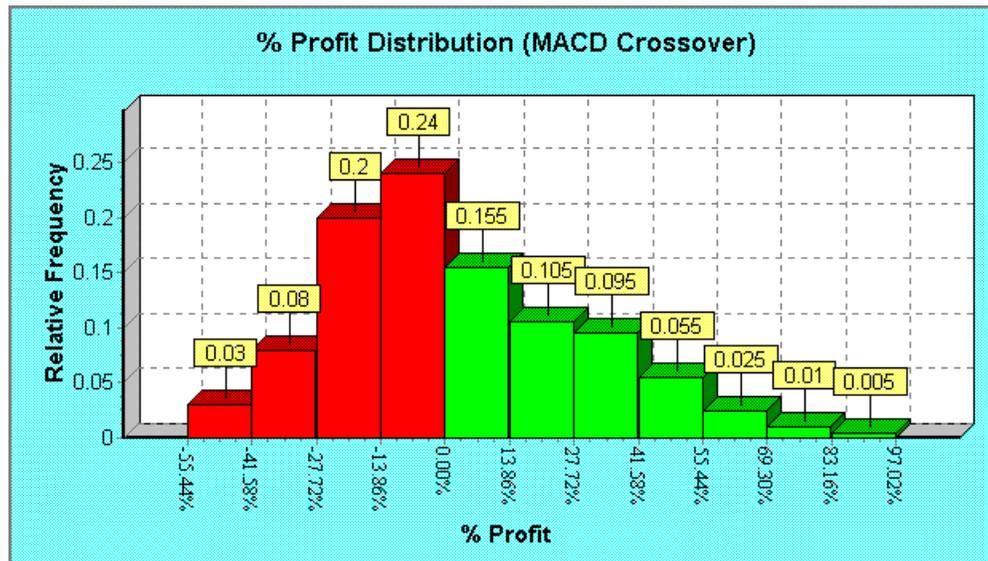


Absolute Frequency

This option generates a distribution chart that displays the actual number of samples.

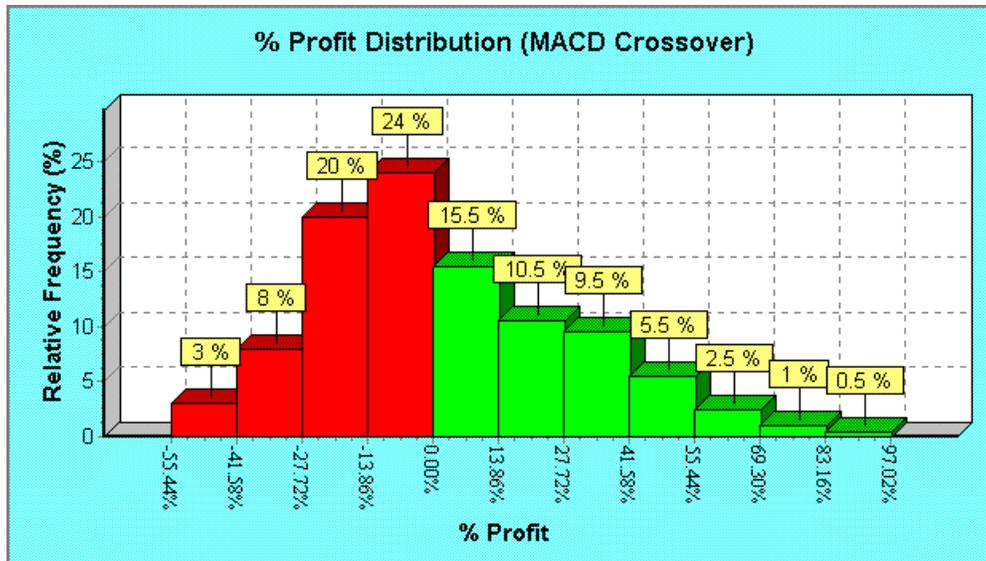
Relative Frequency

This option generates a distribution chart that displays each distribution chart bar as a fraction of the total population size (total number of simulations).



Relative Frequency (%)

This option generates a distribution chart that displays each distribution chart bar as a percentage of the total population size (total number of simulations).



Displaying the distribution chart in fractions rather than population size facilitates easier calculation of probabilities. For example, the probability of the example MACD trading system yielding a profit can be found by simply tallying the bar densities for all of the bars above 0%, the calculation for which is shown below.

Probability of profit

$$\begin{aligned}
 P(X > 0) &= 0.155 + 0.105 + 0.095 + 0.055 + 0.025 + 0.01 + 0.005 \\
 &= 0.45 \\
 &= 45\%
 \end{aligned}$$

where X is a Profit random variable

Similarly, the probability of the example MACD trading system yielding a profit greater than 41.58% can be found by simply tallying up the bar densities for all of the bars above 41.58%, which is:

$$\begin{aligned}
 P(X > 41.58\%) &= 0.055 + 0.025 + 0.01 + 0.005 \\
 &= 0.095 \\
 &= 9.5\%
 \end{aligned}$$

where X is a Profit random variable

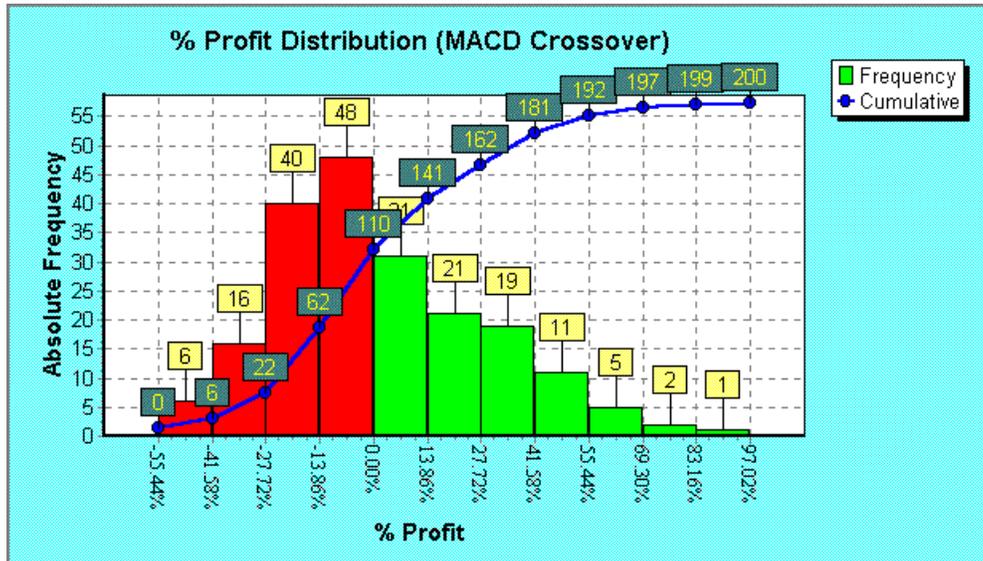
Bars in Distribution chart



This submenu item controls the number of bars in the distribution chart display. If you have a relatively low number of simulations then you will need to use a small number of bars in the distribution chart display, otherwise the distribution chart display will look quite distorted. Alternatively if you carry out a large number of simulations then you might need to increase the number of bars displayed in order to improve the resolution of the distribution chart. By default 10 bars are used. The higher the number of simulations carried out the more accurate the distribution.

(Discrete) Cumulative Frequency Distribution

It is sometimes helpful to display the frequency distribution in terms of a discrete cumulative distribution. The cumulative frequency distribution is just a cumulative tally of all of the frequency bars in the frequency distribution chart. Since we are dealing with a finite sample space the cumulative distribution is really termed a discrete cumulative distribution. To display the cumulative distribution just select the Cumulative Distribution from the popup menu. The resulting display should look something like the following:

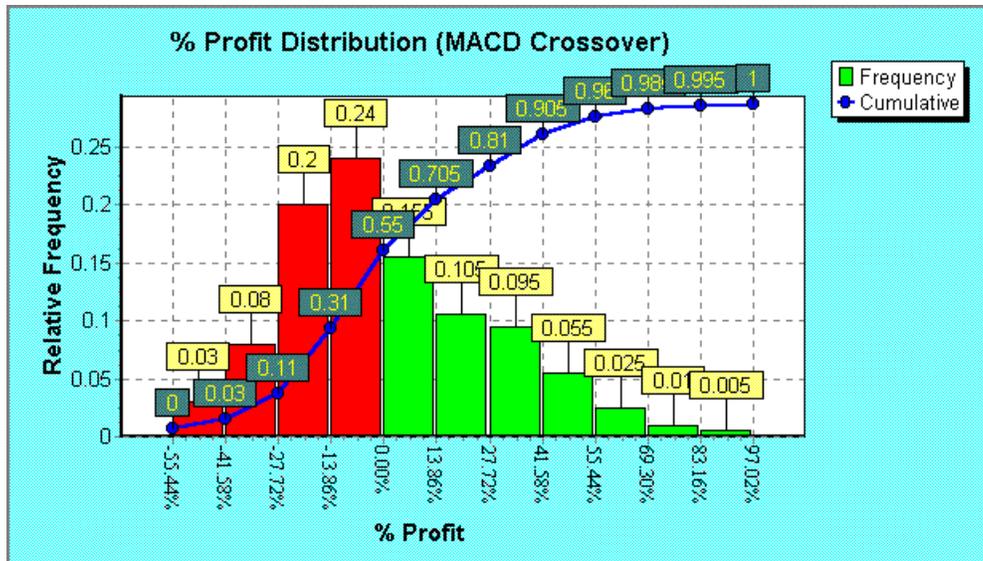


The last point on the cumulative chart will always represent the total sample space size depending on whether you are displaying the chart in terms of absolute or relative frequency. The cumulative distribution chart facilitates easier calculation of probabilities since it only requires one subtraction rather than multiple additions. For instance taking the previous example of the total number of profitable simulations:

$$\begin{aligned}
 &\text{Total number of profitable simulations from the Frequency Distribution} \\
 &= 31+21+19+11+5+2+1 \\
 &= 90
 \end{aligned}$$

$$\begin{aligned}
 &\text{Total number of profitable simulations from the Cumulative Distribution} \\
 &= \text{DCD}(97.02\%) - \text{DCD}(0\%) \\
 &\quad \text{where DCD}(x) \text{ is the discrete cumulative distribution function} \\
 &= 200-110 \\
 &= 90
 \end{aligned}$$

As you can see from the above calculations only one subtraction was required to calculate the total number of profitable trades using the discrete cumulative distribution as opposed to six additions using the frequency distribution. Like the frequency distribution the cumulative distribution can also be displayed with different frequency scales. For example, the above cumulative distribution displayed using relative frequency scale would look like the following:



Using this chart we can easily calculate the probability of a profit: -

$$\begin{aligned}
 \text{Probability of a profit} \\
 P(X > 0) &= 1 - 0.55 \\
 &= 0.45 \\
 &= 45\%
 \end{aligned}$$

Increasing the number of trade simulations

As with any random process, increasing the number of samples will improve the accuracy of the statistical analysis. Tossing a coin—which has equal probability for both outcomes—six times may produce 5 heads in a row and only one tail. This is contrary to the fact that statistics tell us that we should have produced 3 heads and 3 tails. It is not until we toss the coin at least 100 times that the statistical average starts to approximate the theoretical average.

The number of simulations carried out during a Monte Carlo simulation is a trade off between the duration of the simulation and the accuracy of the analysis. By default the Monte Carlo analysis uses 200 simulations. This is okay for small trade databases but for larger databases such as the MACD crossover example we really aren't doing the analysis justice by using such a small sample space. Also if we use a small number of simulations then there is the possibility of missing out on a simulation that could have produced a relatively large loss or profit. The idea of using the Monte Carlo analysis is to exhaustively test the trading system so that we "cover all bases".

There is no empirical formula for determining the number of simulations required to exhaustively test every trade combination since it is almost impossible to calculate the maximum number of combinations or different trading 'routes' for a given trade database and set of trading parameters. As a rule of thumb you should make the number of simulations as large as possible. The larger the number of simulations the more accurate the results will be, and the distribution charts will approach the classic bell-shaped normal probability distribution curve.

It is recommended to first run 500 simulations to get a rough idea of the system's performance, and then run between 5,000-10,000 simulations, in which case it would be advisable to go and have a cup of coffee because this will take some time depending on the speed of your computer. This is where it would be an advantage to use the fastest PC that you can get your hands on.

When running a Monte Carlo simulation with more than 1,000 simulations a message box will pop up asking you whether or not you want to disable the **Simulation Log**. Disabling the **Simulation Log** will increase the processing speed and reduce the memory requirements.

Trade Parameter	Value
System Type	MACD Crossover
Initial Stop Used	No
Portfolio	ASX 200
Earliest Entry Date	6-Dec-1996
Latest Entry Date	9-March-2001
Position Size Model	Equal Dollars Units
Pyramid Profits	No
Initial Trade Capital	\$50000
Portfolio Limit	100%
Transaction Cost	0
Capital per Trade	\$5000
Position Size Limit	100%
Simulation Type	Monte Carlo Analysis
Number of Simulations	5000

The Monte Carlo simulation was rerun on the MACD example with 5000 simulations. The results are shown in the following report.

Monte Carlo Report (MACD Crossover)

Simulation Summary

Simulation Date: 25/07/2001
 Simulation Time: 3:49:58 PM
 Simulation Duration: 518.33 seconds

Trade Parameters

Initial Capital: \$50,000.00
 Portfolio Limit: 100.00%
 Position Size Model: Equal Dollar Units
 Trade Size (\$ value): \$5,000.00
 Pyramid profits: No
 Transaction cost (Trade Entry): \$0.00
 Transaction cost (Trade Exit): \$0.00

Trade Preferences

Trading Instrument: Stocks
 Break Even Trades: Process separately
 Trade Position Type: Process all trades
 Entry Order Type: Default Order
 Exit Order Type: Default Order
 Minimum Trade Size: \$500.00
 Accept Partial Trades: No
 Volume Filter: Ignore Volume Information

Simulation Stats

Number of trade simulations: 5000
 Trades processed per simulation: 6811
 Maximum Number of Trades Executed: 838
 Average Number of Trades Executed: 718
 Minimum Number of Trades Executed: 468
 Standard Deviation: 55.07

Profit Stats

Maximum Profit: \$57,503.76 (115.01%)
 Average Profit: \$708.96 (1.42%)
 Minimum Profit: -\$34,905.25 (-69.81%)
 Standard Deviation: \$13,587.95 (27.18%)
 Probability of Profit: 49.04%
 Probability of Loss: 50.96%

% Winning Trade Stats

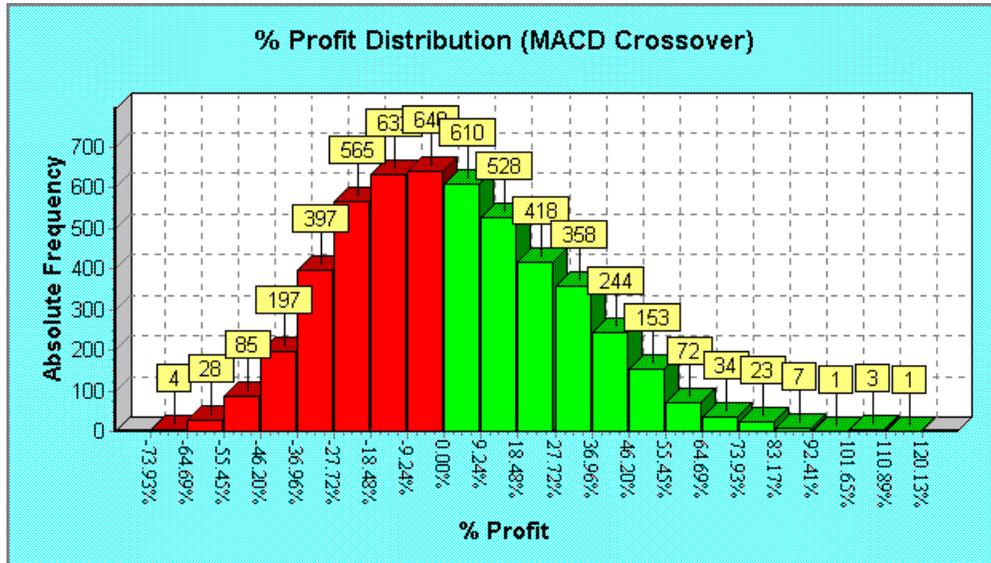
Maximum percentage of winning trades: 35.74%
 Average percentage of winning trades: 29.83%

Minimum percentage of winning trades: 23.89%
 Standard Deviation: 1.39%

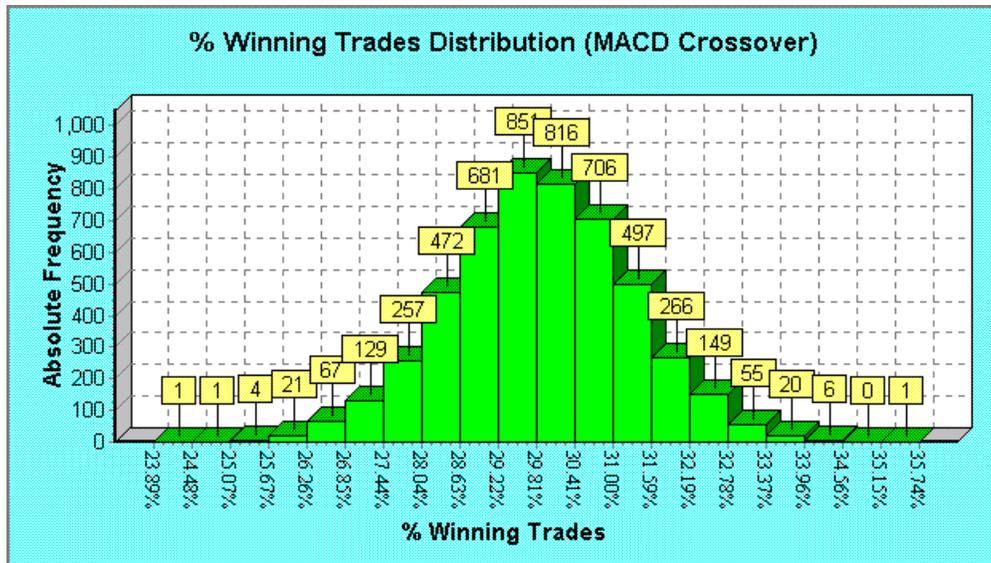
% Losing Trade Stats

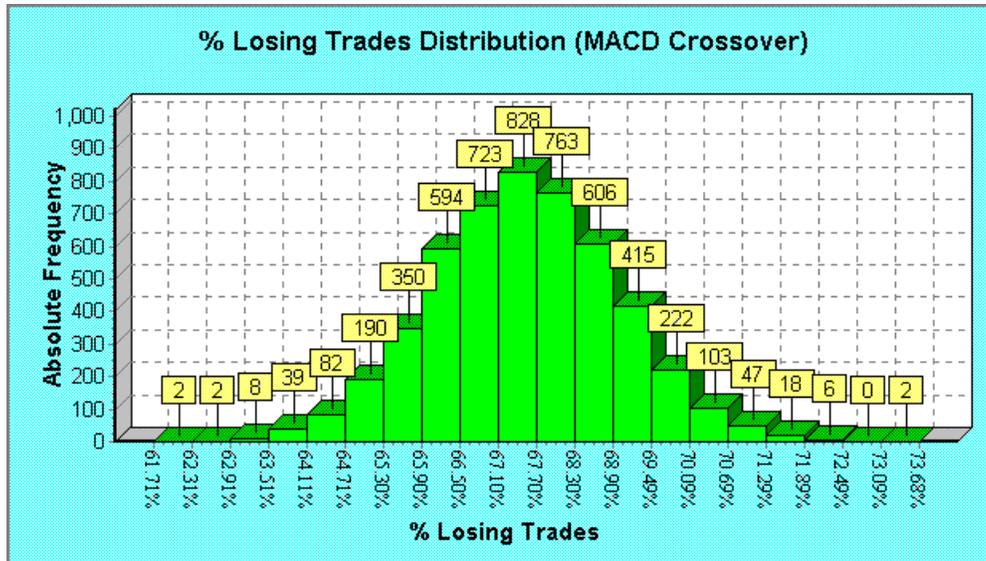
Maximum percentage of losing trades: 73.68%
 Average percentage of losing Trades: 67.48%
 Minimum percentage of losing trades: 61.71%
 Standard Deviation: 1.44%

Shown in the following charts is the % Profit Distribution chart with 20 bars displayed. Note how the distribution chart looks similar to the classic-bell shaped normal probability distribution function.



Shown below are the % Winning Trades and % Losing Trades distribution charts. Like the Profit Distribution charts, both the % Winning and % Losing Trades Distribution charts approximate the classic bell-shaped normal probability distribution function.





Improving the trading system

Using the results obtained from the Monte Carlo analysis, we can conclude that the MACD Crossover trading system is a very mediocre trading system and one that is not worth trading the way it is, and we haven't included transaction costs in the simulations. This trading system has a higher probability of producing a net loss than a profit. Its winning trade percentage is very low. Note that we have not experimented with different position-sizing models, which could be used to improve the bottom-line profitability; nor have we included transaction costs, which will have the effect of reducing net profitability and shifting the bell curve to the left.

Looking at the results from the Monte Carlo simulation, is there any way we can improve its performance? One obvious way of improving its performance would be to improve the percentage of winning trades. With an average winning trade percentage of 29.86% and an average losing trade percentage of 67.45% the most obvious way of improving the winning trades percentage would be to swap the entry and exit triggers in the original MACD Crossover trading system. In the next section we will see the effects of such modifications, and their effects on the trading system performance.

Case Study: Reversed MACD Crossover Trading System

To swap the entry and exit triggers in the original MACD Crossover trading system, we can rewrite the exploration indicators as follows:

```

EntryTrigger := Cross (Mov (MACD () , 9 , E) , MACD () ) ;
EntryPrice := CLOSE ;
ExitTrigger := Cross (MACD () , Mov (MACD () , 9 , E) ) ;
ExitPrice := CLOSE ;

```

After loading the trade data for the Reversed MACD Crossover example, we shall do a Monte Carlo analysis using the following parameters:

Trade Parameter	Value
System Type	MACD Crossover (Reversed)
Initial Stop Used	No
Portfolio	ASX 200
Earliest Entry Date	6-Dec-1996
Latest Entry Date	9-March-2001
Position Size Model	Equal Dollars Units
Pyramid Profits	No
Initial Trade Capital	\$50000
Portfolio Limit	100%
Transaction Cost	0
Capital per Trade	\$5000
Position Size Limit	100%
Simulation Type	Monte Carlo Analysis
Number of Simulations	5000

To analyse this system load up the “MACD crossover (reversed).trb” trade database file. Switching to the Trade Database Window and scrolling through the database list with the color coding option switched on you will immediately notice that there now are a relatively larger number of trades that have a positive percentage change compared to the original MACD Crossover system. This provides a rough indication that the modification of reversing the entry and exit triggers has improved the proportion of winning trades. Now run a Monte Carlo analysis with 5,000 simulations.

Monte Carlo Report (MACD Crossover Reversed)

Simulation Summary

Simulation Date: 26/07/2001
Simulation Time: 12:07:54 PM
Simulation Duration: 277.43 seconds

Trade Parameters

Initial Capital: \$50,000.00
Portfolio Limit: 100.00%
Position Size Model: Equal Dollar Units
Trade Size (\$ value): \$5,000.00
Pyramid profits: No
Transaction cost (Trade Entry): \$0.00
Transaction cost (Trade Exit): \$0.00

Trade Preferences

Trading Instrument: Stocks
Break Even Trades: Process separately
Trade Position Type: Process all trades
Entry Order Type: Default Order

Exit Order Type:	Default Order
Minimum Trade Size:	\$500.00
Accept Partial Trades:	No
Volume Filter:	Ignore Volume Information

Simulation Stats

Number of trade simulations:	5000
Trades processed per simulation:	6773
Maximum Number of Trades Executed:	892
Average Number of Trades Executed:	829
Minimum Number of Trades Executed:	768
Standard Deviation:	16.71

Profit Stats

Maximum Profit:	\$116,603.97 (233.21%)
Average Profit:	\$59,642.09 (119.28%)
Minimum Profit:	\$21,666.30 (43.33%)
Standard Deviation:	\$12,894.13 (25.79%)
Probability of Profit:	100.00%
Probability of Loss:	0.00%

% Winning Trade Stats

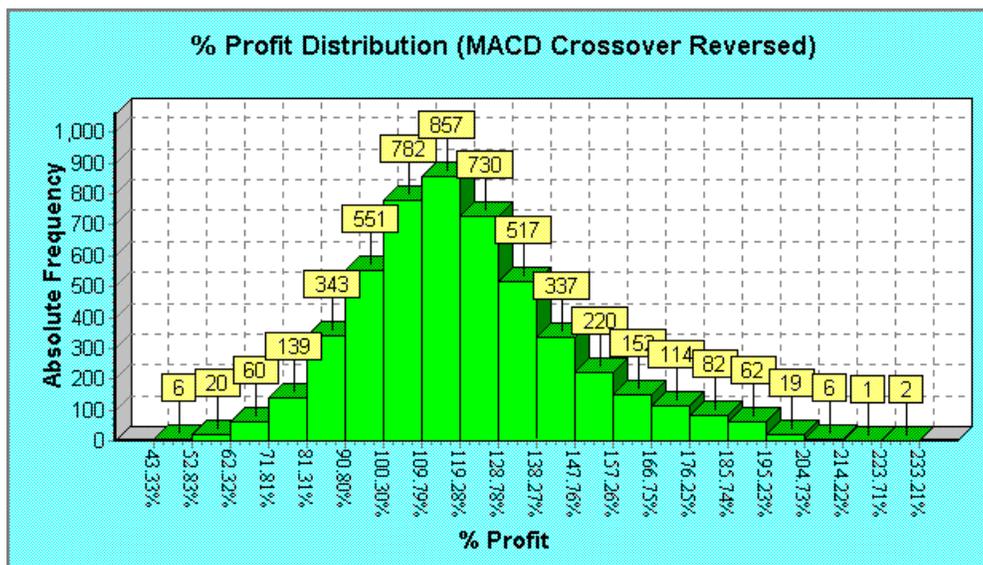
Maximum percentage of winning trades:	75.72%
Average percentage of winning trades:	71.62%
Minimum percentage of winning trades:	67.68%
Standard Deviation:	1.23%

% Losing Trade Stats

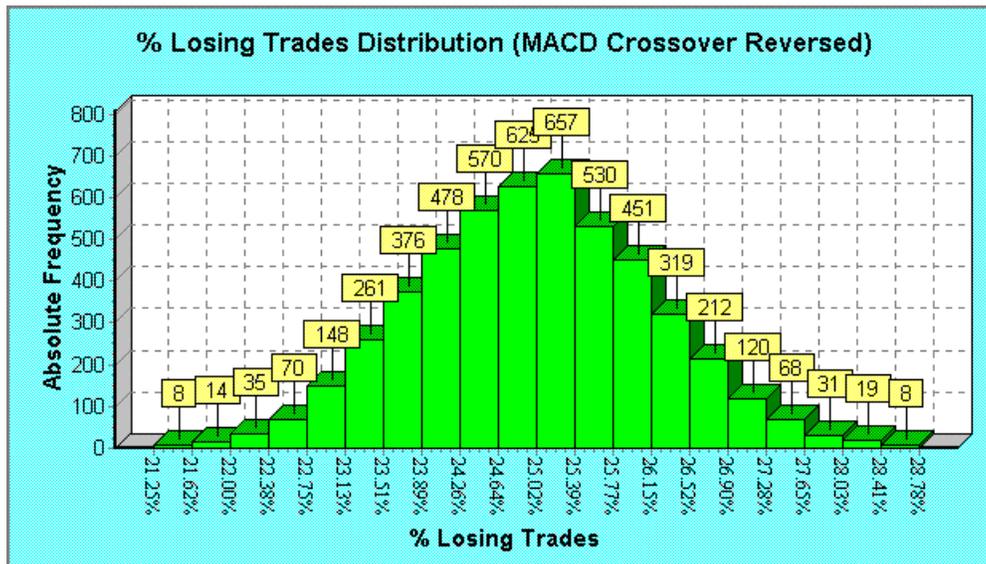
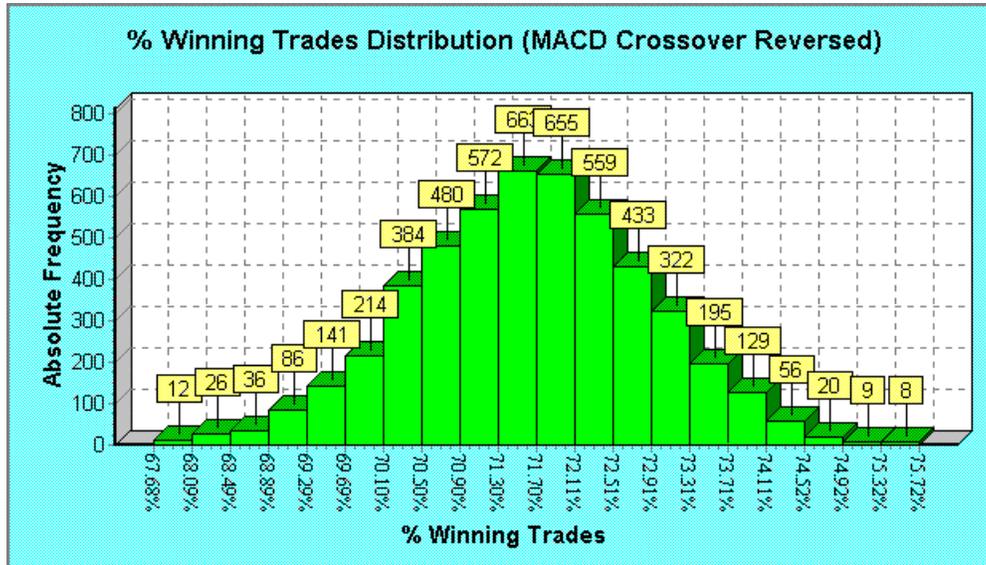
Maximum percentage of losing trades:	28.78%
Average percentage of losing Trades:	24.96%
Minimum percentage of losing trades:	21.25%
Standard Deviation:	1.16%

As can be seen from the *Statistics Summary* report above, there is a striking difference between the two trading systems. Average profit is now 59,642.09 (119.28%) compared to \$708.96 (1.42%) and the minimum profit is now a positive value of \$21,666.30 (43.33%), which means that the probability of obtaining a profit is now 100%. The average percentage of winning and losing trades is now 71.62% and 24.96%, respectively, compared to 29.83% and 67.48% for the original MACD Crossover system.

The Profit Distribution chart shown below now paints a different picture with the distribution chart lying exclusively in positive profit territory. This tells us that this system has been unconditionally profitable in the past and is most likely to be profitable in the future.



The % Winning and % Losing Trades Distribution charts shown below now paint a different picture of the trading system, with a relatively high percentage of winning trades compared to the losing trades. This is why there has been a drastic improvement in the performance of this trading system.



Comments

By swapping the entry and exit conditions of the original MACD crossover trading system we have improved its performance quite dramatically from being an unreliable system to a potentially profitable one. Note that because we have not included transaction costs the performance will actually be worse than what we have obtained; but the point of the exercise was to emphasize the relative difference between the two systems rather than their absolute performance. However the important question that should be asked at this point is why should reversing the entry and exit conditions provide such a dramatic improvement in trading performance?

One possible explanation to this behaviour is contrarian opinion, which states that the majority consensus of all of the market participants is wrong and if you follow the majority you will most likely be wrong as well. The standard MACD Crossover trading system is touted in nearly every book on technical analysis, and as a result, a majority of traders are using it without realising its potential downside. As a result of this the majority of traders using this system will be wrong and produce unsatisfactory results as evidenced by the results from the Monte Carlo analysis. The minority of traders who use the modified MACD Crossover system go against the herd and produce positive results and this is what is substantiated by the results of the Monte Carlo simulations.

Case Study: Random Entry + Bollinger Bands Exit System

The next example we shall look at is a Random Entry system with a Bollinger Band exit and an Initial Stop based on the Average True Range. The Bollinger Band exit trigger is adapted from the Equis Bollinger Band Expert. If you have installed the trade database examples you will find the trade database for this system in the TradeSim data directory. A set of indicators for the trading system is given below.

```

EntryTrig:=ExtFml("TradeSim.Rand")>0.5;
EntryPrice:=CLOSE;
InitialStop:=CLOSE-3*ATR(10);
ExitTrig:=Abs(13-BarsSince(Ref(C>BBandTop(C,20,S,2),-1) AND
H<=Ref(H,-1) AND Ref(H,-1)>=Ref(H,-2) AND
Ref(RSI(14)>65,-1)))<=7 AND
Ref(C>BBandTop(C,20,S,1.25),-1) AND Ref(C<BBandTop(C,20,S,2),-1) AND
H<=Ref(H,-1) AND Ref(H,-1)>=Ref(H,-2) AND
Ref(RSI(14),-1)<ValueWhen(1,Ref(C>BBandTop(C,20,S,2),-1) AND
H<=Ref(H,-1) AND Ref(H,-1)>=Ref(H,-2) AND
Ref(RSI(14)>65,-1),Ref(RSI(14),-1)) AND
BarsSince(C<BBandTop(C,20,S,1.25))<BarsSince(Ref(C>BBandTop(C,20,S,2),-1) AND
H<=Ref(H,-1) AND Ref(H,-1)>=Ref(H,-2) AND
Ref(RSI(14)>65,-1)) AND
BarsSince(C>BBandTop(C,20,S,2))>BarsSince(C<BBandTop(C,20,S,1.25));
ExitPrice:=CLOSE;

ExtFml("TradeSim.Initialize"); { Initialize internal variables }
ExtFml("TradeSim.RecordTrades",
      "Rand Entry + Bollinger Bands Exit",
      LONG,
      EntryTrig,
      EntryPrice,
      InitialStop,
      ExitTrig,
      ExitPrice,
      START);

```

We shall do a Monte Carlo analysis using the following parameters:

Trade Parameter	Value
System Type	Random Entry + Bollinger Bands Exit System
Initial Stop Used	Yes
Portfolio	ASX 200
Earliest Entry Date	18-Feb-1987
Latest Entry Date	14-March-2001
Position Size Model	Fixed Percent Risk Model
Pyramid Profits	Yes
Initial Trade Capital	\$50000
Portfolio Limit	100%
Transaction Cost	\$40
Fraction of Capital Risked per Trade	1.00%
Position Size Limit	100%
Simulation Type	Monte Carlo Analysis
Number of Simulations	5000

Comments

From the results of the analysis, which are shown on the next pages, you will note that this system returns a very good performance without any modification. In fact, this system dispels the myth that no system can be profitable under all market conditions. Note that we have not taken into account other factors such as slippage but this will have the effect of moving the profit distribution to the left slightly.

The profit distribution chart follows the classic skewed bell-shaped curve that falls on the right side of the chart, with an average profit of \$599,041.91 (1,198.10%). This indicates a system, which is unconditionally profitable. The Trade Expectation Distribution chart confirms this observation with an average positive trade expectation of \$1.17 for every dollar risked.

The average percentage of winning trades is 60.69% whilst the average percentage of losing trades is 39.31%.

Without altering the trading system it is possible to improve the performance of this system further by adjusting the fraction of capital risked per trade. For instance you could start from 0.5% of capital risked per trade and go up in increments of 0.05% until you find an optimum value. This is a manual form of optimisation.

Monte Carlo Report (Rand Entry + Bollinger Bands Exit)

Simulation Summary

Simulation Date: 27/06/2001
Simulation Time: 11:33:29 PM
Simulation Duration: 335.76 seconds

Trade Parameters

Initial Capital: \$50,000.00
Portfolio Limit: 100.00%
Position Size Model: Fixed Percent Risk
Percentage of capital risked per trade: 1.00%
Position size limit: 100.00%
Portfolio Heat: 100.00%
Pyramid profits: Yes
Transaction cost (Trade Entry): \$20.00
Transaction cost (Trade Exit): \$20.00

Trade Preferences

Trading Instrument: Stocks
Break Even Trades: Process separately
Trade Position Type: Process all trades
Entry Order Type: Default Order
Exit Order Type: Default Order
Minimum Trade Size: \$0.00
Accept Partial Trades: No

Volume Filter: _____ Ignore Volume Information

Simulation Stats

Number of trade simulations: 5000
 Trades processed per simulation: 3018
 Maximum Number of Trades Executed: 332
 Average Number of Trades Executed: 259
 Minimum Number of Trades Executed: 184
 Standard Deviation: 9.24

Profit Stats

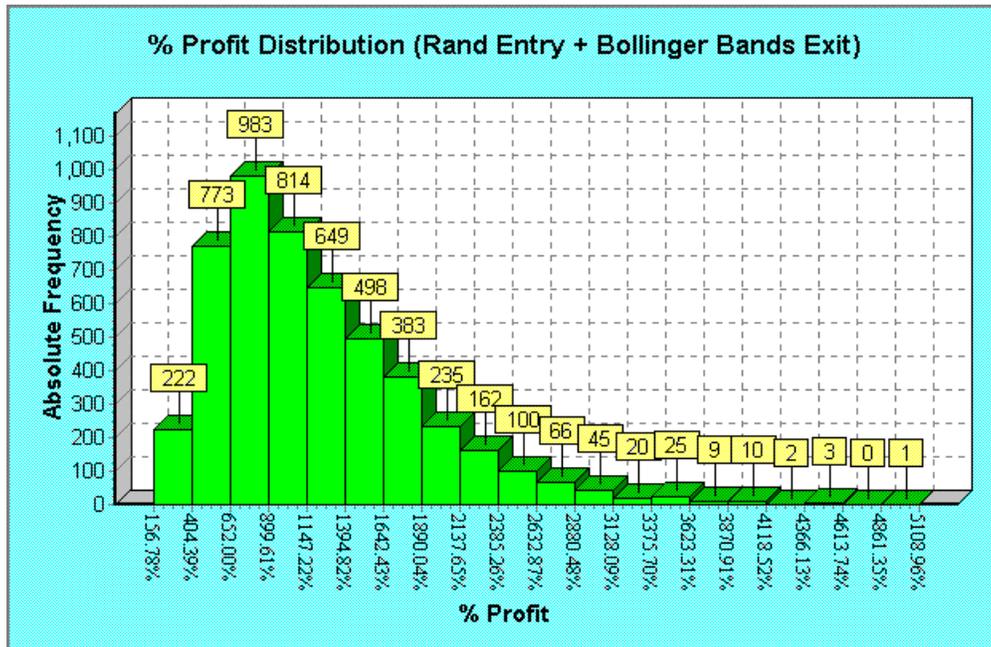
Maximum Profit: \$2,554,479.89 (5109.00%)
 Average Profit: \$599,041.91 (1198.10%)
 Minimum Profit: \$78,389.45 (156.78%)
 Probability of Profit: 100.00%
 Probability of Loss: 0.00%

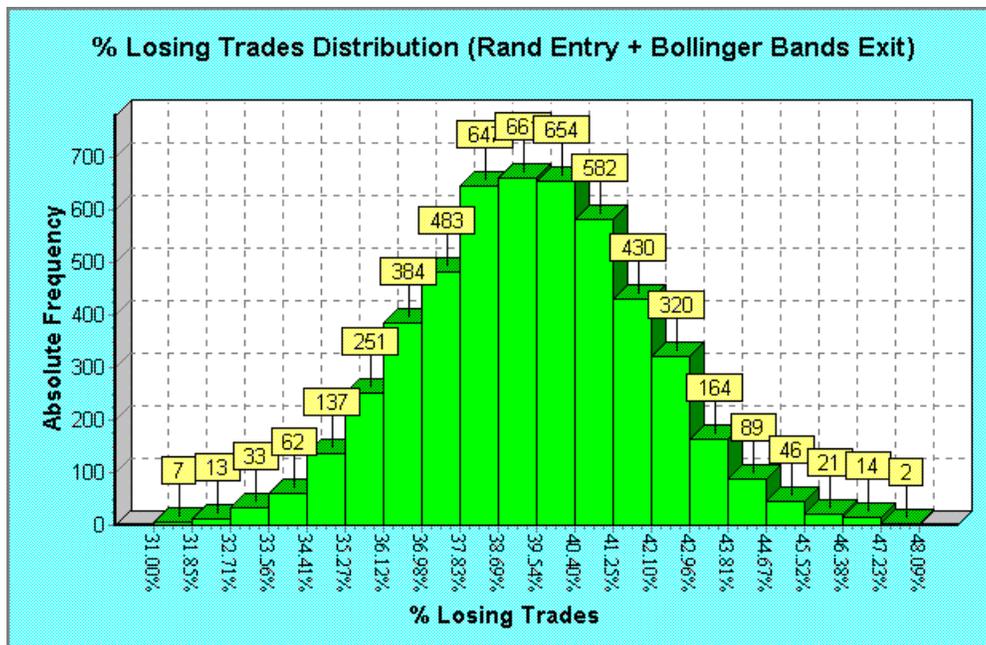
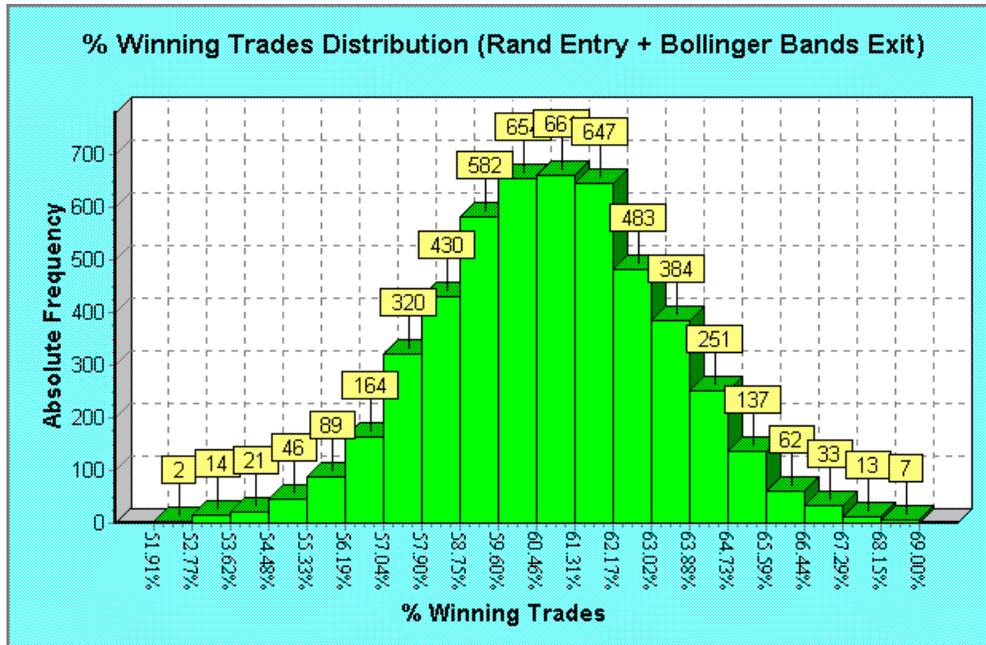
% Winning Trade Stats

Maximum percentage of winning trades: 69.00%
 Average percentage of winning trades: 60.69%
 Minimum percentage of winning trades: 51.91%
 Standard Deviation: 2.49%

% Losing Trade Stats

Maximum percentage of losing trades: 48.09%
 Average percentage of losing Trades: 39.31%
 Minimum percentage of losing trades: 31.00%
 Standard Deviation: 2.49%





Case Study: Trading with limited capital

A lot of entrants into the trading arena often begin trading with a small amount of capital thinking that they can build up equity in the same proportion as traders using a larger initial capital base. However what they don't realise is that there are hidden costs of trading, such as the transaction costs and slippage, as well as taxes. These are the costs of trading. These costs will only reduce your bottom-line profitability, and if they become excessive may even wipe out your initial capital base. TradeSim allows you to specify the total

transaction cost of doing a trade from trade entry to exit so we can easily see the effects of trade transaction costs on the trading system performance.

MACD Crossover (Reversed) system with limited capital

Trade Parameter	Value
System Type	MACD Crossover (Reversed)
Initial Stop Used	No
Portfolio	ASX 200
Earliest Entry Date	6-Dec-1996
Latest Entry Date	9-March-2001
Position Size Model	Equal Dollars Units
Pyramid Profits	No
Initial Trade Capital	\$5000
Portfolio Limit	100%
Transaction Cost	\$40
Capital per Trade	\$1000
Position Size Limit	100%
Simulation Type	Monte Carlo Analysis
Number of Simulations	200

Monte Carlo Report (MACD Crossover Reversed)

Simulation Summary

Simulation Date: 27/06/2001
 Simulation Time: 1:00:32 PM
 Simulation Duration: 17.25 seconds

Trade Parameters

Initial Capital: \$5,000.00
 Portfolio Limit: 100.00%
 Position Size Model: Equal Dollar Units
 Trade Size (\$ value): \$1,000.00
 Pyramid profits: No
 Transaction cost (Trade Entry): \$20.00
 Transaction cost (Trade Exit): \$20.00

Trade Preferences

Trading Instrument: Stocks
 Break Even Trades: Process separately
 Trade Position Type: Process all trades
 Entry Order Type: Default Order
 Exit Order Type: Default Order
 Minimum Trade Size: \$0.00
 Accept Partial Trades: No
 Volume Filter: Ignore Volume Information

Simulation Stats

Number of trade simulations: 200
 Trades processed per simulation: 6773
 Maximum Number of Trades Executed: 331
 Average Number of Trades Executed: 171
 Minimum Number of Trades Executed: 114
 Standard Deviation: 31.26

Profit Stats

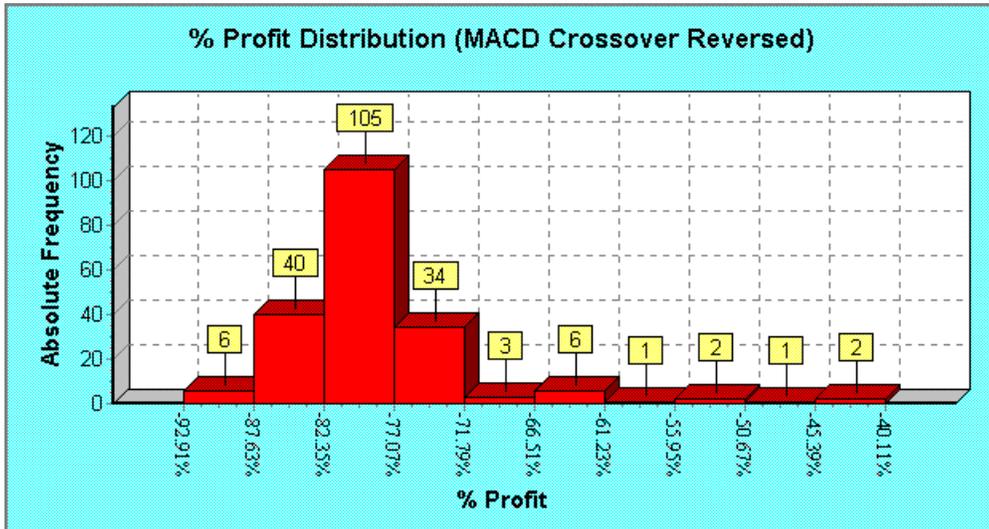
Maximum Profit: **-\$2,005.38 (-40.11%)**
 Average Profit: **-\$3,964.56 (-79.29%)**
 Minimum Profit: **-\$4,645.28 (-92.91%)**
 Probability of Profit: 0.00%
 Probability of Loss: 100.00%

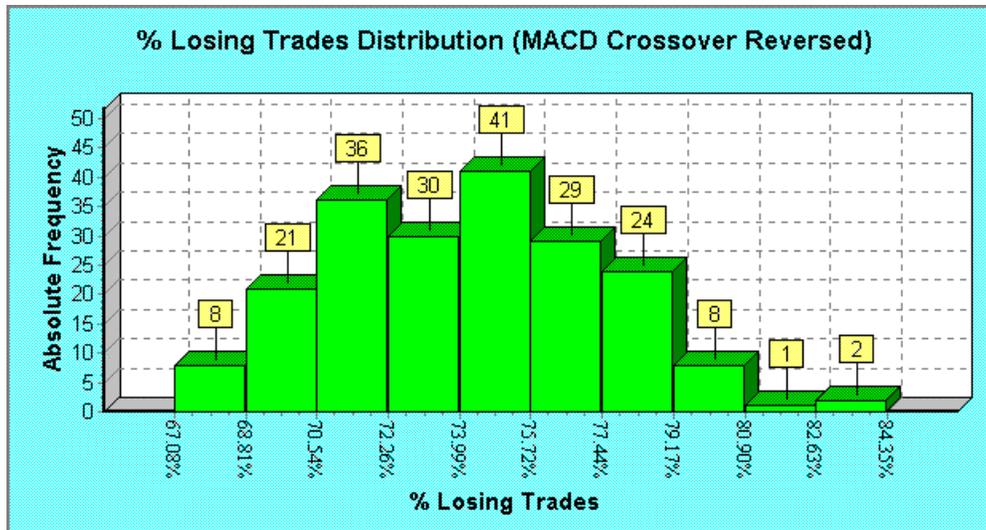
% Winning Trade Stats

Maximum percentage of winning trades: 32.92%
 Average percentage of winning trades: 25.71%
 Minimum percentage of winning trades: 15.65%
 Standard Deviation: 3.31%

% Losing Trade Stats

Maximum percentage of losing trades: 84.35%
 Average percentage of losing Trades: 74.21%
 Minimum percentage of losing trades: 67.08%
 Standard Deviation: 3.31%





Random Entry + Bollinger Bands Exit system with limited capital

Trade Parameter	Value
System Type	Random Entry + Bollinger Bands Exit System
Initial Stop Used	Yes
Portfolio	ASX 200
Earliest Entry Date	18-Feb-1987
Latest Entry Date	14-March-2001
Position Size Model	Fixed Percent Risk Model
Pyramid Profits	Yes
Initial Trade Capital	\$5000
Portfolio Limit	100%
Transaction Cost	\$40
Fraction of Capital Risked per Trade	1.00%
Position Size Limit	100%
Simulation Type	Monte Carlo Analysis
Number of Simulations	200

Monte Carlo Report (Rand Entry + Bollinger Bands Exit)

Simulation Summary

Simulation Date: 27/06/2001
 Simulation Time: 12:53:43 PM
 Simulation Duration: 14.88 seconds

Trade Parameters

Initial Capital: \$5,000.00
 Portfolio Limit: 100.00%
 Position Size Model: Fixed Percent Risk
 Percentage of capital risked per trade: 1.00%
 Position size limit: 100.00%
 Portfolio Heat: 20.00%
 Pyramid profits: Yes
 Transaction cost (Trade Entry): \$20.00
 Transaction cost (Trade Exit): \$20.00

Trade Preferences

Trading Instrument: Stocks

Break Even Trades:	Process separately
Trade Position Type:	Process all trades
Entry Order Type:	Default Order
Exit Order Type:	Default Order
Minimum Trade Size:	\$0.00
Accept Partial Trades:	No
Volume Filter:	Ignore Volume Information

Simulation Stats

Number of trade simulations:	200
Trades processed per simulation:	3018
Maximum Number of Trades Executed:	295
Average Number of Trades Executed:	232
Minimum Number of Trades Executed:	164
Standard Deviation:	22.18

Profit Stats

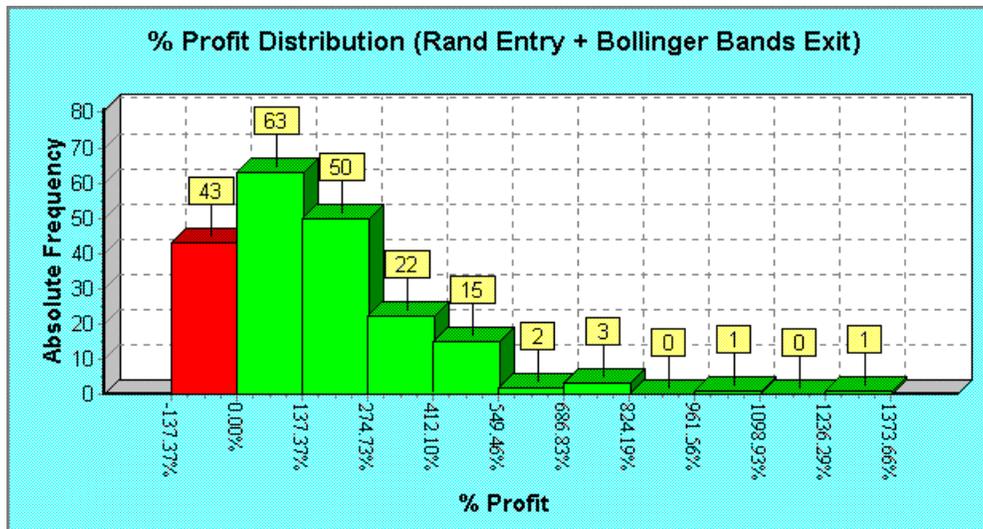
Maximum Profit:	\$63,745.30 (1274.90%)
Average Profit:	\$8,177.54 (163.55%)
Minimum Profit:	-\$4,937.59 (-98.75%)
Probability of Profit:	78.50%
Probability of Loss:	21.50%

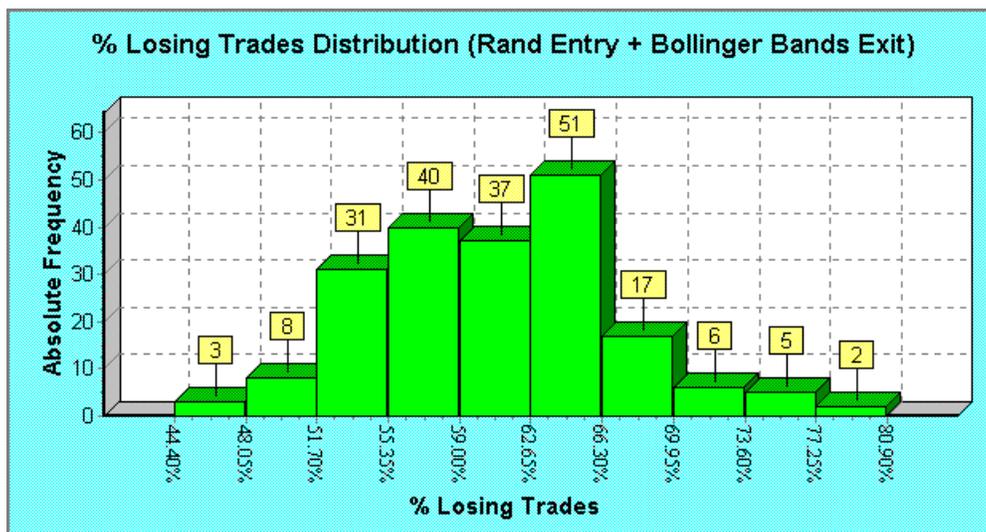
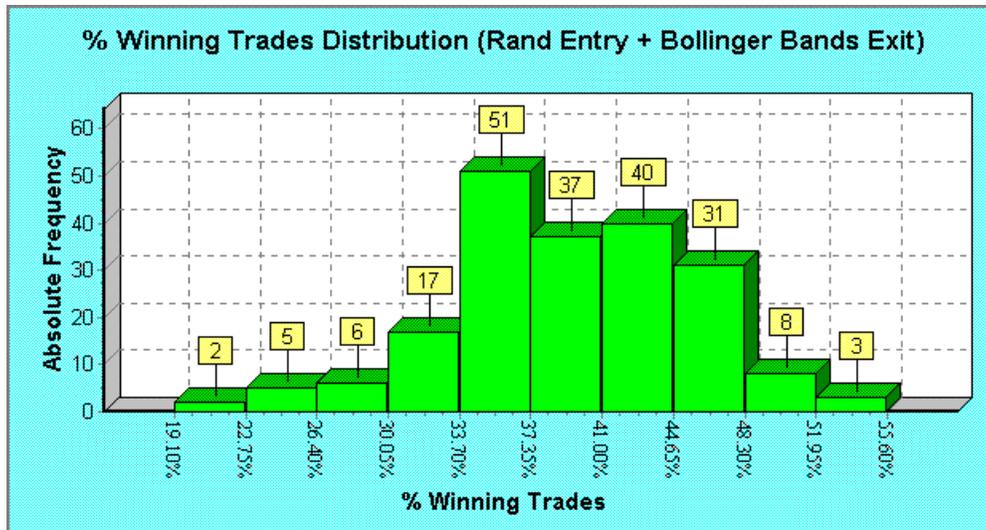
% Winning Trade Stats

Maximum percentage of winning trades:	55.60%
Average percentage of winning trades:	39.30%
Minimum percentage of winning trades:	19.10%
Standard Deviation:	6.14%

% Losing Trade Stats

Maximum percentage of losing trades:	80.90%
Average percentage of losing Trades:	60.69%
Minimum percentage of losing trades:	44.40%
Standard Deviation:	6.13%





Comments

As we predicted, starting with a lower capital base has the effect of reducing overall trading system performance. The MACD (Reversed) trading system, which looked promising when we traded it with a \$50,000 initial capital base and no transaction cost, is now a complete wipeout and guaranteed to lose all of your money. The Random Entry + Bollinger Bands Exit system fared much better due to its position-sizing strategy. As expected, the inclusion of transaction costs had the effect of reducing bottom-line profitability and shifting the profit distribution to the left; but it still has an 80% chance of being profitable. Note that the inclusion of transaction costs has severely reduced the percentage of winning trades in both cases. In fairness to the comparison with the previous examples where we used a much higher initial capital and we did not include transaction costs, it should be noted that transaction costs will have a much more pronounced effect on a trading system with a smaller initial capital base because the transaction costs represent a larger portion of each trade. It would be interesting to see whether or not reversing the entry and exit triggers would improve the proportion of winning trades. We will leave this exercise to the reader.

As has been repeated time and time again in the literature and verified using TradeSim, in order to have any chance of being successful with trading you need to start with a reasonable amount of trade capital and select a trading system that uses good position-sizing strategies.

Summary

We started this chapter by introducing the concept of trading a system using a portfolio of securities as a random process. This led to the need to use statistical analysis in order to evaluate a trading system. We introduced the concept of Monte Carlo analysis as a brute force way of exhaustively testing and analysing a trading system in order to show up any strengths or weaknesses that it may have. We then analysed a number of trading systems and showed simple ways of making dramatic improvements to system performance using the simple notion of contrarian opinion.

By exhaustively testing and simulating a trading system using the Monte Carlo analyser you can show up any strengths or weaknesses in a trading system that would otherwise be missed if you only ran single simulations. The results from the Monte Carlo analysis show up severe limitations in system testers that can only test a single security at a time. The main disadvantage of these types of system testers is that they miss out on providing a lot of valuable information that is necessary in order to make an objective judgment of a system's worth.

In the last case study we examined the effect of using a small amount of initial capital on the two trading system examples and found that a smaller starting capital coupled with finite transaction costs reduced the bottom line profitability quite considerably to the extent of driving one system into unconditional bankruptcy. As has been repeated time and time again in the literature and verified using TradeSim, in order to have any chance of being successful with trading you need to start with a reasonable amount of trade capital and select a trading system that uses good position-sizing strategies.

In conclusion, a trade system is a non-linear process. Increasing the initial capital base does not necessarily lead to a proportional increase in the total net profit, which is why traders using a smaller amount of starting capital are much more at risk of going bankrupt.

Addendum to TradeSim Enterprise

Version 2.4.0 introduces four new statistics. These are the Average Relative Percent and Dollar Drawdown Statistics as well as the Maximum Absolute Dollar and Percentage Drawdown Statistics. To avoid confusion the drawdown parameter used in previous versions has now been renamed as the Relative Drawdown. The Relative Drawdown is a measure of the retracement of equity from a previous equity high point. This is to distinguish it from the newly introduced Absolute or Maximum Peak-to-Valley Drawdown. The Absolute Drawdown is described more fully in the following section: [Absolute Peak-to-Valley \(PV\) Drawdown parameters](#). Some or all of these statistics have been added to the Monte Carlo Report and Simulation Log, as well as the Distribution Charts.

Monte Carlo Report

Monte Carlo Report (Equis Bollinger Bands)

Simulation Summary

Simulation Date:	9/09/2002
Simulation Time:	5:00:04 PM
Simulation Duration:	3.86 seconds

Trade Parameters

Initial Capital:	\$50,000.00
------------------	-------------

Portfolio Limit:	100.00%
Position Size Model:	Equal Dollar Units
Trade Size (\$ value):	\$5,000.00
Pyramid profits:	No
Transaction cost (Trade Entry):	\$0.00
Transaction cost (Trade Exit):	\$0.00

Trade Preferences

Trading Instrument:	Stocks
Break Even Trades:	Process separately
Trade Position Type:	Process all trades
Entry Order Type:	Default Order
Exit Order Type:	Default Order
Minimum Trade Size:	\$500.00
Accept Partial Trades:	No
Volume Filter:	Ignore Volume Information

Simulation Stats

Number of trade simulations:	1000
Trades processed per simulation:	720
Maximum Number of Trades Executed:	97
Average Number of Trades Executed:	86
Minimum Number of Trades Executed:	76
Standard Deviation:	3.49

Profit Stats

Maximum Profit:	\$86,728.99 (173.46%)
Average Profit:	\$51,962.21 (103.92%)
Minimum Profit:	\$19,888.14 (39.78%)
Standard Deviation:	\$10,981.34 (21.96%)
Probability of Profit:	100.00%
Probability of Loss:	0.00%

% Winning Trade Stats

Maximum percentage of winning trades:	72.09%
Average percentage of winning trades:	64.57%
Minimum percentage of winning trades:	55.70%
Standard Deviation:	2.77%

% Losing Trade Stats

Maximum percentage of losing trades:	43.04%
Average percentage of losing Trades:	34.81%
Minimum percentage of losing trades:	27.91%
Standard Deviation:	2.53%

Average Relative % Drawdown Stats

Maximum of the Average Relative Percent Drawdown:	1.60%
Average of the Average Relative Percent Drawdown:	0.91%
Minimum of the Average Relative Percent Drawdown:	0.60%
Standard Deviation:	0.17%

Average Relative \$ Drawdown Stats

Maximum of the Average Relative Dollar Drawdown:	\$1,407.58
Average of the Average Relative Dollar Drawdown:	\$866.01
Minimum of the Average Relative Dollar Drawdown:	\$577.75
Standard Deviation:	\$143.20

Maximum Absolute \$ Drawdown Stats

Maximum Absolute Dollar Drawdown:	\$28,722.31
Average Absolute Dollar Drawdown:	\$11,946.76
Minimum Absolute Dollar Drawdown:	\$9,177.45
Standard Deviation:	\$3,620.72

Maximum Peak-to-Valley Percent Drawdown Stats

Maximum Absolute Percent Drawdown:	30.1275%
Average Absolute Percent Drawdown:	12.2476%
Minimum Absolute Percent Drawdown:	10.3031%
Standard Deviation:	3.1586%

Average Relative Percentage Drawdown Stats

The Average Relative Percent Drawdown is the average value of all the percentage drawdowns for one single simulation. It is equivalent to averaging all points on the Relative Drawdown chart for a single simulation. When running a Monte Carlo Simulation each simulation produces its own unique value for the Average Relative Percent Drawdown in much the same way as it produces a unique profit outcome. We can derive useful statistics from this set of outcomes just as we did for the Profit, Winning and Losing Trade outcomes.

- ❑ **Maximum of the Average Relative Percent Drawdown**
This is the maximum value found for the Average Relative Percent Drawdown for all of the simulations in the Monte Carlo Analysis.
- ❑ **Average of the Average Relative Percent Drawdown**
This is the average value calculated from the Average Relative Percent Drawdown for all of the simulations in the Monte Carlo Analysis. It is calculated by summing all of the Average Relative Percent Drawdown outcomes and dividing it by the number of simulations.
- ❑ **Minimum of the Average Relative Percent Drawdown**
This is the minimum value found for the Average Relative Percent Drawdown for all of the simulations in the Monte Carlo Analysis.
- ❑ **Standard Deviation**
This is the Standard Deviation of the Average Relative Percent Drawdown.

Average Relative Dollar Drawdown Stats

The Average Relative Dollar Drawdown is the average value of all the dollar drawdowns for one single simulation. When running a Monte Carlo Simulation each simulation produces its own unique value for the Average Relative Dollar Drawdown in much the same way as it produces a unique profit outcome. We can derive useful statistics from this set of outcomes just as we did for the Profit, Winning and Losing Trade outcomes.

- ❑ **Maximum of the Average Relative Dollar Drawdown**
This is the maximum value found for the Average Relative Dollar Drawdown for all of the simulations in the Monte Carlo Analysis.
- ❑ **Average of the Average Relative Dollar Drawdown**
This is the average value calculated from the Average Relative Dollar Drawdown for all of the simulations in the Monte Carlo Analysis. It is calculated by summing all of the Average Relative Dollar Drawdown outcomes and dividing it by the number of simulations.
- ❑ **Minimum of the Average Relative Dollar Drawdown**
This is the minimum value found for the Average Relative Dollar Drawdown for all of the simulations in the Monte Carlo Analysis.
- ❑ **Standard Deviation**
This is the Standard Deviation of the Average Relative Dollar Drawdown for all of the simulations.

Maximum Absolute (Peak-to-Valley) Dollar Drawdown Stats

The Absolute or Peak-to-Valley Dollar Drawdown is the worst-case reduction in equity from an equity high point. The Absolute Dollar Drawdown is described more fully in the following section [Absolute Peak-to-Valley \(PV\) Drawdown parameters](#).

- ❑ **Maximum Absolute Dollar Drawdown**
This is the maximum Absolute Dollar Drawdown found from all of the simulations.
- ❑ **Average Absolute Dollar Drawdown**
This is the average or mean value of all of the Absolute Dollar Drawdown values from all of the simulations.
- ❑ **Minimum Absolute Dollar Drawdown**
This is the minimum Absolute Dollar Drawdown found from all of the simulations.
- ❑ **Standard Deviation**
This is the standard deviation of the Absolute Dollar Drawdown for all of the simulations.

Maximum Absolute (Peak-to-Valley) Percentage Drawdown Stats

The Absolute or Peak-to-Valley Percentage Drawdown is the worst-case percentage reduction in equity from an equity high point. The Absolute Percentage Drawdown is described more fully in the following section [Absolute \(Peak-to-Valley\) Percent Drawdown parameters](#).

- ❑ **Maximum Absolute Percentage Drawdown**
This is the maximum Absolute Percentage Drawdown found from all of the simulations.
- ❑ **Average Absolute Percentage Drawdown**
This is the average or mean value of all of the Absolute Percentage Drawdown values from all of the simulations.
- ❑ **Minimum Absolute Percentage Drawdown**
This is the minimum Absolute Percentage Drawdown found from all of the simulations.
- ❑ **Standard Deviation**
This is the standard deviation of the Absolute Percentage Drawdown for all of the simulations.

Simulation Log

The following columns have been added to the Simulation Log.

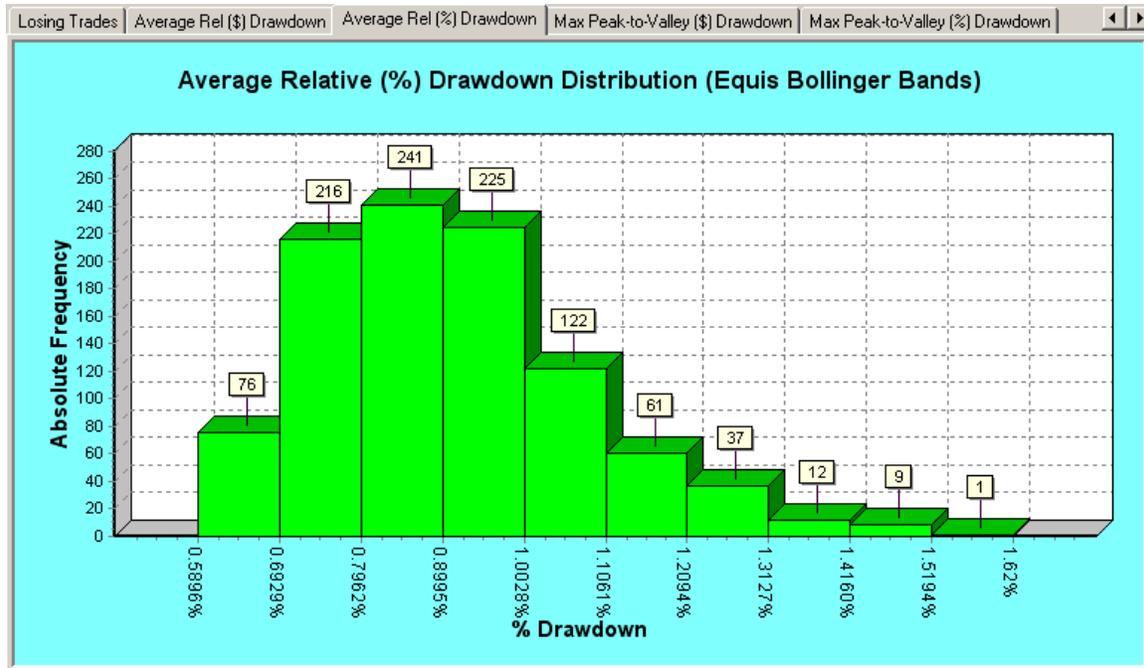
- ❑ **Average Relative Percentage (%) Drawdown**
This column represents the Average Relative Percentage Drawdown for each simulation.
- ❑ **Maximum Relative Percentage (%) Drawdown**
This column represents the Maximum Relative Percentage Drawdown for each simulation.
- ❑ **Average Relative Dollar (\$) Drawdown**
This column represents the Average Relative Dollar Drawdown for each simulation.
- ❑ **Maximum Relative Dollar (\$) Drawdown**
This column represents the Maximum Relative Dollar Drawdown for each simulation.
- ❑ **Maximum Absolute Dollar (\$) Drawdown**
This column represents the Maximum Absolute Dollar drawdown for each simulation.
- ❑ **Maximum Absolute Percentage (%) Drawdown**
This column represents the Maximum Absolute Percentage drawdown for each simulation.

Loss	Expectation	Average Rel-% Dra...	Max Rel-% Drawdo...	Average Rel-\$ Dra...	Max Rel-\$ Drawdown	Max Abs-\$ Drawdo...
6.78	N/A	0.8882%	10.4329%	\$838.59	\$9,177.45	\$9,177.45
6.78	N/A	0.6933%	10.4329%	\$656.37	\$9,177.45	\$9,177.45
8.00	N/A	1.0209%	10.4329%	\$953.90	\$9,177.45	\$15,397.79
8.00	N/A	1.1959%	10.4329%	\$1,133.59	\$9,177.45	\$16,838.89
6.78	N/A	0.8677%	10.4329%	\$847.31	\$9,177.45	\$10,292.47
6.78	N/A	0.8405%	10.4329%	\$767.36	\$9,177.45	\$14,360.67
8.00	N/A	1.0102%	10.3031%	\$968.61	\$9,177.45	\$11,124.09
6.78	N/A	0.8783%	10.4329%	\$856.70	\$9,177.45	\$9,615.76
0.60	N/A	1.2556%	10.4329%	\$1,154.21	\$9,177.45	\$18,241.57
8.00	N/A	0.7507%	10.4329%	\$710.97	\$9,177.45	\$9,177.45
6.78	N/A	0.7342%	10.4329%	\$687.73	\$9,177.45	\$9,481.70
8.25	N/A	0.6740%	10.4329%	\$650.20	\$9,177.45	\$9,177.45
6.78	N/A	0.7579%	10.3031%	\$722.45	\$9,177.45	\$9,533.88
8.00	N/A	1.0422%	10.3031%	\$940.75	\$9,177.45	\$15,008.89
6.78	N/A	0.6656%	10.4329%	\$641.13	\$9,177.45	\$9,177.45
8.00	N/A	0.7460%	10.4329%	\$710.33	\$9,177.45	\$11,436.19
6.78	N/A	0.6905%	10.4329%	\$659.29	\$9,177.45	\$9,177.45
8.00	N/A	1.2553%	10.3031%	\$1,189.26	\$9,177.45	\$21,260.51
1.00	N/A	0.8175%	10.4329%	\$760.70	\$9,177.45	\$9,177.45
1.00	N/A	0.9046%	10.4329%	\$893.85	\$9,177.45	\$11,753.08
0.60	N/A	1.0000%	10.3031%	\$880.68	\$9,177.45	\$20,303.76
6.78	N/A	0.9634%	10.3031%	\$901.92	\$9,177.45	\$13,829.02
0.60	N/A	0.9554%	10.4329%	\$923.22	\$9,177.45	\$10,859.80

Distributions

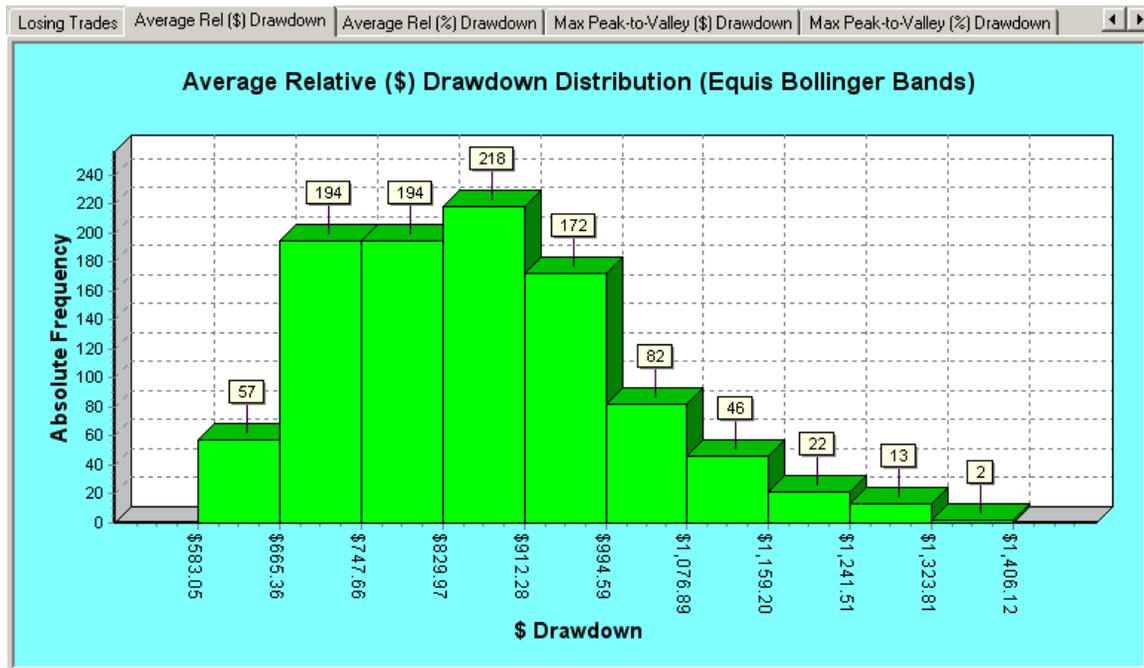
Average Relative Percentage (%) Drawdown Distribution

This distribution illustrates the way that the *Average Relative Percent Drawdown* is distributed.



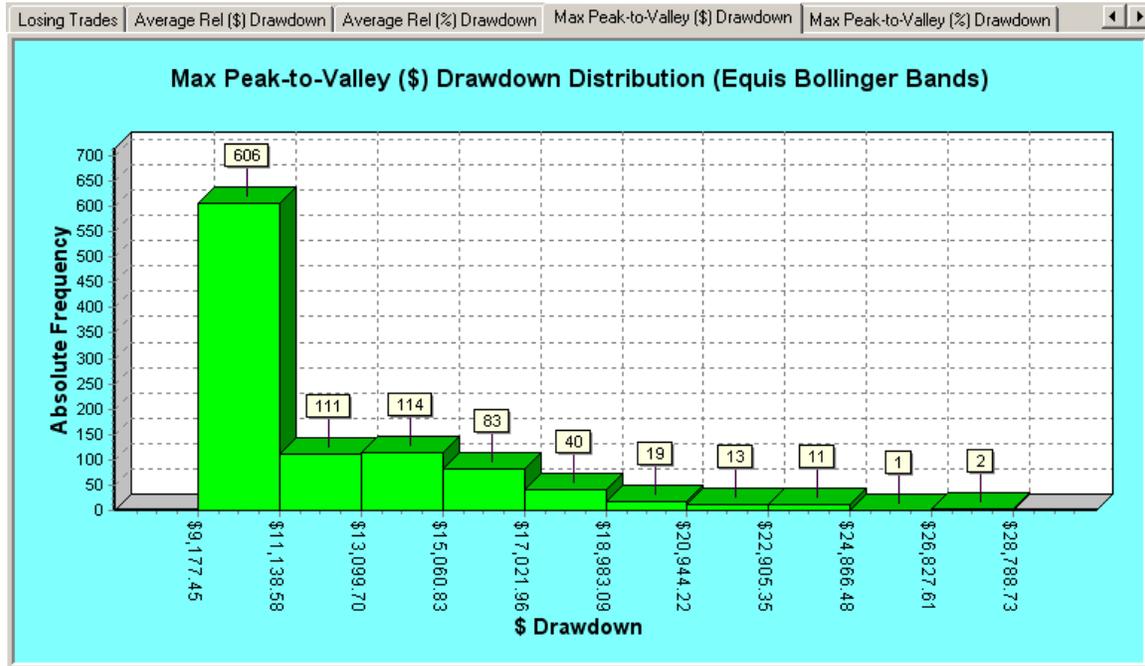
Average Relative Dollar (\$) Drawdown Distribution

This distribution illustrates the way that the *Average Relative Dollar Drawdown* is distributed.



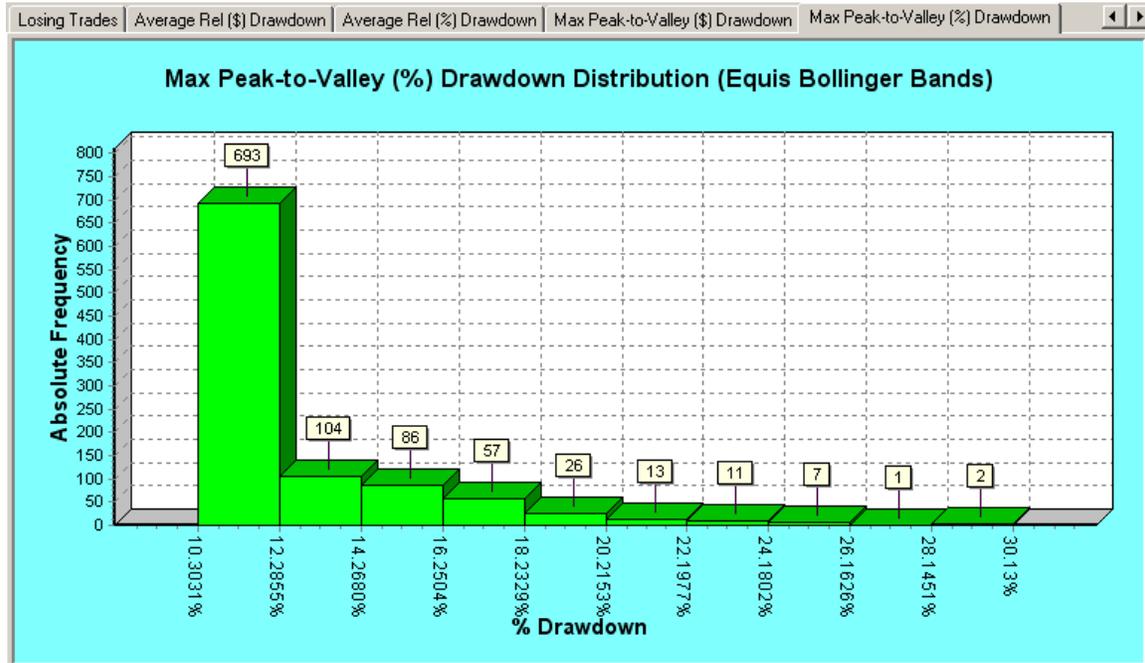
Maximum Absolute Dollar (\$) Drawdown Stats

This distribution illustrates the way that the *Maximum Peak-to-Valley Dollar (\$) Drawdown* is distributed.



Maximum Absolute Percentage (%) Drawdown Stats

This distribution illustrates the way that the *Maximum Peak-to-Valley Percentage (%) Drawdown* is distributed.



Composite Report Generator (Enterprise Edition)

The Enterprise Edition features a brand new report generator, which can be used to easily construct a composite report consisting of any combination of written reports and graphical charts at the click of the button !!!

The reports can either be printed, copied and pasted into another application or simply exported in a variety of different formats including RTF(rich text format), HTML(hypertext markup language), TXT(standard text format). When exporting as a HTML format, all of the original text formatting formats displayed in the reports are preserved and charts are exported as individual JPEG images. The HTML files can then be downloaded to a server for others to view on the net.

By default all files are saved to the 'Export' directory, which is inside the TradeSim Data directory, i.e., [c:\tradesimdata\exports].

Depending on which mode you are running TradeSim will determine which reports and charts are available. Not everything can be included in the report. Currently any text report and chart can be included in the composite report. Tables such as those included in the Trade Statistics, Trade Log, Trade Database Simulation Log cannot be included in the report and have to be printed or exported independently. This is because the table is usually much bigger than its screen container so it is better to export these individually by "right clicking" on them.

Invoking the Composite Report Generator

To invoke the composite report generator you need to first need to load a trade database and either run a simulation or Monte Carlo analysis. Once you have done this you access the composite report generator form the Tools menu as illustrated by the following screen grab.



After doing this you will be greeted with the Composite Report Generator manager screen. The Report Manager consists of two windows and a main toolbar. The left window contains a tree view and facilitates the selection of the charts and reports that you want to include in the composite report. Each branch of the tree view essentially represents all of the charts and reports contained in its respective child window. For example the Trade Simulation report consists of the Trade Parameters, Detailed report, Performance

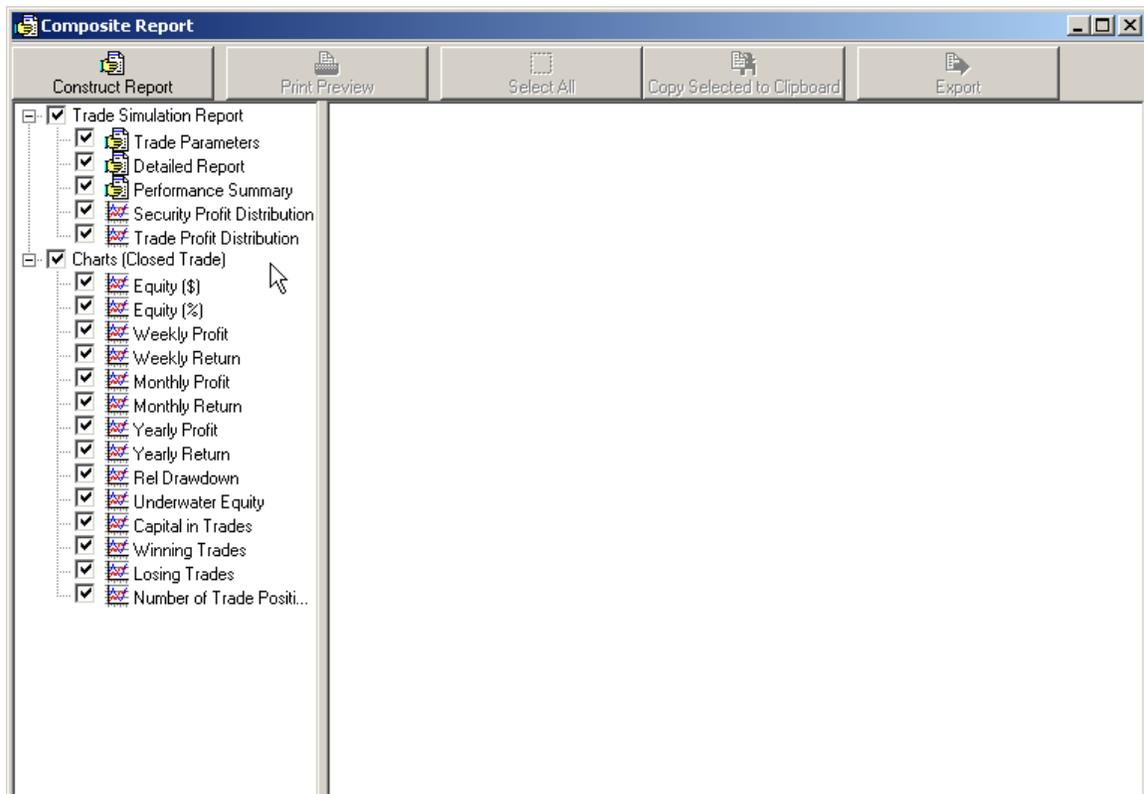
Summary, Security Profit Distribution Chart, Trade Profit Distribution Chart and an optional R-multiple chart. The combined report is not included in the composite report because it duplicates the other reports.

Main Toolbar

 Construct Report	Click on this button to construct the composite report.
 Print Preview	Click on this button to print the composite report
 Select All	Click on this button to select the whole contents of the report including all charts.
 Copy Selected to Clipboard	Copy the current selection to the clipboard for later pasting into another app such as Word for Windows.
 Export	Export the whole report in a variety of file formats.

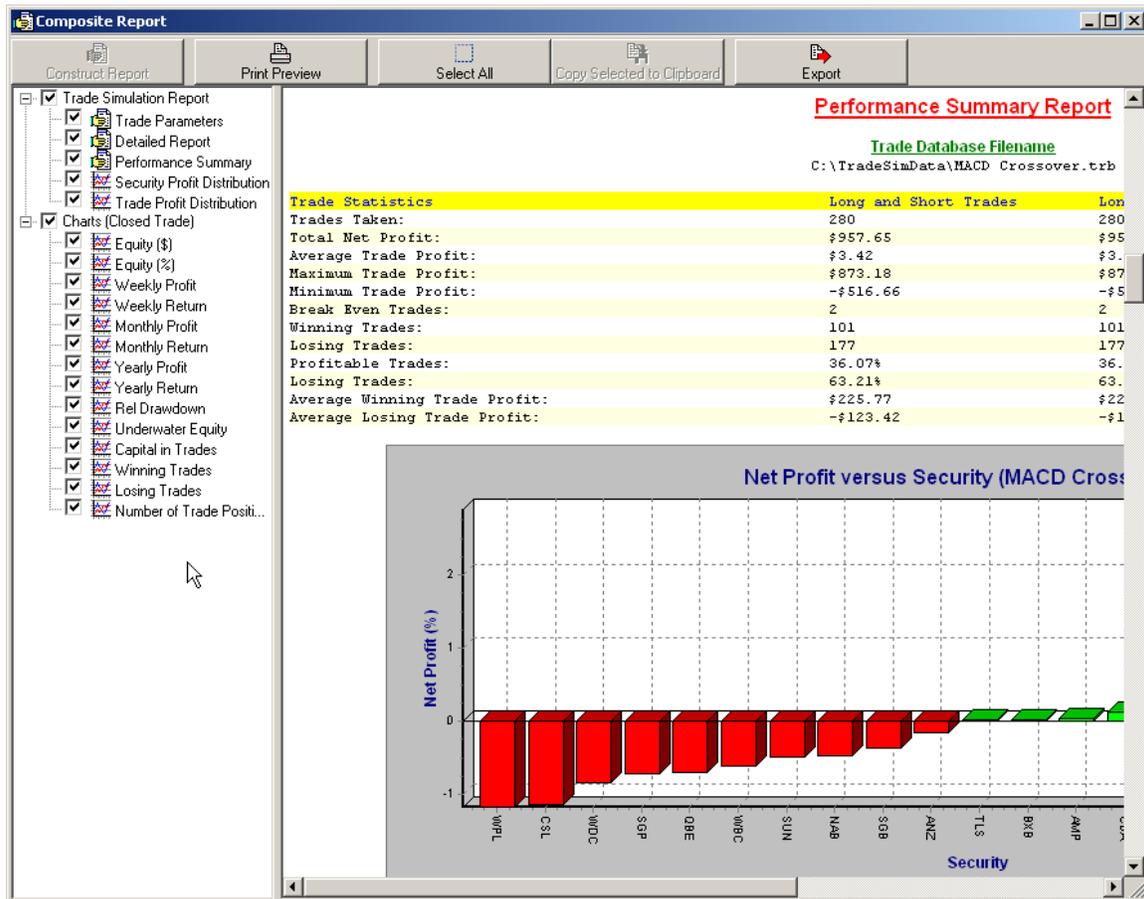
Selecting the charts and reports

On the left windowpane you select the charts and reports from the selection tree that you want to include in the composite report. Currently any text report and charts can be included in the composite report. Tables such as those included in the Trade Statistics, Trade Log, Trade Database Simulation Log cannot be included in the report.



Once you have selected the appropriate charts and reports click on the “Construct Report” button.

NOTE: The size of charts in the composite report will be proportional to the size of the chart window. For smaller charts just shrink the chart window to the appropriate size before you click ‘Construct Report’.



Printing the Report

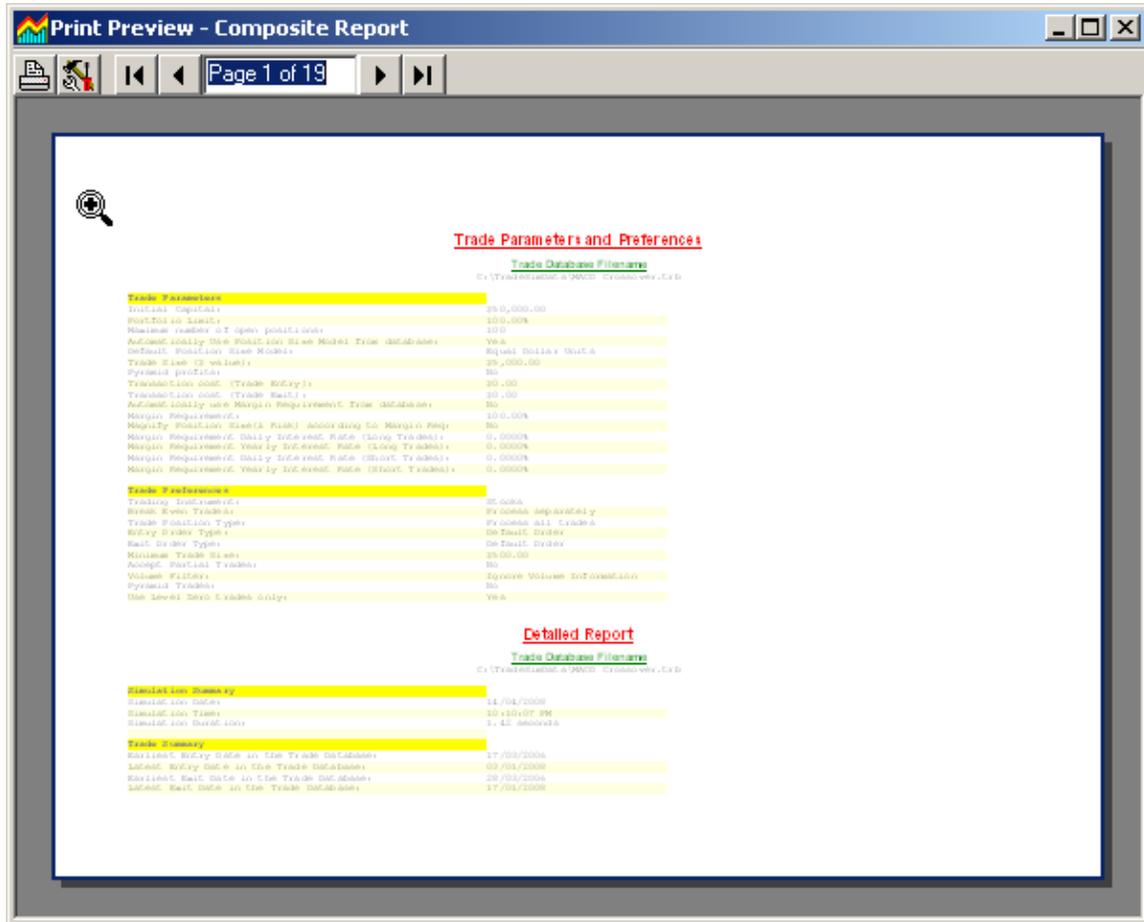
To print the report click on the ‘Print Preview’ button.

The whole report is divided into pages so each chart fits on one page. The printer is automatically configured for Landscape page orientation so that this allows the charts to easily fit on the page. The ‘Print Preview’ toolbar contains a number of buttons.



	Click to print the document
	Click to setup the printer
	Click to view the first page
	Click to view the preceding page
Page 1 of 19	Displays the current page number

▶	Click to advance to the next page
◀	Click to view the last page



Clicking the left button whilst the mouse cursor is a magnifying glass with a '+' sign will enlarge the printview page and vice versa for the '-' sign.

Once you are satisfied with how the report looks in the print preview click on the printer button to print the whole document.

Copying and Pasting into other Applications

Copying and pasting into Word®.

[See 'Appendix F: Copying and Pasting into Word' for more details.](#)

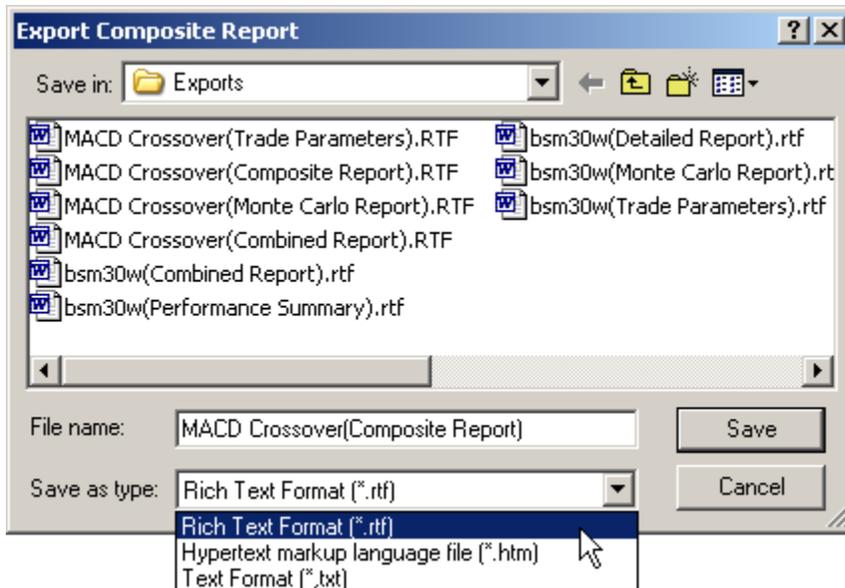
Copying and pasting into Excel®.

[See 'Appendix F: Copying and Pasting into Excel' for more details.](#)

Exporting the composite report

The reports can be exported in a variety of different formats including RTF (rich text format), HTML (hypertext mark-up language), TXT (standard text format). To export the composite report click on the “Export” button from the main toolbar. A dialog box will popup where you select the export type from the “Save as type:” drop down menu as well as the filename which will default to the name of the trade database.

For exporting into Microsoft Word use the RTF format. When exporting as a HTML format, all of the original text formatting displayed in the reports is preserved and charts are exported as individual JPEG images. The HTML files can then be downloaded to a server for others to view on the net.



Exporting to Excel®

See [‘Appendix F: Exporting reports to Excel’](#) for more details.

Miscellaneous Issues

The Question of Survivorship Bias

When testing a portfolio of securities over a relatively long period of time the question of survivorship bias should be addressed. Survivorship bias comes into play because not all of the securities that were originally in a portfolio say 10 years ago are still in existence today. Alternatively if you choose a portfolio today, which consists of currently listed securities then chances are that quite a few of these securities did not exist 10 years ago and some securities may have only been recently listed and therefore the effect of these securities on a simulation will be minimal compared to a security that has existed throughout the whole testing interval. Some companies may go out of business in which case they are delisted or they may have a name change and excluded from the portfolio after a certain date just by virtue of the fact that data is no longer produced for the defunct symbol after a certain date. The RecordTrades function does not understand this and only operates within the bounds of the security data that is supplied to it from the MetaStock exploration.

The consequence of this is that as securities get dropped from or introduced to the portfolio the trading results will be biased towards the securities that have existed the longest in a portfolio list and thus the trading results become biased in favour of the longest surviving securities hence the term “survivorship bias”. This in itself may produce erroneous results if this was not intended for in the first place.

Whether you make up your own portfolio or chose to use a predefined industry list such as the ASX-200, All-Ordinaries, NASDAQ or DOW, you still face the issue of survivorship bias in your trading results. One-way around this would be to test a Portfolio over a short period of time such that all securities in the portfolio remain in existence over that period of time. However this conflicts with our original aim of testing a trade system over a long period of time.

An alternative solution would be to use an industry standard list such as the ASX-200 for example and update the portfolio when the list is updated which is usually every six months. However the problem with this is that MetaStock does not accommodate dynamically changing security lists and thus the trade database generated using a trade database exploration is based on a static security list. Since Version 7 and above of MetaStock allows you to run multiple explorations you could of course run multiple trade database explorations with each exploration containing its own security list that is relevant to the period of interest. The only problem with this is that you would need to be able to specify the period of interest for each portfolio list otherwise each of the trade database explorations would produce duplicate trades and the RecordTrades function does not currently facilitate merging trade databases in this way.

True Survivorship Bias Free backtesting with TradeSim

TradeSim now introduces survivorship bias free back testing to further refine back-testing results even more. All TradeSim Editions including the trial now comes with the ability to do survivorship bias free backtesting using a Survivorship Bias Filter (SBF) Table that is easy to create, This table is essentially a text file which contains a list of constituent symbols and there corresponding date ranges for when they were included in the index. Multiple date ranges are permitted which allows for the circumstance when a constituent came into and out of the index.

Please refer to document [AN-5](#) for complete details on how to implement Survivorship Bias Free backtesting.

An Alternative Solution

After numerous emails bringing this aspect to my attention I have tackled this issue from a different point of view. Rather than concentrate on a static list, which by its very nature introduces bias in to the simulation, why not introduce your own additional rules into the trading system, which dynamically measures the performance of a security and only includes a trade in the trade database, which exceeds a

certain performance measure. In this way the portfolio selection now becomes integral with the trading system and survivorship bias no longer becomes an issue because only trades that meet a certain performance criterion are included in the trade database for analysis by TradeSim. For example the trading system used in the RecordTrades function could be modified as follows.

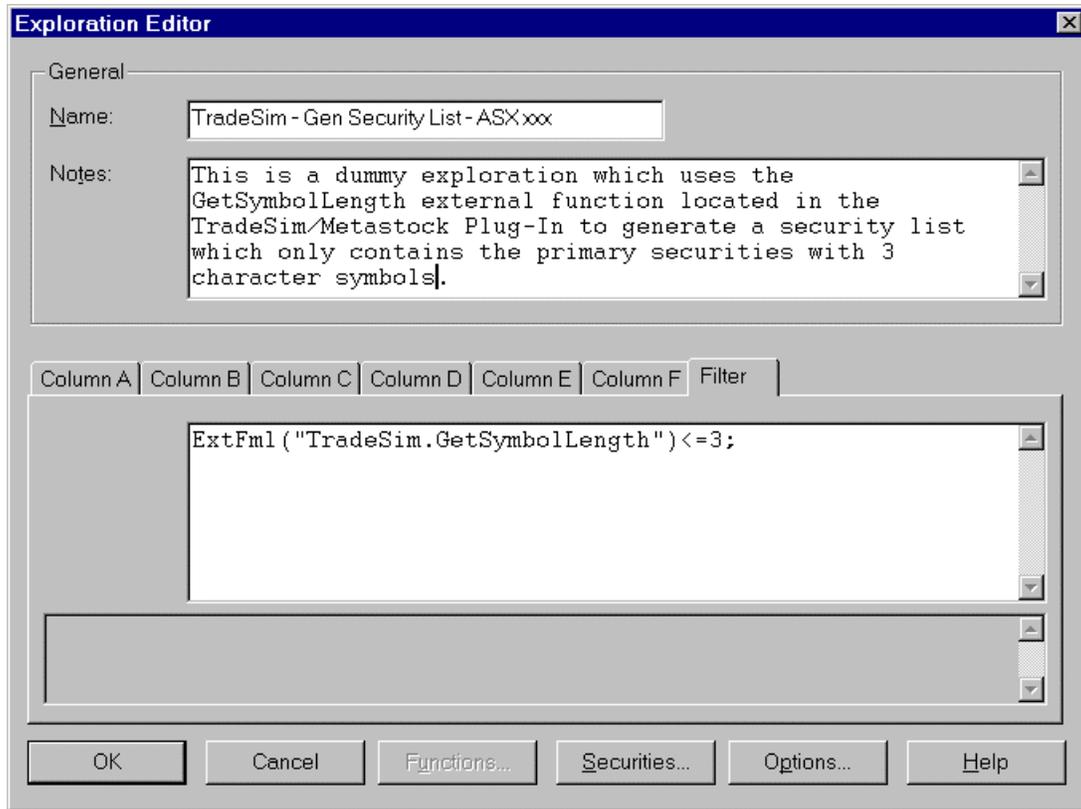
```
EntryTrigger:=(Your Entry Criteria) AND (Security Criteria Measurement);
```

Which performance criterion you choose to incorporate into your trading system depends on how you would want to quantify security performance. A simple method that I have adopted is based on the average turnover of a security, which is defined by the product of the closing price and the traded volume. By averaging this over a period of time gives some indication to the liquidity and tradability of the security. For example if we are only interested in securities with an average turnover of \$50000 over the last 10 days we could rewrite our entry strategy as follows.

```
EntryTrigger:=(Your Entry Criteria) AND mov(C*V,10,S)>50000;
```

Refining the Security List

Now that we have included security performance criteria in our trading system and shifted the selection of securities from a static security list to a mechanism, which continuously dynamically measures security performance, what do you then specify in the security list when you run RecordTrades exploration? Well there is no reason why you should not include all securities in the list, which may run into several thousands and let the security criteria measurement filter out the irrelevant trades. However this is unnecessary and would only serve to slow down the exploration so some preliminary security list filtering should be done before hand. One of my favourite techniques, which of course is dependent on how your security database is structured, is to only include the fully paid shares and exclude all of the warrants and stock options. This is easy to do with the GetSymbolLength function available in the TradeSim plug-in. You simply run a security list pre-filtering exploration and use the GetSymbolLength function to only look for securities with three character symbols. All in all this should amount to around 1500 securities for the Australian ASX. The following screen snapshot illustrates how to set up a security list exploration to include all 3-character symbols in the security list.



Trading System Optimization

By definition optimisation is used to find the best possible solution to a problem. In terms of trading systems the best possible solution is obviously one, which maximizes profit return, however other factors such as drawdown may play a part. A thorough in-depth analysis of optimisation theory and techniques is way beyond the scope of this document however Katz and McCormick¹⁴⁾ provide a thorough in-depth explanation. The most important issue that needs to be kept in mind when optimising a trading system is to avoid over optimisation or curve fitting because trading systems based on over optimisation usually perform poorly when they are actually traded. Using TradeSim to back test or simulate an optimised trading system will most likely alert you to discrepancies between theoretical performance and actual performance because TradeSim can back test a trading system over a portfolio of securities whereas most optimisers only optimise over one security.

Because TradeSim is primarily a trading simulator and back tester on its own it does not have any inbuilt support for trade system optimisation. This is left to other packages such as MetaStock. However using TradeSim to simulate your optimised trading system opens up a whole lot of new issues. Firstly simulating a pre-optimised trading system using TradeSim may not produce the spectacular results produced by the MetaStock optimiser and back tester. This is primarily because simulating a trading system with a portfolio of securities usually produces completely different results than simulating it with one security alone.

The best way to optimise a trading system using TradeSim is to use MetaStock to manually generate trade databases for each value of the optimisation variable of interest and then use TradeSim to analyse the resulting trade data. For example you could generate multiple trade databases for the MACD trading system by stepping the MACD period from 4 to 30 and then use TradeSim to analyse each database to see which stepping yields the best performance.

Selecting your securities

In all of the examples used in this manual we have generated trading data using securities from the top 200 stocks on the Australian Stock Exchange (ASX). The main reason for doing this is simply liquidity which gives more validity to the trading data than if we were using the whole 1500 stocks from the ASX which includes many low liquidity small cap stocks. The choice of securities is of course entirely up to the individual and their style of trading but the main reason for using liquid stocks is to avoid any erratic trading behaviour caused by illiquid stocks.

The Black-Box Challenge

In the Introductory chapter we talked about black-box trading systems and why they were appealing to the uninitiated. Even without a proven trading track record people are still prepared to hand out thousands of dollars of their hard earned money in return for something that presumedly allows them to make much more money with very little effort. Well I'm sorry to say that if you have already parted with your hard earned money let that be a lesson of not taking anything at face value. Just to set the records straight for any vendor touting fantastic results with their mega-buck trading packages I would like to propose the challenge to these vendors by scrutinizing their trading systems using TradeSim. That is we would like to put their trading systems through the ringer and see how they would have performed in the past. Any takers? I doubt it!

Some Trading Tips and Suggestions

We digress in this chapter to talk about some of the common mistakes made by new entrants in the trading arena. What I would like to point out is that there is nothing wrong with making mistakes in trading; they are usually unavoidable as a trader. **It is part of the learning process and the value of making mistakes is that you learn from them so that you don't repeat the mistake again.** Because trading is mostly a psychological endeavour, making mistakes is part of the mind conditioning process. Unfortunately some things just can't be learned without making the mistake yourself at first hand, no matter how much advice is given from books and other people who probably have made these mistakes themselves. Some mistakes can have subtle effects but some can be totally disastrous. The following list shown below is by no means exhaustive but just some that come to mind and ones that have been learnt from the school of hard knocks. Every trader will have his or her own stories and a whole book could be devoted to such a topic.

- If you have developed a trading plan and start changing the plan midway because you are experiencing a string of losses then you are not emotionally prepared for the roller coaster ride that trading can bring. Stay out of the market until you get this part of your psychology sorted out. Drawdowns are a natural part of any trading strategy.
- Be a black sheep and don't follow the herd. This statement is a corollary to the fact that the majority consensus of all of the market participants are wrong and if you follow the majority you will most likely be wrong as well! How many people bought stock during the roaring bull market of the recent dot com mania and are still holding onto these securities at a much reduced equity because they had followed the herd and bought in when the smart players were selling. If you need more evidence of this the previous chapter on using TradeSim (Enterprise Edition) provides plenty of quantitative proof of this fact. Referring back to the example of the simple MACD crossover trading system and look at how we dramatically improved its performance just by reversing the entry and exit conditions. That is we changed the system so that we were selling when everyone else was buying which is contrary to what most literature and common beliefs espouse. In actual fact in the majority of cases where a trading system has a poor historic performance, its performance can usually be improved by simply swapping the entry and exit conditions. This is the effect of contrarian opinion ¹⁸⁾

- If your friends or neighbors scythe about their 10000% portfolio paper gain in a roaring bull market and you are feeling disappointed with your trading performance because you are sticking to your trading plan and have only achieved a 50% increase in equity, just remember the saying: ***A bird in your hand is worth two in a bush.*** Chances are that after a crash or correction in the market your neighbors will still be holding onto losers hoping for them to return to their former crown of glory. If you stick to your trading plan you will most likely be holding onto a net profit because a proper trading plan will preserve your trading capital at the very least. Don't be concerned about anyone else's involvement in the market least of all people who don't have a proper trading plan or understand the concept of capital preservation. In fact the best thing to do is to isolate yourself from others who don't understand the underlying concepts of trading. Tell them nothing about your own involvement in the markets and pretend you don't know anything because they won't listen to you anyway.
- ***Never try and catch a falling knife.*** This saying has relevance to people who try and pick market tops and bottoms. Picking tops and bottoms is akin to predicting the future movement of the market. This is because picking a market bottom implies that the market will move higher in the near future and picking a top implies that a market will move lower in the near future. Because nothing or no one can predict the future movements of the market with any accuracy trying to pick market bottoms or tops is a futile exercise.
- Keep away from traders chat forums, which are full of propaganda and stock manipulators. This type of forum should have no part in your trading routine. Most of these forums are full of gamblers who try to manipulate stock prices by spreading propaganda with the aim of ramping up stocks waiting for unsuspecting punters to purchase them (or sell them). (Note that some promoters of newsletters use these techniques in a much more subtle way.) Usually these types of so-called traders are gun-slinging gamblers who scythe about their winning trades but never talk about their losing trades. It is typical of a gambler to only talk about their winnings but never mentioning their losses, which are usually substantially more than their winnings. These sorts of people are usually abundant in a bull market and their sole purpose on a forum is to ramp up a stock trying to get that last drop out of it before they dump it onto some unsuspecting punter, hence the terminology pump-and-dump is quite an apt description with the advent of traders chat forums. A bull market is no substitute for brains nor is it a substitute for having a proper trading plan. After a crash the same people who were in abundance on these forums high-noting themselves usually drop away or revert to bleeding hearts sessions in total disbelief of the markets behaviour. Having said all of this there are a number of credible traders forums on the web and the [Trader Forums](#) section at the end of this manual lists a few of them.

Appendix A

Single Security Trade Recording Examples using a MetaStock Indicator.

Example 1 - Long Trades Only:

```

EntryTrigger := Cross (MACD () ,Mov (MACD () ,9,E) );
EntryPrice := CLOSE;
ExitTrigger := Cross (Mov (MACD () ,9,E) ,MACD () );
ExitPrice := CLOSE;
InitialStop := 0;           { optional initial stop }

ExtFml ( "TradeSim.Initialize" ); { Initialize internal variables }
ExtFml ( "TradeSim.RecordTrades" ,
        "MACD Long example" ,    { Trade Data Filename }
        LONG ,                   { Trade Position Type }
        EntryTrigger ,          { Entry Trigger }
        EntryPrice ,           { Entry Price }
        InitialStop ,          { Initial Stop }
        ExitTrigger ,          { Exit Trigger }
        ExitPrice ,            { Exit Price }
        START );              { Trade Recorder Control }

```

Example 2 - Short Trades Only:

```

EntryTrigger := Cross (Mov (MACD () ,9,E) ,MACD () );
EntryPrice := CLOSE;
ExitTrigger := Cross (MACD () ,Mov (MACD () ,9,E) );
ExitPrice := CLOSE;
InitialStop := 0;           { optional initial stop }

ExtFml ( "TradeSim.Initialize" ); { Initialize internal variables }
ExtFml ( "TradeSim.RecordTrades" ,
        "MACD Short example" ,  { Trade Data Filename }
        SHORT ,                 { Trade Position Type }
        EntryTrigger ,          { Entry Trigger }
        EntryPrice ,           { Entry Price }

```

```

InitialStop,
ExitTrigger,          { Exit Trigger }
ExitPrice,           { Exit Price }
START);              { Trade Recorder Control }

```

Example 3 - Long and Short Trades:

```

{ This is the 'LONG' trading part of the recording process }
LongEntryTrigger := Cross(MACD(),Mov(MACD(),9,E));
LongEntryPrice := CLOSE;
LongExitTrigger := Cross(Mov(MACD(),9,E),MACD());
LongExitPrice := CLOSE;
LongInitialStop := 0;          { Optional initial stop }

ExtFml("TradeSim.Initialize"); { Initialize internal variables }
ExtFml("TradeSim.RecordTrades",
      "MACD Long and Short example", { Trade Data Filename }
      LONG,                          { Trade Position Type }
      LongEntryTrigger,              { Entry Trigger }
      LongEntryPrice,               { Entry Price }
      LongInitialStop,              { Initial Stop }
      LongExitTrigger,              { Exit Trigger }
      LongExitPrice,               { Exit Price }
      START);                       { Trade Recorder Control }

{ This is the 'SHORT' trading part of the recording process }
ShortEntryTrigger := LongExitTrigger;
ShortEntryPrice := CLOSE;
ShortExitTrigger := LongEntryTrigger;
ShortExitPrice := CLOSE;
ShortInitialStop := 0;          { Optional initial stop }

ExtFml("TradeSim.Initialize"); { Optional call to initialize internal
variables }

{ Typically you would initialize again if you had set-up internal variables for
the last call to the RecordTrades function but wanted to set the internal
variables to the default state again before the next call to the RecordTrades
function }

ExtFml("TradeSim.RecordTrades",
      "",                          { Not needed here }
      SHORT,                        { Trade Position Type }
      ShortEntryTrigger,            { Entry Trigger }

```

```
ShortEntryPrice,      { Entry Price }  
ShortInitialStop,    { Initial Stop }  
ShortExitTrigger,    { Exit Trigger }  
ShortExitPrice,      { Exit Price }  
CONTINUE);          { Trade Recorder Control }
```

Appendix B

Multiple Security Trade Recording Examples using the MetaStock Explorer.

Example 1 - Long Trades Only:

```

EntryTrigger := Cross (MACD () ,Mov (MACD () ,9,E) );
EntryPrice := CLOSE;
ExitTrigger := Cross (Mov (MACD () ,9,E) ,MACD () );
ExitPrice := CLOSE;
InitialStop := 0;           { optional initial stop }

ExtFml ( "TradeSim.Initialize" ); { Initialize internal variables }
ExtFml ( "TradeSim.RecordTrades" ,
        "MACD Long example" ,    { Trade Data Filename }
        LONG ,                   { Trade Position Type }
        EntryTrigger ,           { Entry Trigger }
        EntryPrice ,             { Entry Price }
        InitialStop ,           { Initial Stop }
        ExitTrigger ,           { Exit Trigger }
        ExitPrice ,              { Exit Price }
        START );                { Trade Recorder Control }

```

Example 2 - Short Trades Only:

```

EntryTrigger := Cross (Mov (MACD () ,9,E) ,MACD () );
EntryPrice := CLOSE;
ExitTrigger := Cross (MACD () ,Mov (MACD () ,9,E) );
ExitPrice := CLOSE;
InitialStop := 0;           { optional initial stop }

ExtFml ( "TradeSim.Initialize" ); { Initialize internal variables }
ExtFml ( "TradeSim.RecordTrades" ,
        "MACD Short example" ,   { Trade Data Filename }
        SHORT ,                  { Trade Position Type }
        EntryTrigger ,           { Entry Trigger }
        EntryPrice ,             { Entry Price }

```

```

InitialStop,          { Initial Stop }
ExitTrigger,         { Exit Trigger }
ExitPrice,           { Exit Price }
START);              { Trade Recorder Control }

```

Example 3 - Long and Short Trades:

```

{ This is the 'LONG' trading part of the recording process }
LongEntryTrigger := Cross(MACD(),Mov(MACD(),9,E));
LongEntryPrice := CLOSE;
LongExitTrigger := Cross(Mov(MACD(),9,E),MACD());
LongExitPrice := CLOSE;
LongInitialStop := 0;          { Optional initial stop }

ExtFml("TradeSim.Initialize"); { Initialize internal variables }
Tally:=ExtFml("TradeSim.RecordTrades",
    "MACD Long and Short example", { Trade Data Filename }
    LONG,                          { Trade Position Type }
    LongEntryTrigger,              { Entry Trigger }
    LongEntryPrice,                { Entry Price }
    LongInitialStop,              { Initial Stop }
    LongExitTrigger,              { Exit Trigger }
    LongExitPrice,                { Exit Price }
    START);                       { Trade Recorder Control }

{ This is the 'SHORT' trading part of the recording process }
ShortEntryTrigger := LongExitTrigger;
ShortEntryPrice := CLOSE;
ShortExitTrigger := LongEntryTrigger;
ShortExitPrice := CLOSE;
ShortInitialStop := 0;          { Optional initial stop }
ExtFml("TradeSim.Initialize"); { Optional call to initialize internal
variables }

{ Typically you would initialize again if you had set-up internal variables for
the last call to the RecordTrades function but wanted to set the internal
variables to the default state again before the next call to the RecordTrades
function }

Tally:=Tally + ExtFml("TradeSim.RecordTrades",
    "",                          { Trade Data Filename }
    SHORT,                       { Trade Position Type }
    ShortEntryTrigger,           { Entry Trigger }
    ShortEntryPrice,            { Entry Price }

```

```
ShortInitialStop,      { Initial Stop }  
ShortExitTrigger,     { Exit Trigger }  
ShortExitPrice,       { Exit Price }  
CONTINUE);           { Trade Recorder Control }
```

```
Tally;                { adding this line will display the correct number of trades  
written to the trade database }
```

Appendix C

Implementing Volatility Trailing Stops the Correct Way

This article has now been moved to the reference library folder in your TradeSim installation folder. [Please click here to view this document.](#)

Note: If this article is missing it can be downloaded from the following website location
<http://www.compuvision.com.au/DownloadTradeSim.htm>

Appendix D

Statistics and Frequency Distributions¹

Statistical data, generated in large masses, can be very useful in studying the behaviour of a random process if the data is presented in the form of a relative frequency distribution. For those that are not familiar with probability, statistics and random processes, a frequency distribution is a way of correlating random data and plotting the resulting data in a graphical form. Such an arrangement is obtained by grouping the data into classes and determining the proportion of measurements in each of the classes. For instance if we were interested in studying the life expectancy of car batteries we might conduct an experiment and gather data relating to the lifetime of a population of say 40 similar car batteries. The table shown below shows the results of such an experiment where each entry in the table represents the lifetime of each of the 40 car batteries to the nearest tenth of a year. The batteries were guaranteed to last 3 years.

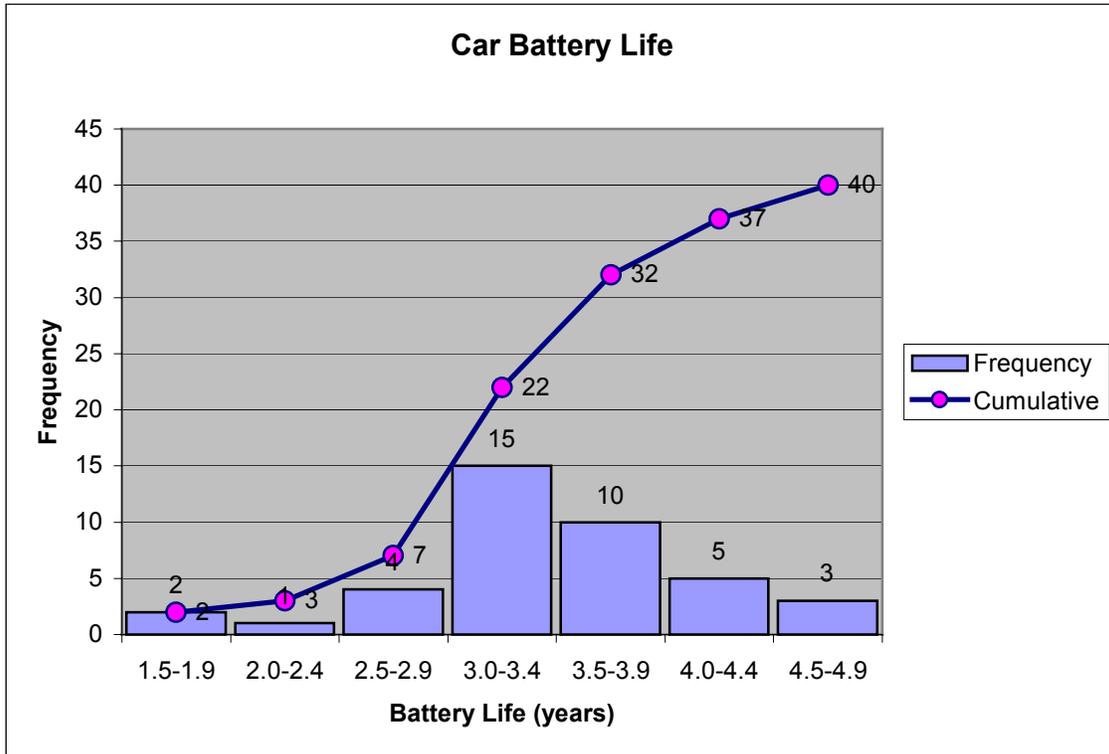
Car battery life (years)				
4.1	1.6	4.3	3.1	3.8
3.5	3.1	3.4	3.7	3.2
4.5	3.3	3.6	4.4	2.6
3.2	3.8	2.9	3.2	3.9
3.7	3.1	3.3	4.1	3
3	4.7	3.9	1.9	4.2
2.6	3.7	3.1	3.4	3.5

We must first decide on the number of classes into which the data are to be grouped. This is done arbitrarily although we are guided by the amount of data available. Usually, we would choose between 5 and 20 class intervals depending on the amount of data available. The smaller the amount of data available, the smaller is our choice for the number of classes. For the data in the above table we will choose 7 class intervals. The class width must be large enough so that 7 class intervals accommodate all of the data. To determine the approximate class width we divide the difference between the largest and the smallest measurements by the number of intervals. For the above example the class width would be no less than $(4.7-1.6)/7=0.443$. In practice, it is desirable to choose equal data widths having the same number of significant places as the given data. For this example we shall choose a width of 0.5. If we begin the lowest interval at 1.5, the second class would begin at 2.0, and so forth. We can now tabulate the data in terms of frequency of occurrence, the results of which are shown in the table below.

Class Interval	Frequency	Cumulative Frequency	Relative Frequency	Relative Cumulative Frequency
1.5-1.9	2	2	0.05	0.05
2.0-2.4	1	3	0.025	0.075
2.5-2.9	4	7	0.1	0.175
3.0-3.4	15	22	0.375	0.55
3.5-3.9	10	32	0.25	0.8
4.0-4.4	5	37	0.125	0.925
4.5-4.9	3	40	0.075	1

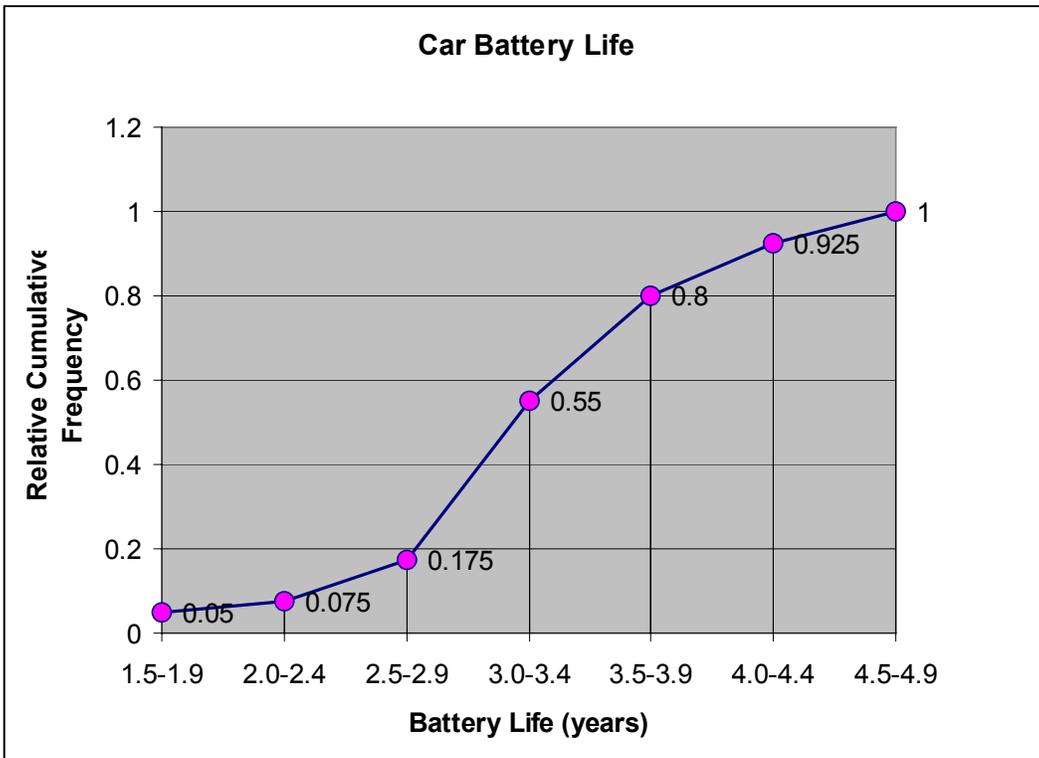
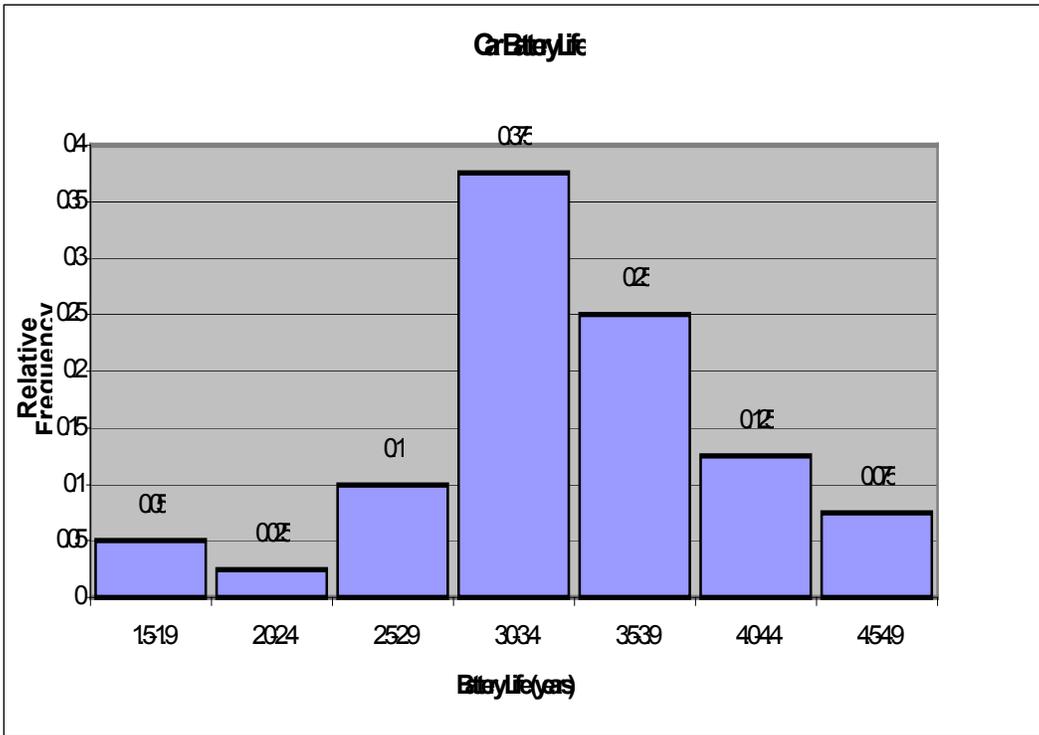
¹ The information contained in this appendix was adapted from *Probability and Statistics for Engineers and Scientists*¹⁵⁾

The cumulative frequency is a tally of the values in the frequency column up to that point. For example the cumulative value at 2.9 is equal to $\text{frequency}(1.5-1.9) + \text{frequency}(2.0-2.4) + \text{frequency}(2.5-2.9) = 1 + 2 + 4 = 7$. The last point of the cumulative chart or table is always equal to the population size, which in our example is 40. The information provided by a relative frequency distribution in tabular form is easier to grasp if presented graphically. The Frequency and Cumulative Frequency versus the class interval is plotted in the chart below.



Relative Frequency

It is more convenient to express a sample population in terms of relative frequency rather than absolute frequency as was done above. The advantage of this is that it makes it easier to compare one experiment with another and it also facilitates computing probabilities directly from the table and charts. The relative frequency values are computed by dividing the frequency values by the population size so that the normalized sample population is always 1.



Appendix E

The Universal Text Trade Database File Format {P,E}.

This article has now been moved to the reference library folder in your TradeSim installation folder. [Please click here to view this document.](#)

Note: If this article is missing it can be downloaded from the following website location
<http://www.compuvision.com.au/DownloadTradeSim.htm>

Appendix F

Exporting the Reports into Microsoft® Word® and Excel®.

The new report format in Version 6 of TradeSim makes it easy to export the results into numerous formats as well as copy and paste into a variety of applications whilst maintaining the original appearance of the reports.

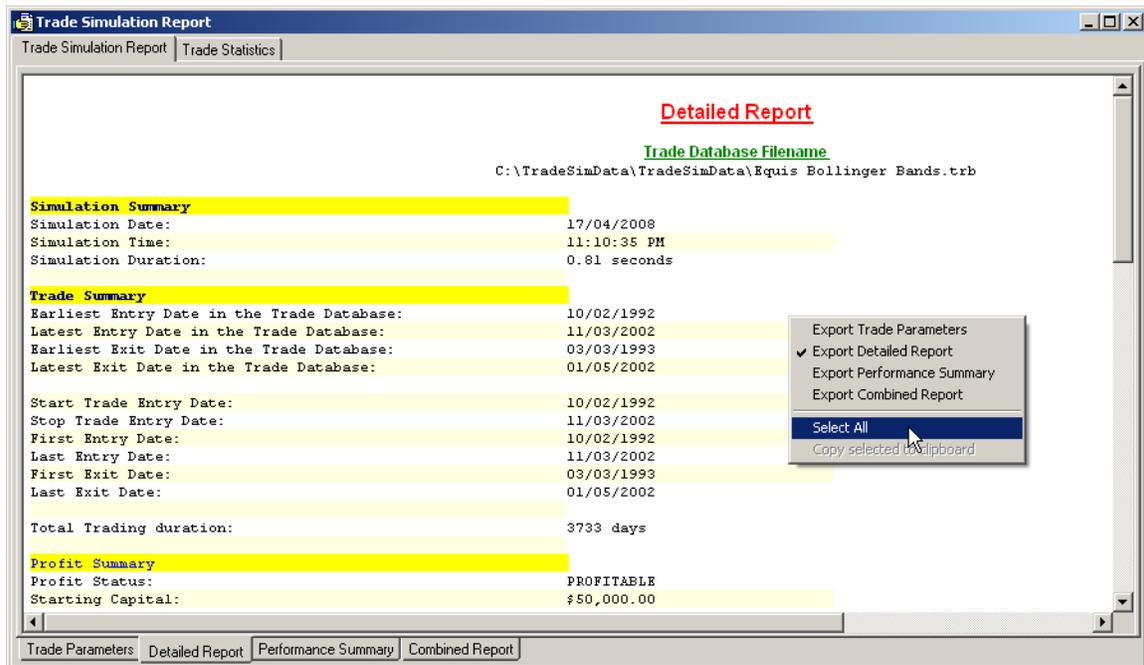
The reports can either be printed, copied and pasted into another application or simply exported in a variety of different formats including RTF (rich text format), HTML (hypertext markup language), TXT (standard text format). When exporting as a HTML format, all of the original text formatting formats displayed in the reports is preserved and charts are exported as individual JPEG images. The HTML files can then be downloaded to a server for others to view on the net.

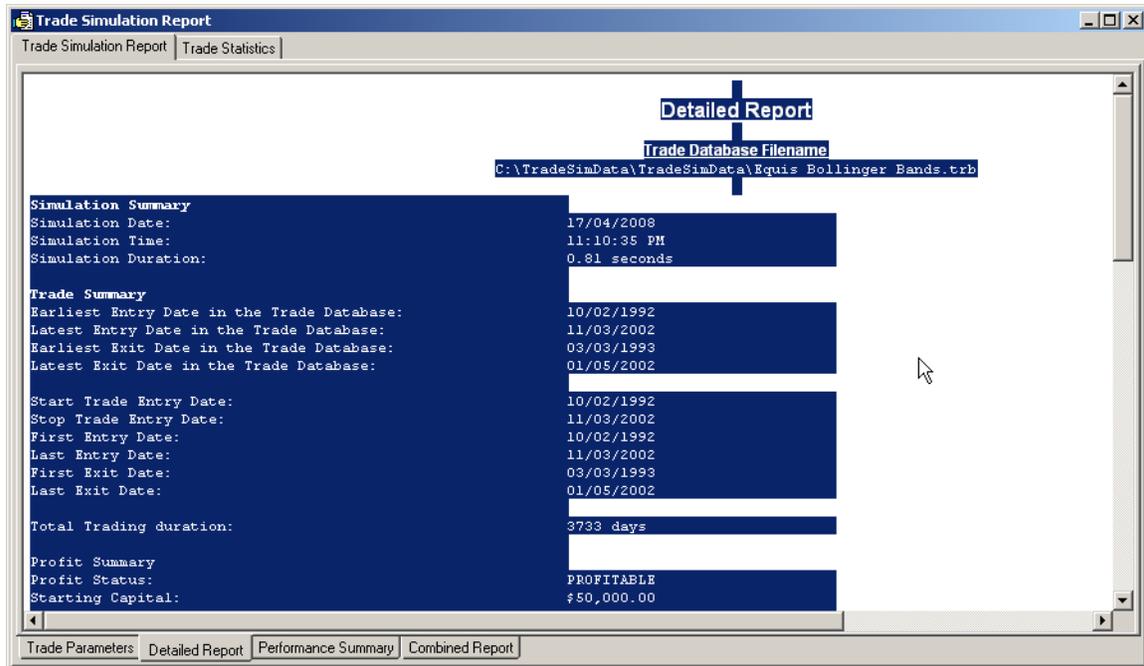
NOTE: Export capability is only available with the Professional and Enterprise Editions. However Copy and Paste is available in all editions including Standard Edition.

By default all files are saved to the 'Export' directory, which is inside the TradeSim Data directory, i.e., [c:\tradesimdata\exports].

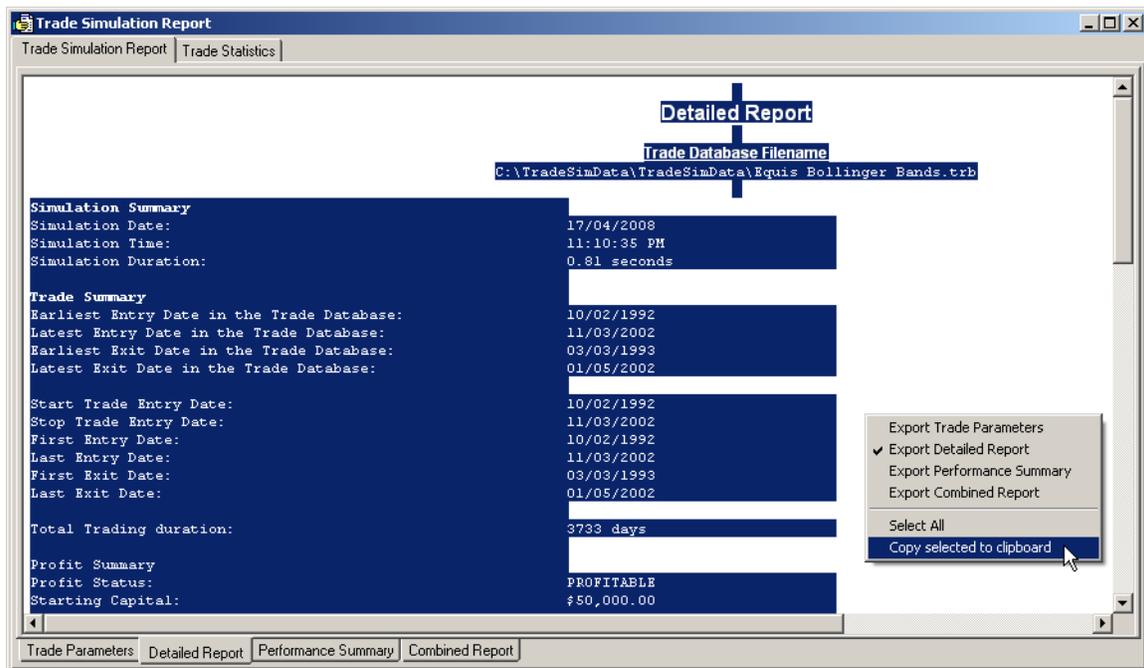
Copying into the Clipboard

After running a simulation right click on the required report and click 'Select All'. If you only need to copy a partial amount of the report left click and drag the mouse to select the desired portion of the report.



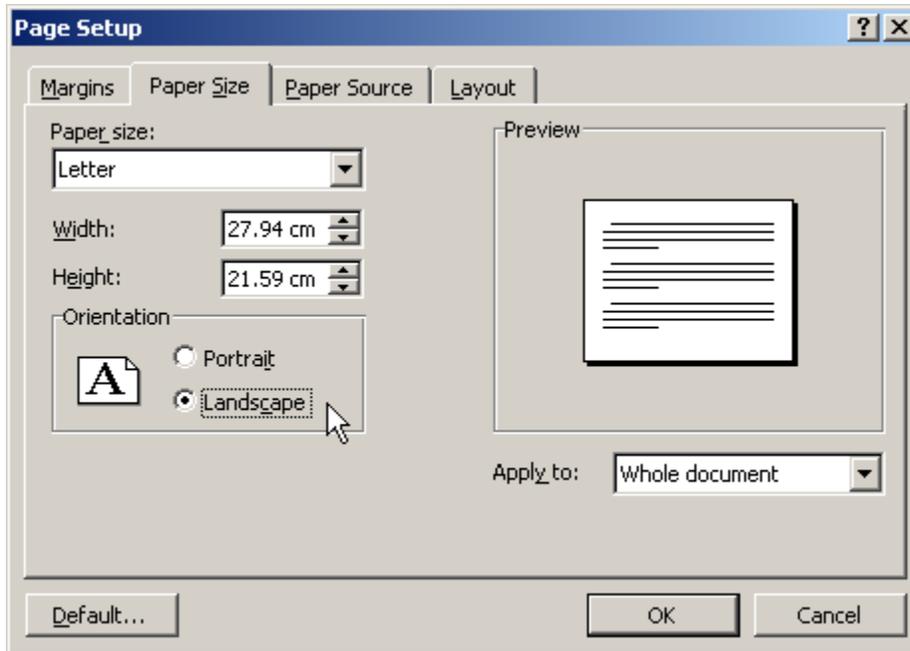


Now right click again and select 'Copy Selected to Clipboard'



Pasting into Word®

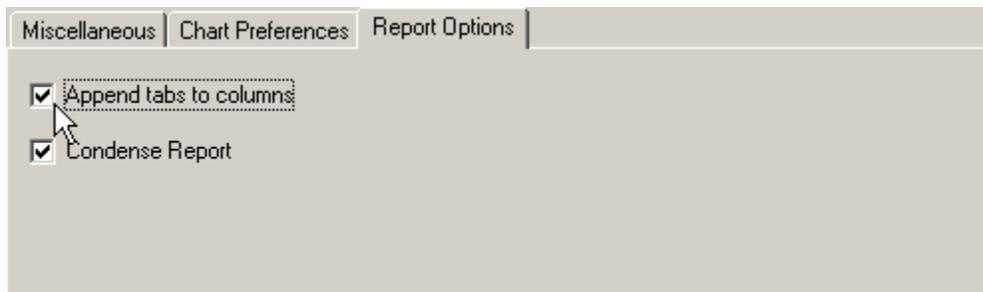
Before you paste the clipboard contents into Word it is recommended that you set the Page Size to 'Landscape' otherwise the information will be wrapped around and be less legible. This is done from the 'Page Setup' menu as follows.



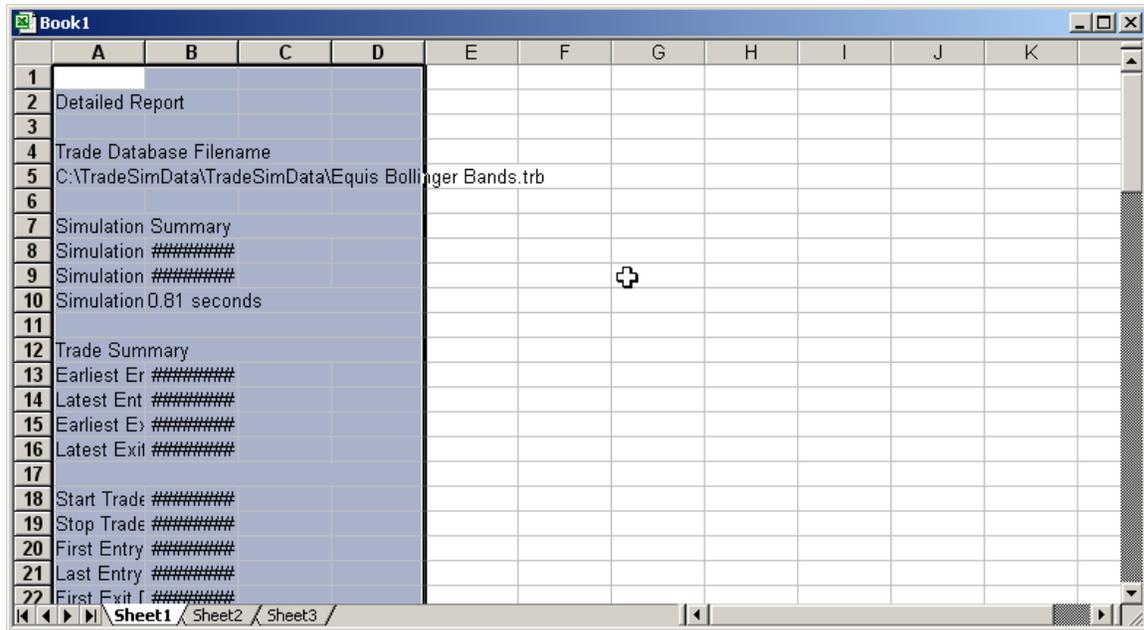
To paste into Word first position the mouse cursor in your document and either hold down the 'Ctrl + V' key selection from the keyboard or select 'Paste' from the 'Edit' menu.

Pasting into Excel®

If you copy and paste any parts of a text report into Excel you may notice that column formatting is lost and everything is put into one column. To preserve the column formatting you need to enable 'Append tabs to columns' in the 'Report Option' tab of the global preferences dialog before you run a simulation.



Once this is done just select the desired cell in Excel where you want to paste the report and either hold down the 'Ctrl + V' key selection from the keyboard or select 'Paste' from the 'Edit' menu..

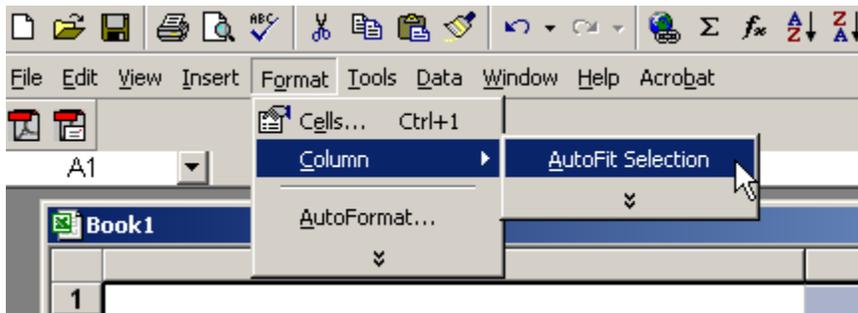


You will note that the pasted information looks congested and confusing so you need to follow these steps to clean it up.

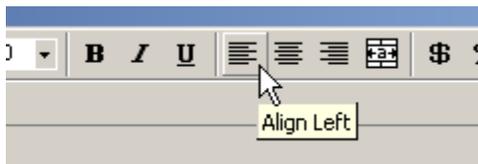
Select the whole work sheet if it hasn't automatically done it after you have pasted into the work sheet.

Now automatically readjust the cell widths using the following menu sequence.

Format → Column → Auto Fit Selection



Now left justify all cell contents from the main toolbar or 'Format' menu.

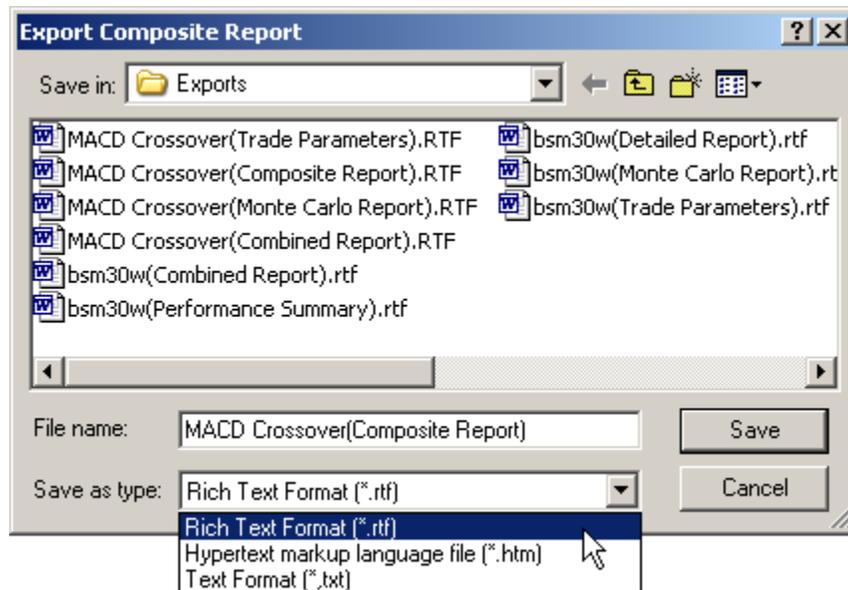


	A	B	C
1			
2	Detailed Report		
3			
4	Trade Database Filename		
5	C:\TradeSimData\TradeSimData\Equis Bollinger Bands.trb		
6			
7	Simulation Summary		
8	Simulation Date:	17/04/2008	
9	Simulation Time:	11:10:35 PM	
10	Simulation Duration:	0.81 seconds	
11			
12	Trade Summary		
13	Earliest Entry Date in the Trade Database:	10/02/1992	
14	Latest Entry Date in the Trade Database:	11/03/2002	
15	Earliest Exit Date in the Trade Database:	03/03/1993	
16	Latest Exit Date in the Trade Database:	01/05/2002	
17			
18	Start Trade Entry Date:	10/02/1992	
19	Stop Trade Entry Date:	11/03/2002	
20	First Entry Date:	10/02/1992	
21	Last Entry Date:	11/03/2002	
22	First Exit Date:	03/03/1993	
23	Last Exit Date:	01/05/2002	
24			
25	Total Trading duration:	3733 days	
26			
27	Profit Summary		
28	Profit Status:	PROFITABLE	
29	Starting Capital:	\$50,000.00	
30	Finishing Capital:	\$103,476.94	
31	Maximum Equity/(Date):	\$55,915.29 (18/02/2002)	
32	Minimum Equity/(Date):	\$1,492.72 (03/03/1993)	
33	Gross Trade Profit:	\$131,660.19 (263.32%)	
34	Gross Trade Loss:	-\$78,183.25 (-156.37%)	
35	Total Net Profit:	\$53,476.94 (106.95%)	
36	Average Profit per Trade:	\$499.78	
37	Profit Factor:	1.684	
38	Profit Index:	40.62%	
39	Total Transaction Cost:	\$0.00	
40	Total Slippage:	\$0.00	
41	Total Trade Interest:	\$0.00	
42	Daily Compound Interest Rate:	0.02%	
43	Annualized Compound Interest Rate:	7.37%	
44			

Exporting the reports

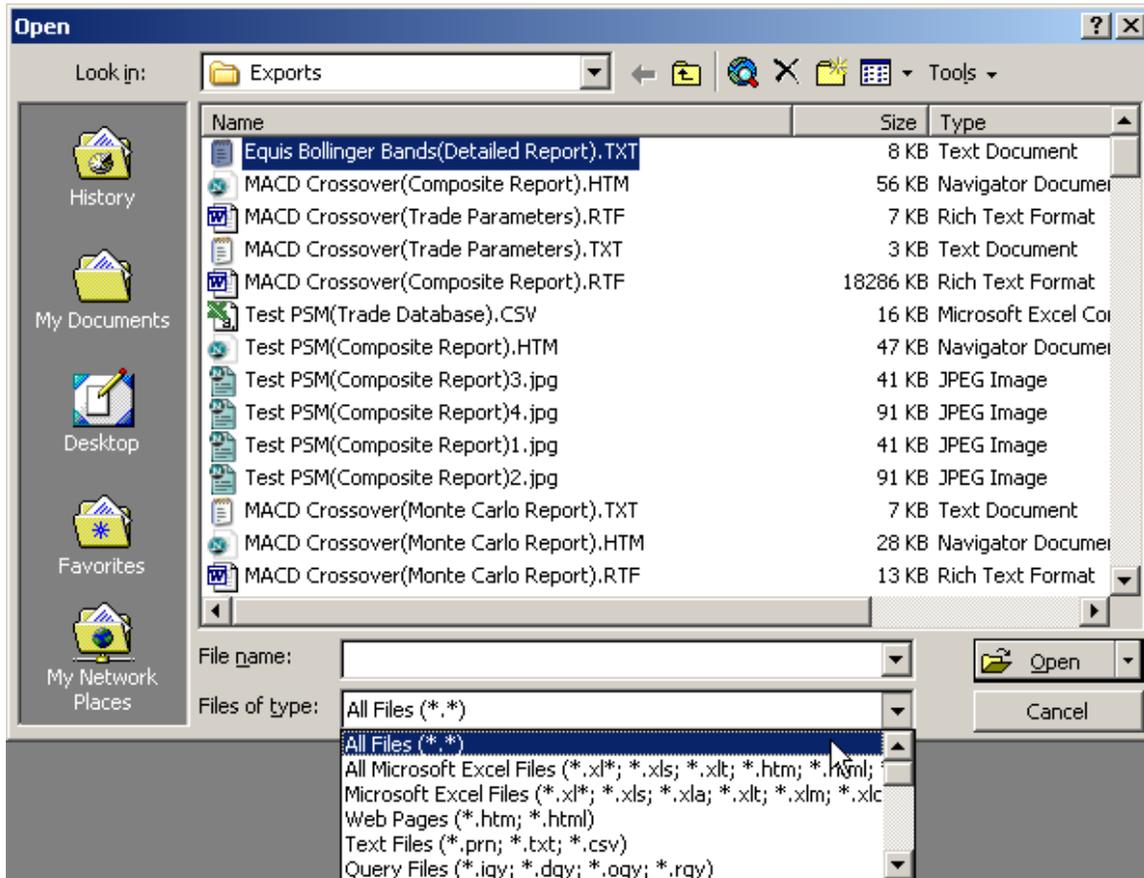
The reports can be exported in a variety of different formats including RTF (rich text format), HTML (hypertext mark-up language), TXT (standard text format). To export the report right click on the report and select the appropriate export option. A dialog box will popup where you select the export type from the 'Save as type:' drop down menu as well as the filename which will default to the name of the trade database.

For exporting into Microsoft Word use the RTF format. When exporting as a HTML format, all of the original text formatting displayed in the reports is preserved and charts are exported as individual JPEG images. The HTML files can then be downloaded to a server for others to view on the net.

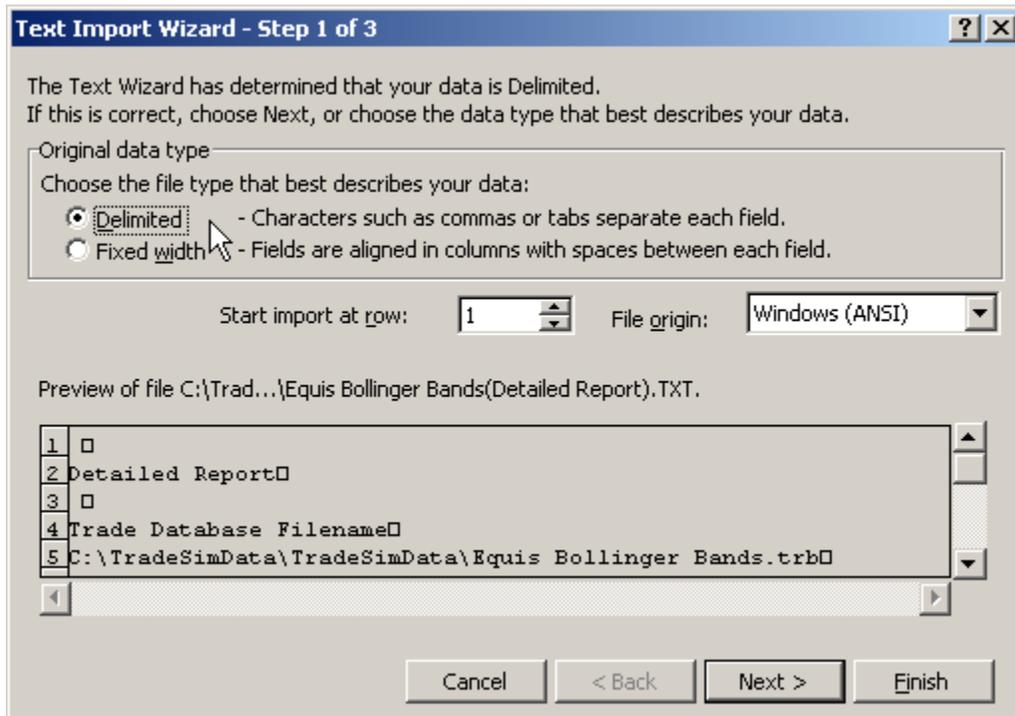


Exporting the reports to Excel®

When exporting to Excel use the TXT format. All reports are exported to the \tradesimdata\exports directory. When loading the exported file into Excel make sure you specify 'All Files' in the 'Files of Type' drop down.



Now select 'Delimited' as the data separator.

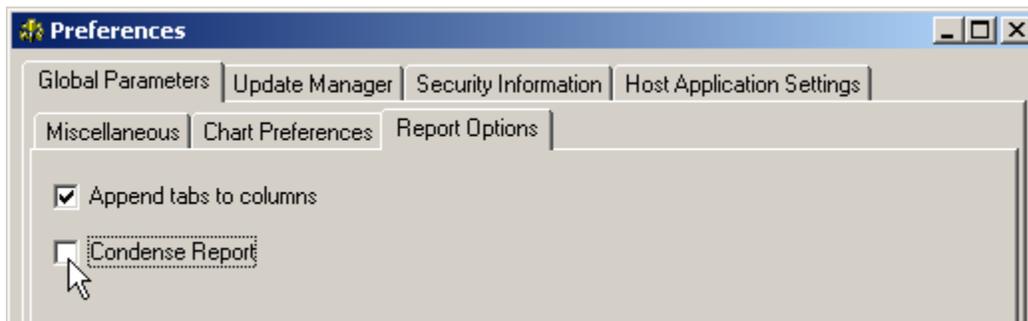


Click on 'Finish' and then clean up as above for the Copy and Paste example.

You can do further cleaning up by right or left justifying the contents in the second column. For example select the contents of column 'B' by clicking on the 'B' column header. Then click on the left or right justify tool in the toolbar. You also may want to add additional formatting for presentation such as color and bold etc. Once you have finalized the format make sure you save it as a XLS file not a TXT file otherwise all of the formatting will be lost.

Comparing simulation reports in Excel

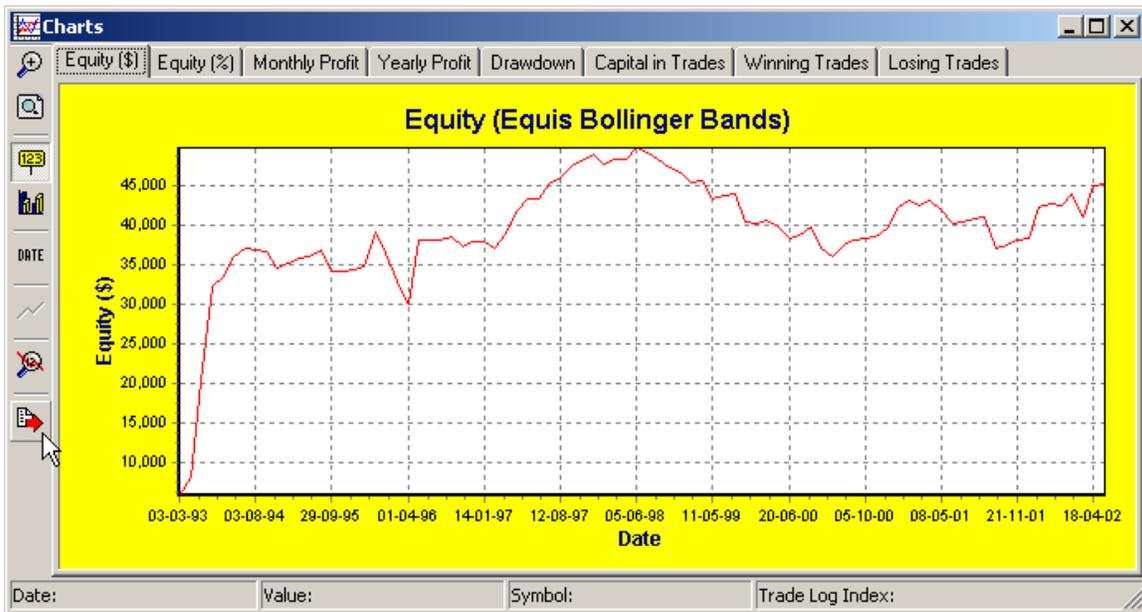
For brevity some of the report results include value(date) or revenue(percentile) pairs. This saves space in the reports but makes it hard to do a comparison in Excel of numeric values from one simulation report to another. To separate the pairs into separate lines you need to deselect 'Condense Report' in the 'Report Options' in the Preferences dialog box before you run a simulation as follows.



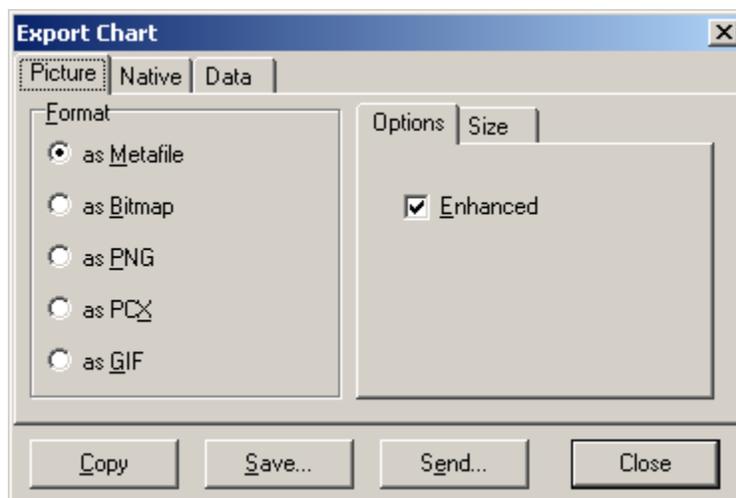
Appendix G

Exporting Charts {P,E}

The Professional and Enterprise Editions of TradeSim allow you to export any of the charts in a variety of image and text formats.



To invoke the chart exporting dialog box click on the export tool on the chart tool bar. You can export the charts in either image or text formats depending on the tab selection.



Exporting the Chart as an Image File.

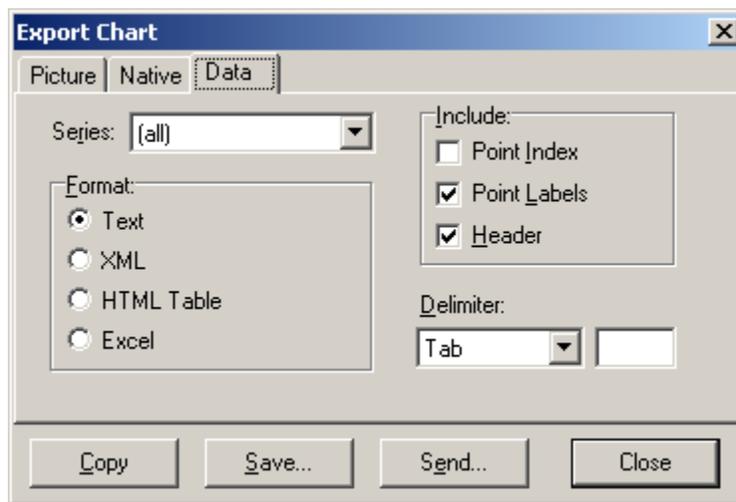
You can export the chart as an image file by clicking the 'Picture' tab and then selecting the required format from the format group box. An additional set of options available from the adjacent tabbed page control, allow you to customize the way the image is saved.

Chart Formats:

- ❑ **Metafile Format**
Saves the chart as either enhanced (emf) or standard metafile (wmf) formats.
- ❑ **Bitmap**
Saves the chart as a bitmap (bmp) formats.
- ❑ **PNG**
Saves the chart in Portable Network Graphics (png) format.
- ❑ **PCX**
Saves the chart in PCX (pcx) format.
- ❑ **GIF**
Saves the chart in Graphic Interchange Format (gif) format.

Exporting the Chart as a Numeric File.

You can also save the numeric contents of the chart by clicking on the 'Data' tab.



Series Selection Menu.

The Series dropdown menu allows you to select which series you want to save if the chart displays multiple series or graphs on a single chart. For example with the 'Portfolio Heat' charts display both the actual heat on a trade by trade basis as well as the maximum heat envelope, so you can export either or all of the chart series.

Numeric File Formats.

- ❑ **Text**
Saves the numeric contents of the chart as a text (txt) file. You can also specify the delimiter character used to separate the columns of data.
- ❑ **XML**
Saves the numeric contents of the chart as an Extensible Markup Language (XML) file.
- ❑ **HTML Table**
Saves the numeric contents of the chart as a Hypertext Markup Language (HTML) file.
- ❑ **Excel**
Saves the numeric contents of the chart as a Microsoft Excel® (XLS) file.

Reference Literature

This list of references is by no means exhaustive but represents material, which is either recommended, or for general reading.

Recommended Reading

The following references are ones that provide relevant background material for using TradeSim.

- 1) Compuvision Australia. *TradeSim Quick Start Tutorial*.
- 2) Equis *MetaStock for Windows 95/98 & NT*. This is the user manual that comes with MetaStock Version 7.0 and is a prerequisite for using TradeSim.
- 3) Van K. Tharp. *Trade your way to financial freedom*. McGraw-Hill.
- 4) Mark Jurik. *Computerized Trading*. Prentice Hall.

TradeSim Application Notes

Note: If any of these articles are missing they can be downloaded from the following website location <http://www.compuvision.com.au/Articles.htm>

- 5) [AN1 - Generating a Portfolio Security List in MetaStock the Easy Way.](#)
- 6) [AN2 - Implementing Volatility Trailing Stops the Simple Way.](#)
- 7) [AN3 - Testing Trade Pyramid Strategies using TradeSim.](#)
- 8) [AN4 - Creating a Trade Database with Multiple Periodicity.](#)
- 9) [AN5 - Survivorship Bias Free Back Testing using TradeSim](#)
- 10) [AN6 - Provisional Trades and Signal Ranking](#)
- 11) [AN7 - Simulating CFD's using Variable Margin Requirement](#)

TradeSim Technical Briefs

Note: If any of these articles are missing they can be downloaded from the following website location <http://www.compuvision.com.au/Articles.htm>

- 12) [TB1 - Problems and Issues using the TradeSim/MetaStock Plug-In.](#)
- 13) [TB2 - The Universal Text Trade Database File Format.](#)

General Reading and References

The following references are ones that the author has read and recommend for general reading. This list is by no means exhaustive.

- 14) Jeffery Owen Katz, Ph.d., & Donna L. Mc Cormack. *The Encyclopedia of Trading Strategies*.
- 15) Ronald E. Walpole and Raymond H. Meyers. *Probability and Statistics for Engineers and Scientists (second edition)*. Collier Macmillan International Editions.

- 16) Morris Hamburg and Peg Young. *Statistical Analysis For Decision Making (6th edition)*. The Dryden Press
- 17) Martin Pring. *Breaking the Blackbox*. Wrightbooks.
- 18) Dr. Alexander Elder. *Trading for a Living*. John Wiley & Sons.
- 19) Steven B Achelis. *Technical Analysis From A to Z*. McGraw Hill.
- 20) John J. Murphy. *Technical Analysis of the Financial Markets*. New York Institute of Finance.
- 21) G.S. Rehill & R McAuliffe. *Reasoning and Data*. MacMillan Education Australia.
- 22) Perry J Kaufmann. *Trading Systems and Methods*. John Wiley and Sons.
- 23) Ed Seykota and Dave Druz. *Determining Optimal Risk*. V 11:3 (122-124) Technical Analysis of Stocks and Commodities published by Technical Analysis, Inc.
- 24) Robert P. Rotella. *The Elements of Successful Trading*. New York Institute of Finance.
- 25) Catherine Davey. *Making Money from CFD trading*. Wright Books.

Magazines and Journals

These are some of the few trading magazines or journals that I would recommend. There are probably other magazines available but I have found there are more bad ones than good ones.

- 26) *Technical Analysis of Stocks and Commodities* published by Technical Analysis, Inc. <http://www.traders.com>
- 27) *Your Trading Edge*. Text Media Group Australia. This is the only Australian trading magazine worth subscribing too. Aimed at both stock and commodities traders. <http://www.yte.com.au>.

Websites

The following websites are a good source of information and ideas. This list is by no means exhaustive. There are enough traders and financial websites to fill pages of this manual however I have narrowed the field down to a group of websites, which I think, are more pertinent to the topics discussed in this manual. If you go to the Links page at our website <http://www.compuvision.com.au> you will find many more links dealing with other topics.

Australian Stock Exchange (ASX) <http://www.asx.com.au> . This website contains a lot of valuable information relevant to the Australian Stock Market.

TradeSim Forums

 We now have our very own forum dedicated to TradeSim issues located at <http://www.compuvision.com.au/phpBB2/>

Paritech hosts a trader's forum, which has a section, dedicated to TradeSim and a host of other topics <http://www.paritech.com.au/forums/cgi-bin/ultimatebb.cgi>

Trading Software

Equis International are the producers of MetaStock <http://www.equis.com> . You can jump directly to the MetaStock home page at <http://www.MetaStock.com>

Compuvision Australia Pty Ltd are the producers of TradeSim and have a website at <http://www.compuvision.com.au>

Trader Forums

Reef Capital. <http://www.reefcap.com> This is an Australian forum by run Nick Radge with a high level of content and discussion covering a broad range of issues from software to Futures trading.

Trader Club. www.traderclub.com This is an American Traders forum by Chuck Le Beau. It covers a broad range of topics and most of the contributors are heavily into trade system design and testing.