In This Issue

An Official Guide to Trading System Design Part II
Promising Trading Tools and Methods

This is the second installment in a three-part series dealing with the development of a trading plan. This month, the all-important issue of selecting or designing a trading system is discussed.

THE TRADING SYSTEM

A trading system should be an integral part of your overall plan. We are fortunate that the personal computer revolution has made trading and system planning accessible to all investors. The introduction of the computer does not, by itself, guarantee any level of success, however. Success will depend upon how well you design and integrate your management approach. Even the best trading system will fail if it is devoid of a workable plan that includes checks and balances to verify your methodology and focus.

DESIGNING A SYSTEM

Begin by purchasing or, if you have some programming ability, developing a systematic procedure for generating buy and sell signals. Don't be too specific about the markets you will address with each system. A good system will work well for several markets. For example, a system for oats that is different from one for wheat, that is different from one for corn, etc. could well be a problem. It may represent too much control and consume too many degrees of freedom, thereby restricting performance in real trading. Try to group your markets into a few categories such as grains, currencies, metals, etc. for like handling. This will allow diversity of approach for classes of markets.

CAPITALIZING ON DIVERSITY

In your search for a trading system to meet your needs, you should investigate analytical methods that are conceptually diverse. I suggest mixing approaches such as neural networks, chaos theory, Kalman filtering, momentum, auto regressive integrated moving averages and simple breakout methods. This is an abbreviated list of the possibilities you might consider. Remember that diversity of method and market reduces investment capital requirements, a necessary element of every trading plan.

Your trading system should also look to the diversity of global markets available to U.S. and overseas traders. A well-conceived plan will incorporate many of the newer overseas markets to find success (please see CTJ794 and CTJ894). Your next real profit opportunity may be overseas. Please don't expect a bargain where fees and commissions are concerned, however. Overseas markets typically charge more, much more perhaps, than you are accustomed to paying at U.S. exchanges. If you are a very active trader, however, you may negotiate a low commission cost for all markets, including overseas. One active trader

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reported to me that he pays $11 per round turn, regardless of exchange, market or country of origin.

CLASSIFYING TRADING SYSTEMS

Trading-system approaches generally fall into the two basic areas of 1) Trend Following, and 2) Counter Trend Following. Trend following systems simply follow the market's basic trend direction. Counter trend systems look to buy or sell on dips or bulges in price activity.

Trend following methods may produce many small losses in your search for the rare winning trade. This type of trading requires patience and persistence. A long-term perspective is needed so you won't be too discouraged by the many small losses you are sure to endure. The trend follower must take care to have positions in place when that golden move finally materializes. It is difficult to dispute the merits of the trend-following approach.

BREAKOUT SYSTEMS

Breakout systems are a popular form of trend-following system. They are simple to program and users are always poised to enter the markets in the trend direction. They can be designed to produce a good simulated track record with a minimum of parameter control. Non-trending, sideways markets produce heavy losses with this approach. Currencies, on the other hand, appear to experience more sustained trends and have produced fairly lucrative results. There is definitely room for the breakout method in every portfolio of tools.

THE KALMAN FILTER

The Kalman filter is another super tool of the trend-following genre for tracking market movement. It is a differential filter that minimizes response lag. Thus, when the Kalman filter suggests market entry, it can do

so much more quickly than would a moving average filter, which may take days longer. A drawback of the Kalman filter is that it is difficult to formulate. Making sense from economic time series input is more difficult than, say, the geophysical forces the Kalman filter is called upon to consider in satellite or missile tracking. Finding a workable Kalman filter often boils down to controlling a parameter known as the "Kalman gain." The Kalman gain in mismodeled systems stubbornly moves toward zero. It is in the user's best interest to keep the gain propped up so the filter will quickly adapt to marginal market movements.

COUNTER-TREND ANALYSIS

Counter-trend systems depend upon choppy market conditions. I consider them to be inherently dangerous. What appears to be a temporary drop or jump in the market may, in fact, be the beginning of a new trend. For the counter-trend trader, a powerful trend can consume vast resources very quickly.

Another serious defect in counter trend approaches is that you will always miss those sweet profit opportunities that come with long, uninterrupted trends. In the long run, counter trend methods produce many small profits and occasional large losses that will inevitably take the profits away.

NEURAL NETWORKS

Neural networks are hybrid systems that can include both trend and counter-trend analysis. In a neural network, market direction is projected daily, but much of the decision making depends upon how the analyst/ designer interprets the data. A Neural Network can look forward several days into the future, albeit with decreasing reliability. The neural network may have the ability to

CSI's On-Line Stock Advisory Report

Recommendations as of September 10, 1994

SECURITIES

SYM.	STOCK	DATE	SIG.	POS. PRICE	PRESS PRICE	$/SH GAIN	CLOSED POS. P/L
AA	Aluminum Co. of Am	8/8	HS	78.75	82.88	-4.12	-3.25
ABX	Amer Barrick Res	8/22	HL	22.37	24.50	+2.12	
AMGN	Amgen	8/8	HS	50.62	51.62	-1.00	
AAPL	Apple Computer		N				+1.38
BEL	Bell Atlantic Corp		N				-.50
BV	Blockbuster Ent.		N				+.38
BTY	British Telecom	6/20	HS	56.25	60.00	-3.75	
BC	Brunswick Corp.		N				
CS	Cabletron Systems	8/8	HS	96.00	108.62	-12.62	+5.50
CAT	Caterpillar Inc.	7/25	HS	53.37	55.37	-4.00*	
CHV	Chevron Corp	8/22	HL	42.37	43.37	+1.00	
C	Chrysler Corp		N				+.75
CPQ	Compaq		N				
DIS	Disney		N				+.87
DOW	Dow Chemical	7/25	HS	67.00	76.37	-9.38	
DD	DuPont		N				+1.50
EK	Eastman Kodak		N				
XON	Exxon Corp		N				
F	Ford Motor Co.		N				+2.50
GD	General Dynamics		N				
GE	Gen Electric Co.		N				+1.38
GM	General Motors Corp.	8/22	CS	49.00	51.37	-2.38	
GENZ	Genzyme Corp.	8/8	HS	29.00	35.00	-6.00	
HWP	Hewlett-Packard	9/6	HS	87.62	90.12	-2.50	+2.62
HD	Home Depot	9/6	HS	44.00	44.00	-	+4.00
INTC	Intel Corp.	8/22	HS	63.25	65.75	-2.50	+4.75
IBM	Int'l Bus Mach.	9/6	HS	67.12	67.88	-.75	
IP	Int'l Paper	7/18	HS	72.88	74.37	-1.50	+2.62
LOTS	Lotus Development		N				+9.50
ML	Martin Marietta		N				
MDT	Medtronic, Inc.	8/8	HS	85.75	99.00	-13.25	
MRK	Merck		N				
MSFT	Microsoft Corp.	8/8	HS	52.37	56.88	-4.50	+4.26
MMM	Minnesota Mining		N				+1.38
MOB	Mobil Corp		N				
JPM	Morgan (JP) & Co.	8/22	HS	63.37	65.50	-.12	+4.50
MOT	Motorola, Inc.	8/8	HS	53.00	52.12	+.88	+.88
ODP	Office Depot		N				
PEP	Pepsico, Inc.		N				
MO	Philip Morris	7/11	HS	53.37	59.88	-6.50	+2.88
PG	Procter & Gamble		N				+1.38
PBEN	Puritan-Bennett		N				
SK	Safety-Kleen		N				
SUNW	Sun Microsystems		N				
TX	Texaco Inc.		N				+2.13
COMS	Three Com Corp	8/22	HS	29.88	33.62	-7.50*	
TYSNA	Tyson Foods "A"		N				-.88
UTX	United Technologies		N				
USS	U.S. Surgical		N				
WAG	Walgreen Co.		N				
WMT	Wal-Mart Stores	8/15	CL	24.00	25.00	+1.00	-.37
					TOTAL	**-$77.37**	**+50.16**

Minor discrepancies are due to rounding.

*The $ EQ Gain has been doubled and the POSN price has been halved to compensate for 2/1 splits in CAT and COMS.

As of the September 9th market close, current profit = $-27.21 per share. The "Date" is the date a position was taken at the opening price; The Position Price is the price at which the position was entered, and the "Press Price" is the close price of the stock the day before the Technical Journal went to the printer (September 9). The $/Share Gain is the positive or negative difference between the position price to the press price for one share.

The report makes use of certain signals, (see "SIG." in the title) abbreviations for which are decoded as follows:

SIG.	MEANING
CL	Cover long at the next opening price, i.e., sell your long position and remain neutral.
CS	Cover Short at the next opening price, i.e., buy back your short position and maintain a neutral stance until the next signal.
N	Neutral. Stay out of this market until a signal occurs.
BO	Buy at the opening.
SO	Sell short at the opening.
RLS	Reverse your long position by selling it then sell an additional unit short.
RSB	Reverse your short position by buying it back and buy an additional unit so that you are net long a unit.
HL	Hold your long position.
HS	Hold your short position.

Past performance is no guarantee of future results.

RECOMMENDATIONS:

Recommendations as of September 10th were to maintain short positions in AA, AMGN, BTY, CS, CAT, DOW, GENZ, HWP, HD, INTC, IBM, IP, MDT, MSFT, JPM, MOT, MO and COMS, while keeping long positions in ABX and CHV. The long position in WMT was to be closed, as was the short position in GM. These recommendations were effective September 10th and may have been superseded prior to delivery of this Technical Journal. New market positions should only be made at the time of recommendation.

INVESTED CAPITAL: (Chart)

The total invested capital shown on a weekly frequency represents the sum of the entry share prices for all long positions plus one-half of the sum of all entry share prices for short positions.

PROFIT: (Chart)

The total profit includes the $/share gain for all open trades plus the per-share closed position profit. A commission expense of $0.50 per share has been charged against all closed positions. The total profit is an equity reading and includes all open and closed positions taken since commencement of the record on June 6, 1994.

REPORTING FREQUENCY:

The CSI Technical Journal which includes our past record is offered monthly and is typically prepared two weeks before delivery. The advisory report, for which a recent summary is listed here, is computed weekly and made available on Saturdays at noon. Recommendations posted from month to month may be closed out or reversed in the weekly updates offered in the electronic reports. Users of QuickTrieve 4.06 may access the weekly advisory to obtain recommendations that take effect on the following Monday.
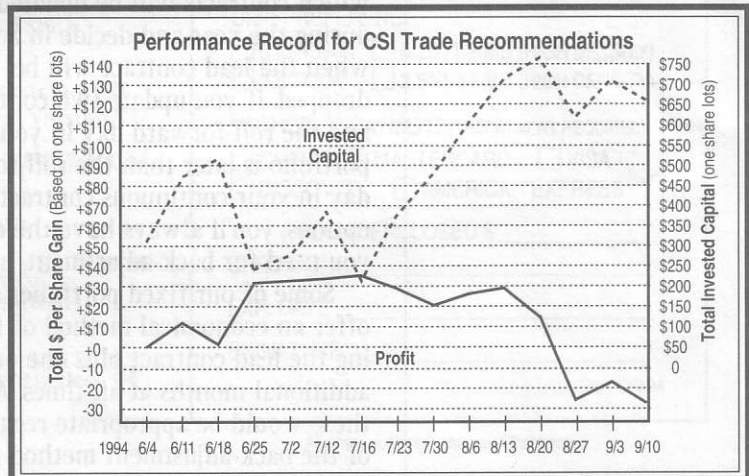
Performance Record for CSI Trade Recommendations

Ask Customer Service

Q. *How can I best arrange for daily updates that will accommodate rollovers in my continuous contract files?*

A. That depends on the back-adjustment method you select. If you use the close-to-open method (#1), then you need only one contract per commodity every day, including the rollover day. For this arrangement, you may use a custom portfolio or any of our fixed portfolios with normal contracts. Just remember that all necessary contracts must be updated every day.

Because there is overnight market movement, the close-to-open method can contribute a level of error in your output series. Therefore, the open-to-open (#2) or close-to-close (#3) methods are preferred to the above. When using either of these choices, you need two contracts (the old and the new) on the rollover day. Although you can add a second contract to a custom portfolio for just the rollover day (incurring only a small additional charge), we recommend against this method. It is time consuming and likely to be forgotten. A better option for custom portfolio users is to update at least two contracts of each commodity every day.

Our automatic roll-forward custom portfolio option allows you to select which contracts will be updated during the year and decide in advance when the lead contract will be dropped. If you update two contracts and the roll-forward day in your portfolio is later than the roll-forward day in your continuous contract options, you'll always have the data you need for back-adjustment.

Some of our fixed portfolios also offer an economical method of following the lead contract plus one or more additional months at all times. Any of these would be appropriate regardless of the back-adjustment method used.

Q. *How does the continuous contract builder handle gaps in my normal contact data? For example, I followed April gold in February, then June gold in May. I'm missing the price activity in between.*

A. The continuous contract program will combine and back adjust the contracts you have, regardless of what may be missing. In your example, the difference between the June contract price and the April contract price will be added to the April contract data. When viewing your continuous contract file with QuickPlot,® it may appear complete — until you check the calendar at the bottom of your chart. You'll find the date scale jumps from February to May, with no apparent gap in between.

We recommend you review your normal contract data and correct such omissions before creating continuous contract files. If you find omissions later, they can be corrected by acquiring the missing data and rebuilding the continuous files.

Q. *Can I create non-adjusted continuous series that mimic CSI's code 55 or code 56 series?*

A. Yes. The Program Options screen lets you determine if your continuous contract data will be back-adjusted or not. If you opt for no adjustment, a simple nearest-future series will be created using the rollover date you choose. Of course, your data drive must hold all active trading months for the time period they represented the nearest future contract.

Q. *Where do I find the continuous contract menu in QuickTrieve 4.06?*

A. It's in QuickManager's® Convert Subsystem. ✦

New Perpetual Contract® Series Available - Open-Interest Weighting Adds Functionality

We are very pleased to announce the release of our new Open-Interest Weighted Perpetual Contract data. Unlike our traditional Perpetual Contract series, which use time weighting over a constant period forward, these series apply an open-interest weighting to all active contract months.

The contract or contracts with the greatest open interest have the most impact on the quoted prices, and those with the least open interest have the least impact. The new formula is actually an enhancement of an earlier Perpetual Contract Series which used an average of all contracts with no weighting of any type.

Long-term analysis is easy with this smooth, continuous data set. Signals generated from your trading system are simply applied to the current contract with the greatest open interest.

Open-Interest Weighted Perpetual Contract data is identified as delivery month code 51. Please specify code 51 when ordering historical data and daily updates on this series.

As this Journal goes to press, code 51 data (like all Perpetual Contract data) is not available as "history on demand." We expect to resolve this shortcoming some time during the month of October. As a special introductory offer, we will provide assisted phone histories of "code 51" data at the "on demand" prices until we have added the more automated capability to our system. ✦
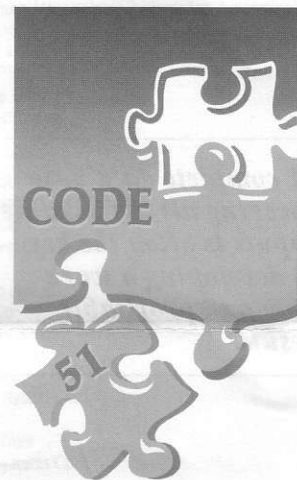
CSI Software Product Summary

Please check all that apply and complete the information box at right.
Mail or fax to CSI, 200 West Palmetto Park Road, Boca Raton, Florida 33432; Fax: (407) 392-7761

❑ **QuickTrieve®/QuickManager®** for PC - To retrieve, manage & edit data (includes 1994 Alerts Calendar); New daily user $59. QuickTrieve/QuickManager version 4.06 upgrade (for current QuickTrieve users only): $39; demo disk $5

❑ **QuickPlot®/QuickStudy®** for PC - Charting & analysis software (requires QT/QM) $89

❑ **Trade Data Manager™** - Macintosh downloader & accounting program $59; upgrade $49 or *FREE* with $100 history order

❑ **Trading System Performance Evaluator™** (TSPE) for PC - Computes your system's capital requirements $149

❑ **Trader's Money Manager™** for PC - $399 (includes TSPE); Demo disk: $15

❑ **TraDe$k™** for PC - Traders' complete accounting system - CSI daily user $149; Unrestricted use $299; 30-day trial version $22

❑ **Seasonal Index Value Pack** for PC - Ten years of history for 33 popular commodities $315

❑ **Daily Updates** for PC - Starting at $10.80 per month

❑ **CSI Technical Journal** - Aug. '90 to present $35/Yr. - $5/Reprint

❑ **CSI Mailing List** - $200/1,000 names (CSI users omitted)

❑ **CSI Product Catalog** -*FREE*

❑ **On-Line Stock Advisory Report** - $15/mo. *FREE* until Dec. '94 (requires QT 4.06)

Please add $29 per software package for overseas shipping.

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> *"A complete data base covering all the possible inputs is often the key to developing a workable and profitable result."*

measure market forces and determine whether a given market is expected to be indeterminate or potentially prone to a trend.

For neural networks or nearly any trading approach, the need to look beyond tomorrow depends upon how much time is needed to react to the advice. As Winston Churchill said, "It is a mistake to look too far ahead. Only one link of the chain of destiny can be handled at a time." Being warned about tomorrow is all anyone should need because there is always time to make an appropriate correction after sleeping on the advice. Your plan must include the ability to be spontaneous in such situations.

Neural network output can take many forms. The system may tell general directional tendency such as, "strongly up," "moderately up," "weakly up," "neutral," etc. Or it might take a more forthright path with explicit trading signals such as, "Buy at the market open and follow your position with a trailing stop introduced daily." Most users of a trading system should prefer the explicit advice. In this mode, there is little doubt about the performance measurement and the system developer will be more accountable.

Neural networks excel when offered heavy doses of comprehensive data. A complete data base covering all the possible inputs is often the key to developing a workable and profitable result. CSI's data base offers more depth of coverage than any other. Neural Network traders should do well with CSI's comprehensive, global resources.

NEURAL NET DATA CONDITIONING

The data conditioning effort required before the neural network processor can be engaged is an important aspect of your trading plan. This step deliberately takes the apparent identity away from your input data.

To a neural network, all data has the same dimensionless appearance. The data form recommended is in directional standard deviations over time, or a time series of readings ranging from zero to one, or from minus one to plus one, etc. Each dimensionless set is derived solely from the independent time series of which it is a part. Taking ratios, averaging, filtering and other useful measures are required to develop the input. The conditioned input can be used by the neural network software to search for fruitful pre-conditions that may give rise to reliable market predictions.

Keep your independent variable count low. Neural networks excel with many diverse, but unrelated, series. Too many data series can confuse a network and prolong the training/processing step. Consider indexing like inputs using the methods suggested in CTJ893. This will help to simplify and accurately target pertinent independent variables. Federal Reserve Chairman Alan Greenspan recently announced that many of the government's commodity indices are out of date. Perhaps he, too, has seen the need to simplify certain model inputs.

Opportunities are great with any of the systems discussed above, particularly with balanced diversification. Next month's final installment of this article will continue with this theme. We'll also move forward into the areas of measuring performance, integrating results and evaluating your chances of achieving success. Tune in for more insightful ideas on conquering trading system design problems and pitfalls. Your success may depend on it. ✦

Bob Pelletier