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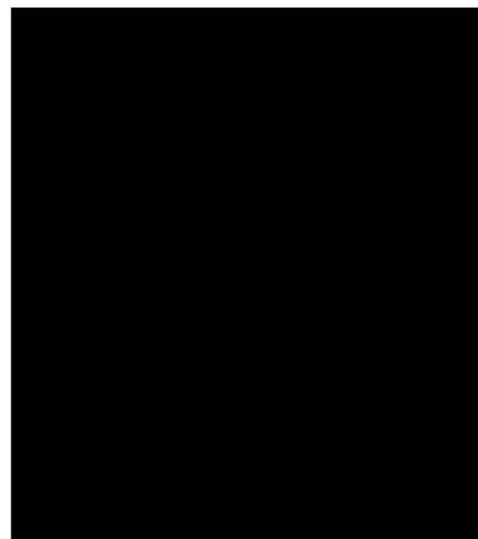
MECHANICAL SYSTEMS HELP YOU AVOID MISTAKES, BE LESS EMOTIONAL

By David Vomund

AIQ user Richard Denning, a CPA, has been investing since 1973. He was one of AIQ's first users, buying the original software package in 1987. He is an active member in an AIQ chat forum at www.yahoogroups.com and is an expert in the Expert Design Studio language. Mr. Denning is one of the featured speakers at AIQ's Fall Seminar at Lake Tahoe.

Vomund: How much of your trading is based on a mechanical approach and how much is based on judgment?

Denning: Let me first mention that the trading portion of my portfolio is about 33% of the entire portfolio. The rest is managed in long-term positions that are largely buy-and-hold. With the trading portion of my portfolio, all of the entries come from Expert Design Studio (EDS) strategies. My goal is to run fully mechanical strategies but right now a good portion of my trading portfolio is based on judgment. Judgment comes in when



RICHARD DENNING, CPA

deciding the position size and how many positions to take at one time.

Vomund: What are the advantages of mechanical systems?

Denning: There are several advantages. When you are trading you're constantly making decisions. Having a mechanical system helps avoid the common mistakes that many new traders make. One such error is to begin trading without having a well thought out plan.

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That's like taking off in an airplane without a flight plan. When you implement a mechanical system you are forced to create rules. You write them down and code them. You have to define an exit in order to run a test. You run tests over several time periods to see how different market conditions affect the final outcome. Creating a mechanical system gets you organized and allows you to look at a trading strategy as a business.

In addition, following a mechanical system helps you to achieve a more consistent approach and to be more emotionally neutral. It helps you become less dependent on your emotions and it keeps you from getting either overly optimistic when the market is extremely bullish or extremely pessimistic when the market is bearish.

Vomund: *It sounds like it is useful for people to create and back test a system even if they don't want to follow a mechanical model.*

Denning: That's right. It helps to organize and program your judgment. Even judgment traders must have patterns that they follow as part of their strat-

egy. Running back tests and examining the trades helps you to understand the details of a trading plan and the related chart patterns. Looking at charts of the selections from the system test helps program the trader's mind for judgmental trading. The process of testing and examining the results is very important, more so than the actual system that is used. It helps the trader build confidence.

"A mechanical system helps you become less dependent on your emotions and it keeps you from getting either overly optimistic when the market is extremely bullish or extremely pessimistic when the market is bearish."

The mind tends to generalize from one or two examples to the whole population. This can be extremely dangerous for a judgmental trader, as these types of generalizations do not hold up when a larger population is tested. By back testing these ideas, a judgmental trader can get a better idea of what really works and what is just an over generalization of an isolated example.

Vomund: *How important is it to have a system that fits the psychological profile of a trader?*

Denning: It is extremely important. Beginning traders tend to focus on the annual rate of return after running a back test. But the most important thing in fitting a particular system to the trader's personality is the kind of risk tolerance that he or she can live with. So the key is to find a system that you can live with long-term.

What often happens is you find a strategy that shows fantastic back testing results and you think,

"I'm going to make 200% a year." Then you start trading it and you find out it's really difficult to follow the system. It might be that the risk is too high and there is a lot of drawdown. If you are risk intolerant, then as soon as you get into a drawdown you give up the system and choose not to follow its rules.

Systems also need to fit your lifestyle. If you work eight hours a day and can't follow the markets during the main trading hours, then a daytrading program won't work no matter how good the model is.

Vomund: *Describe the emotional struggles you experience when you follow a purely mechanical system.*

Denning: You run into the same problems as when you incorporate judgment in your analysis. During some periods you become overly optimistic. At other times you become overly pessimistic, constantly wondering whether your system is breaking down. Each system goes through bad periods so your emotions tell you to stop following the model. Ideally, if I could build a system that could monitor itself and make all the necessary decisions, I would turn it over to a non-biased third party who would then execute the trades. The best-nonbiased party would be a computer that is a fully automated trading platform. That would totally eliminate the tendency to not follow the rules.

Vomund: *Do you prefer to trade trend-following systems or counter-trend systems?*

Denning: I run both, but even with the trending systems, I prefer to enter after a retracement in price has occurred. The very short-term systems are often counter-trend. For example, I'll go

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long when the security is near the lower AIQ band looking for a one-to-three day reversal.

Uptrending securities trade between the 20-day moving average and the upper AIQ band. For trending trades, I look for stocks that have hit the upper AIQ band but have retraced back to the 20-day moving average. So I'm trading in the direction of the overall intermediate term trend but there is a counter-trend element as well.

My goal is to run four systems that include both trend following and counter-trend systems on different time frames, and run these systems against the background of the long term buy and hold portion of the portfolio. There is an excellent article by Tushar Chande in the July 2001 issue of *Futures* magazine. He tested four different categories of systems based on how fast they enter and exit and found that combining the systems from the different categories produced the lowest standard deviation and the highest overall return. As market conditions are constantly changing from trending to trading range, the objective is to have at least two systems, one that will do well in the trending environment and the other in the trading range environment.

Vomund: *What type of exit strategies do you find work well in your back tests?*

Denning: An effective short-term sell strategy, called One Down or Two Up, was developed by another AIQ user, Monty Webb. Basically, if the stock closes below the open for the day then you sell the next day. In addition, if it closes higher two days in a row then you sell the next day. This method seems to work on

counter-trend systems where generally two good up days in a row is all you will get.

I'm also a frequent user of fixed time stops. In designing a system I'll try using a 1-day hold, 2-day hold, 3-day hold, 4-day hold, and a 5-day hold. Looking at the return figures for different time periods can give you useful information on your system. If you see a retracement occurring right after your purchase, then you can change the system to enter at a delayed date. For instance, if you see a retracement on the first and second day after the buy point, then the system can be changed to buy on day three. This also gives you an idea of what the best

"As market conditions are constantly changing ... the objective is to have at least two systems, one that will do well in the trending environment and the other in the trading range environment."

holding period is for the particular system being tested.

I have found that 2, 5, and 10-day fixed holding periods work very well with retracement entry systems. If the system is counter-trend, I use 2 days and if it is a trending system I will use 5 to 10 days depending on the market conditions. In the 1998, 1999, and early 2000 markets, I was using the 10-day fixed exit on my retracement trending systems and it worked very well. In some cases I took profits early. Upon later analysis I discovered that I would have done even better to stay with the 10-day fixed hold.

I am working on a variable 5 to 10-day stop that would automatically adjust down as market

conditions move from favorable to unfavorable. When the relative strength of the SPX starts gaining on that of the NASDAQ, I would bring the stop down to 5 days. When the reverse situation occurs, the system would increase it back up to 10 days. These time periods tend to work well because they fit the short term cycles that are predominant in the stocks.

As a further enhancement to time stops I have developed a different kind of variable time stop. For this type of time stop the fixed period is extended for "X" days past the last signal. This can only be used on systems that give multiple signals over a short period of time. Therefore, if you have a 2-day holding period and you get another buy signal on day two, then you would hold the position an additional two days, making it a 4-day holding period by exiting on the fifth day. I've programmed this into EDS.

Vomund: *As you create a model, can you explain the tradeoff between adding rules to improve the accuracy of a system versus over back-fitting a system? When do you know that a system is over optimized?*

Denning: That is a difficult problem but there are some rules of thumb that help. The first rule is to keep the systems simple. The simpler the system, the more robust it will be and the greater the likelihood it will hold up during varying market conditions. I've seen people add a lot of rules to their systems. Each rule cuts the number of trades down to where there are so few trades that it's not statistically valid. A large annual percentage return can fool you if that is all you are looking at. I think if you have more than five rules, then the chance of having a

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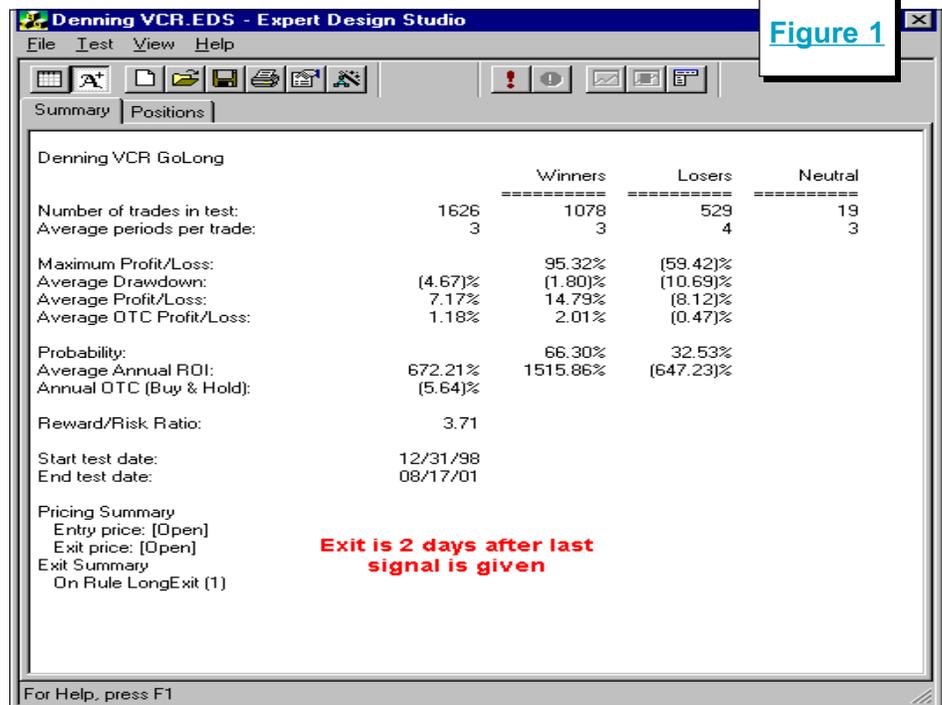
curve-fitted system dramatically increases. The five-rule limit doesn't include data filter rules (i.e. requiring a minimum price or minimum volume).

It helps to have rules that have logical relationships. You can create a system that appears to work by looking at whether an AFC or NFC football team wins the Super Bowl but that's not logical. If it has worked in the past it is strictly just by chance. A computer cannot tell the difference between a chance relationship and one that has cause and effect. This is where it is important to really understand what you are doing so that you don't end up programming chance relationships that will not repeat in the future.

To check for over-optimization you can test your system with a different set of data. That means after you create your system using, say, two years of data and the system is set, then you test it with data from a different two year time period. You then compare the results. It's also best if you check the system out with different market conditions and many different trading vehicles. It is easier to get an over optimized system if you are designing it to trade just one stock. This is one of the major advantages of AIQ – it can quickly test your system over thousands of stocks and show you the overall results.

Vomund: *How many trades per year would you like to see in a back test?*

Denning: I like to see at least 200 trades per year. If there are fewer trades than that, then I use the rules as a more restrictive subset of a broader trading system to pick out the better trades. It's important that the trades are spread throughout the year as well. If the majority of trades



come in one month, then the system won't work as well as the EDS Summary Report indicates. If a back test shows outstanding results but AIQ's new Portfolio Simulator (new function in the Portfolio Manager application) reveals a much lower return, then the best of the buy signals may have been clumped into one or several small time periods.

AIQ has a great feature that allows you to export the EDS and Portfolio Simulation results to Excel. By using the graphing, statistical, and subtotal function in Excel, I get a much better understanding of what the system is doing. Just graphing the signals per day over a four year time period is very revealing.

Vomund: *Can you show us one of your EDS models?*

Denning: The example that I'll cover uses a custom indicator that I designed called the Volume Climax Reversal indicator. For this indicator, I first compute a volume ratio, which compares today's volume to its 50-day exponential

moving average.

Next I compute an inverted 5-day rate of change. When I designed this indicator, I was mainly interested in finding buying opportunities when stocks are low, so I inverted the ratio to show a positive value when there was a fast rate of decline in price. I take the value of the close 5 days ago divided by the current close and convert this to a percentage.

The Volume Climax Reversal indicator is computed by multiplying the volume ratio times the inverted 5-day rate of change. I plot this indicator with two horizontal lines at 60 and -60. For this indicator, I look for levels greater than 60. The EDS formula is:

$$\text{VCR is } [\text{volume}] / \text{expavg}([\text{volume}], 50) * (\text{val}([\text{close}], 5) / [\text{close}] - 1) * 100.$$

Editors Note: *For an explanation on how to create your own indicators refer to TradingExpert's User Reference Manual page 599.*

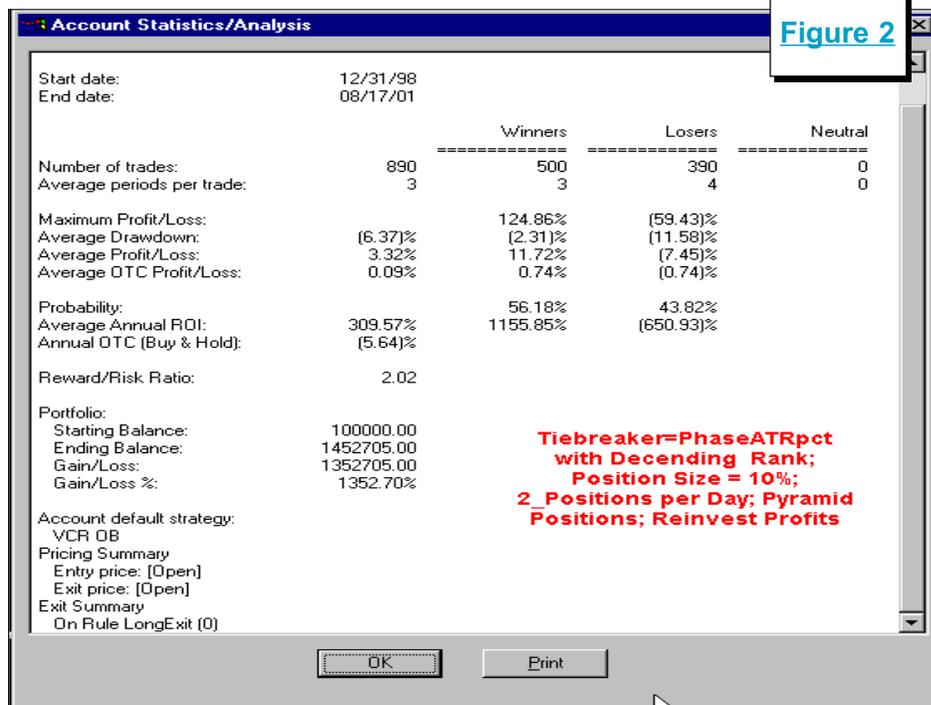
I've created an EDS scan which looks for the Volume Climax Reversal indicator to be above 60,

AIQ USER SHARES EXPERTISE *continued*

an opening price to be below the lower AIQ band, and a Wilder RSI below 30. The rules for shorting are just reversed. All of the indicators are coded into the EDS file except the AIQ bands. You must set the IT ESA to 20 in Charts to duplicate the returns. In addition, the size of the database that is used affects the results. I try to keep in my database all of the stocks that are trading over 50,000 average daily shares and have a price of at least \$5. This scan is designed to be run on a large database as it is looking for extreme conditions and needs lots of stocks to find enough trades.

I find that the best way to enter these trades is to watch for the stock to gap down at the open (but less than a 10% gap) after a signal, and then to trade up from the open by a fourth of the stock's average true range over the last 30 days. This helps to eliminate those that are continuing to plunge.

A tiebreaker method that tests fairly well is one based on another custom indicator. I multiply the built-in phase indicator by -1 and

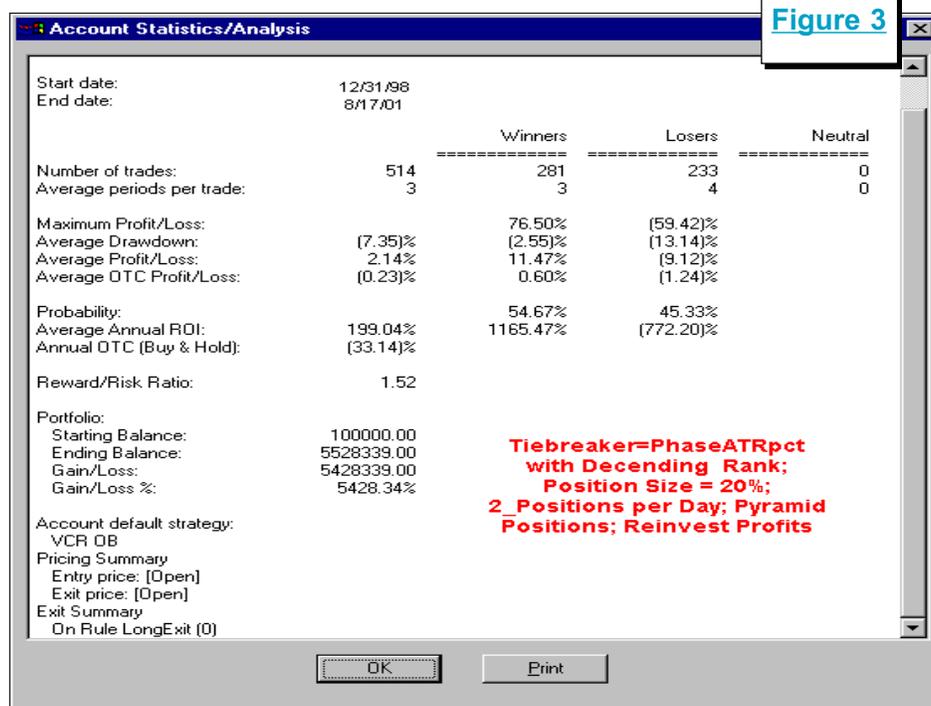


that by an Average True Range Percent and then do a descending ranking to choose the positions to trade. Judgment traders can examine the charts of all the selections and enter only those with the best looking charts after seeing that the stock is trading up from the open.

This system comes with the usual disclaimer – it is provided as an example of a trading system and I am not recommending that anyone actually trade these signals. I do not claim that this system will be profitable in the future or that profit and losses will be similar to those shown in the examples. This system is difficult to trade as it can be likened to attempting to “catch a falling knife” in a volatile environment.

Figure 1 shows a 2.7 year back test of the system on a database of 3113 stocks. It shows 1626 signals with average profit per signal of 7.17%, an R/R of 3.71, and an AAROI of 672%. The sell strategy is set for a fixed two-day holding period past the last entry signal. I've also run this test using the AIQ Portfolio Simulator.

The results were not as good as the EDS test led us to believe (Figures 2 & 3). The two simulation runs used different position sizing criteria. In Figure 2, the capitalization was 10% per posi-



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tion, 2 trades per day, 12 maximum positions, reinvest profits, and pyramid positions. In Figure 3, the position size was increased to 20% and the maximum positions reduced to 6. Using the 20% position sizing approach the account grew from \$100,000 to \$5,528,339 vs. \$1,452,705 for the 10% sized positions. On the 20% sized positions, the average profit per trade was 2.14%, with an R/R of 1.52 and an AAROI of 199%.

The reason for the lower results in a more realistic Simulation test is that the system tends to generate the best signals in bunches and these can't all be taken in actual trading. In addition, commissions and slippage reduce the actual profit.

Editor's Note: *The new Portfolio Simulator is covered in the TradingExpert User Reference Manual on page 470.*

An example of a stock that passes this filter is AVNT (Figure 4). The stock opened below its lower AIQ trading band and its Volume Climax Reversal indicator was above 60 and the Wilder RSI was below 30.

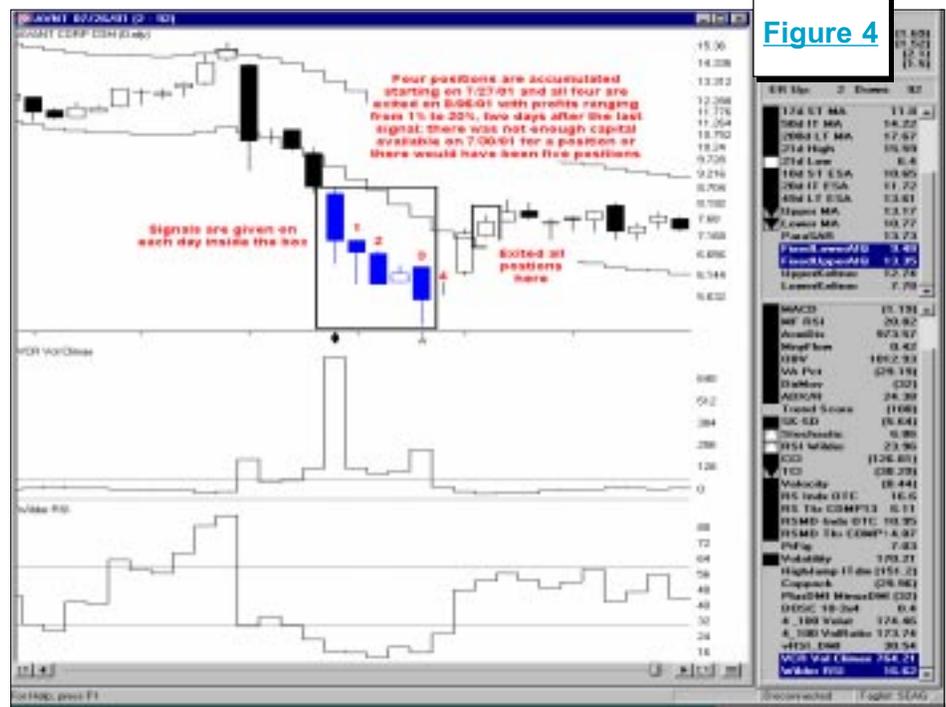


Figure 4

You'll notice in Figure 4 that I'm plotting Fixed Upper AIQ and Fixed Lower AIQ instead of the regular AIQ bands. These are really the same indicators. In the middle of a chart, the AIQ bands change as more data is added so I use an EDS formula in order to have fixed bands (the idea for

using fixed bands also comes from AIQ user Monty Webb). The formula is:

**FixedLowerAIQ is [Lower AIQ].
!Plot as custom indicator on chart**

**FixedUpperAIQ is [Upper AIQ].
!Plot as custom indicator on chart**

This system is set up to find short sale candidates as well. You simply reverse the parameters – the stock must have a Volume Climax Reversal indicator below -60, an opening price above the upper AIQ trading band, and an RSI above 70. The test results are not shown, but they are not as favorable as trading the long side.

Additional tests were run using Excel and TradeIt!, a freeware program from AIQ user Chris Kruza that is available in the shared files area of the AIQ-EDS email list at www.yahogroups.com. I exported the 20% capitalization simulation run to Excel and then computed the monthly return % (Figure 5) and the cumulative

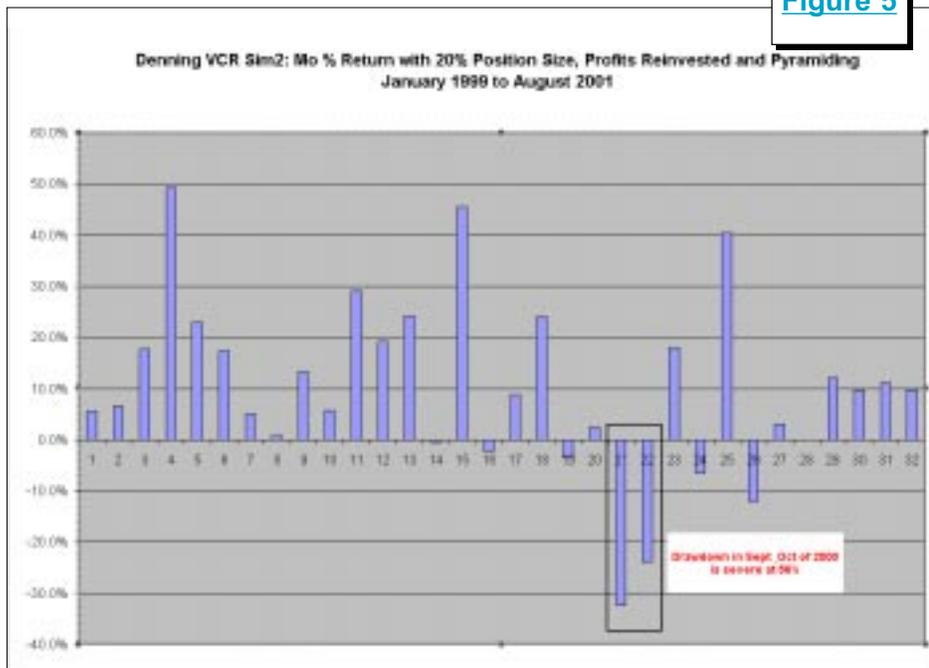


Figure 5

AIQ USER SHARES EXPERTISE *continued*

equity curve (Figure 6). Similar graphs can be produced with Tradelt! By taking four times the standard deviation of the monthly returns (as computed by Excel) we can estimate the expected maximum future drawdown from a system. The standard deviation of the monthly returns from the 20% sized simulation times four yields an expected maximum drawdown of 55%. We see that September and October of 2000 experienced a drawdown of 56% (Figure 5) so hopefully the maximum is now behind us.

Since this system incurs severe drawdowns, most will find it unacceptable to trade with the 20% position size. We should go back and choose a different position sizing to try to reduce the maximum drawdown. If we go back to the 10% position size, the drawdown is reduced to a total of 25% for September and October of 2000 (Figure 7). This illustrates the trade off that often occurs between total profit and drawdown.

Editors Note: AIQ users can download this EDS file at

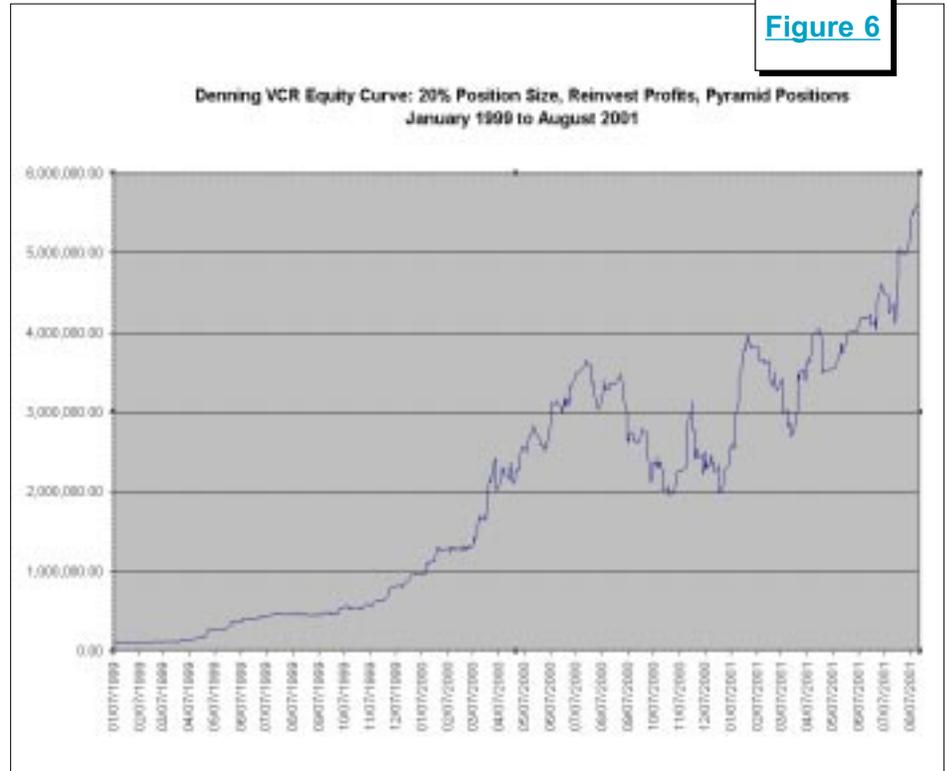


Figure 6

www.aiqsystems.com. Click on Educational Products and then Opening Bell. Click on the proper file at the bottom right section of the screen.

Vomund: Thank you for sharing your thoughts with us. We look forward to hearing your presentation at AIQ's seminar in October. ■

Richard Denning can be contacted at rdencpa@ix.netcom.com.

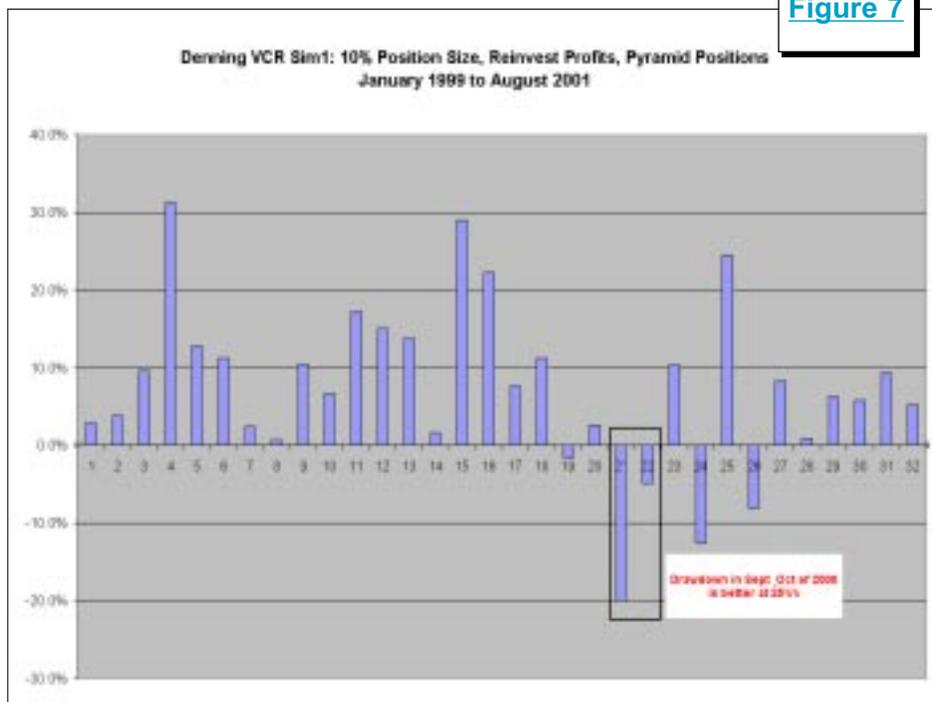


Figure 7

S&P 500 Changes

Pepsi Bottling Group (PBG) replaces Adaptek Inc. (ADPT). PBG is added to the Soft Drinks (SODAGR) group.

TMP Worldwide (TMPW) replaces CIT Group (CIT). TMPW is added to the Advertising (SERVICEA) group.

John Hancock Financial Services (JHF) replaces Harcourt General Inc. (H). JHF is added to the Life & Insurance (INSURALI) group.

Zions Bancorp (ZION) replaces Alza Corp. (AZA). ZION is added to the Banks (BANKGRP) group.

MARKET REVIEW

August was another ugly month for the market. The S&P 500 fell 6.4% and the Nasdaq Composite fell 11%. So much for a summer rally! There were a few sectors that gained in value during the month. Gold, Consumer Goods, Food & Agriculture, and Paper all gained 3% to 4%. Most sectors lost value, however, with Technology leading the way with a 16% drop.

The AIQ timing model was on the wrong side of the market in August. It fired buy signals on the 9th, 17th, 21st, 22nd, 24th, and 31st. Most of these signals were a result of strong market breadth indicators.

The Advance/Decline Line (the most common market breadth indicator) has been very strong and hit new yearly highs in the middle of August. Unfortunately, this may be deceptive. The strong Advance/Decline Line implies that most stocks are increasing but this is not the case. Richard Russell in *Dow Theory Letters* explains why the indicator is deceptive. He notes that about 48% of the stocks



Figure 8

on the NYSE are preferreds, closed-end bond or stock funds, or ADRs. These issues are affecting the market breadth data and possibly hurting the effectiveness of our timing model. We'll cover this topic in detail in next month's issue.

The market charts revealed

that those with long positions were on the wrong side of the market. In [Figure 8](#) we see that the Nasdaq Composite fell below its horizontal support trendline in mid-August. What was support now became resistance as the Nasdaq rallied in late August but couldn't penetrate the 1934 level. ■

STOCKDATA MAINTENANCE

The following table shows stock splits and other changes:

Stock	Ticker	Split	Approx. Date	Stock	Ticker	Split	Approx. Date
Griffon Corp.	GFF	10%	09/05/01	Sterling Bcschs.	SBIB	3:2	09/19/01
SCP Pool Corp.	POOL	3:2	09/10/01	Archer Daniels Mid.	ADM	5%	09/25/01
Alliant Techsys.	ATK	3:2	09/10/01	Charter One Finc'l	CF	5%	10/01/01
Monaco Coach	MNC	3:2	09/10/01	Nuveen (John)	JNC	3:2	10/01/01
Nicholas Financial	NICK	2:1	09/11/01	Career Educ.	CECU	2:1	10/01/01
Herley Industries	HRLY	3:2	09/11/01				

Trading Suspended:

Barrett Resources (BRR), Chris-Craft Ind. (CCN), CSFBdirect (DIR), Del Webb Corp. (WBB), Earthgrains Co. (EGR), E-Stamp Corp. (ESTM), Houghton Mifflin (HTN), Jenny Craig (JC), Nova Corp. (NIS), Quaker Oats (OAT), Sawtech Inc. (SAWS), Triton Energy (OIL)

Name/Ticker Changes:

Antec Corp. (ANTC) to Arris Group (ARRS), Biosite Diagnostics (BSTE) to Biosite Inc. (BSTE), Cabletron Systems (CS) to Enterasys Networks (ETS), Exide Tech. (EX) to Exide Corp. (EX), KRUG Int'l (KRG) to Sun Link Health Systems (SSY), McKesson HBOC Inc. (MCK) to McKesson Corp. (MCK), Wit Soundview Group (WITC) to Soundview Tech. Group (SNDV)