

Detecting And Determining Trends

Trend-Quality Indicator

Having trouble detecting trends, or estimating their duration when you do spot one? This indicator comes to the rescue.

by David Sepiashvili

Trend detection and estimation is one of the most important objectives of technical analysis. One common filtering technique that attempts to eliminate stock market noise and extract important trends is smoothing with the help of moving averages. When using moving averages (MAs) to detect a trend in a security's price, the main difficulty is determining the appropriate averaging period.

To determine the appropriate period can be challenging because different periods have advantages and disadvantages. A shorter averaging period, for instance, may give higher profits but involve high risk, owing to numerous random fluctuations that affect the trend. A longer moving average helps avoid many false reversals by lagging behind the security's current prices, but as a rule, less risk means less profit.

The trend-quality indicator (or Q-indicator) is a trend detection and estimation tool that is based on a two-step filtering technique. It measures cumulative price changes over term-oriented semicycles and relates them to "noise." The approach reveals congestion and trending periods of the price movement and focuses on the most important trends, evaluating their strength in the process. The indicator is presented in a centered oscillator and banded oscillator format.

MOVING AVERAGES AND YOU

Even if you have tuned your moving average (MA) length, a new problem crops up: An optimized system gives good results on historical data but is vulnerable to significant market changes. This can mean disappointing results on new (future) data.

There are two steps to approaching this problem:

1 Create a moving average that filters a limited number of term-oriented averaging period alternatives (to avoid overoptimization). Determine in any commonly accepted way the moving average reversal points, and let your MA correspond to upward and downward semicycles of the price movement.

2 Improve the accuracy of this MA with a procedure that attempts to recognize, in a timely way, promising and nonpromising price trends within the extracted semicycles as well as estimate their strength.

If step 1 (moving average filtering) is a conventional, well-mastered technique, step 2 has been a stumbling block for many trading systems.

Remember there is no free lunch in the stock market. The recognition of promising trading opportunities can be achieved only with some concessions. A reliable reversal signal cannot be identified before the trend develops, but if you want to



catch the major part of the trend, you cannot wait too long. As in any decision-making procedure, you must consider the tradeoff between sensitivity and reliability. If your indicator is too sensitive, you will be bandied by false signals, and if it has coarse tuning, you could miss critical points. Striking a compromise between sensitivity and reliability requires some objective criteria, which can be found only through the assessment of the price trend performance.

THE CPC INDICATOR

To estimate the price dynamics, you can use the cumulative price change (CPC) indicator, which measures the amount that the price has changed from a fixed starting point within a given semicycle. The starting points can be determined using, for example, the moving average crossover rule. The CPC indicator is calculated as a cumulative sum of differences between the current and previous prices over the period from the fixed starting point t_0 :

$$CPC(t) = \sum_{\tau=t_0}^t P(\tau) - P(\tau-1)$$

The trend within the given semicycle can be found by calculating the moving average of the cumulative price change:

$$\text{Trend} = \text{MA}(CPC, m, t \geq t_0)$$

Segmenting the price time series and constructing trends within the extracted semicycles offers the smallest average gap between actual and averaged datapoints. This results in a better fit of the real price dynamics. The cumulative price change indicator and trend indicator can both be used either as standalone indicators or as components of other technical analysis tools.

ESTIMATING TREND PERFORMANCE

A basic criterion for estimating trend performance is the amount the trend changes over up or down semicycles. If there is little or no visible progress in the trend, it may be considered as nonefficient.

Further, significant changes in trend may be considered as promising trading opportunities, but the term "significant" is relative and subject to interpretation. The trend-quality indicator (Q-indicator) is an attempt to estimate trend in relation to noise. It answers the long-standing question of whether a trend change qualifies as significant and promising, or insignificant and better ignored. In terms of noise, trend estimation not only determines whether the trend is reliable, but also allows you to measure its strength gradually. Thus, regardless of their prices, trends of various securities can easily be compared to each other or against any index.

The Q-indicator can be calculated by dividing trend by noise:

$$Q\text{Indicator} = \frac{\text{Trend}}{\text{Noise}} \cdot c$$

where c is an appropriate correction factor. This ratio seems to be closely related to the signal-to-noise ratio in signal processing. The technical analysis problem of detecting a trend in a security's price movement in the presence of random fluctuations differs somewhat from the signal processing problem of regenerating a designated input signal buried in stochastic noise. In spite of this difference, applying such a ratio to measure trend performance relative to the background noise seems to be rewarding.

The denominator of the Q-indicator — noise — can be defined as the average deviation of the cumulative price change from the trend. To determine linear noise, first calculate the absolute value of the difference between CPC and trend, and then smooth it over the n -point period:

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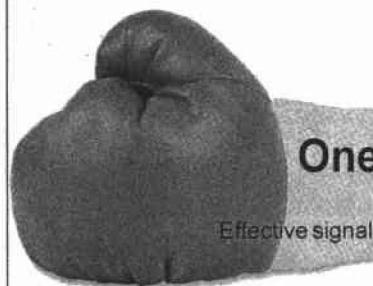
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$$\text{Noise}_1 = \text{MA}(|\text{CPC} - \text{Trend}|, n)$$

The root mean square noise, similar to the conventional standard deviation, can be derived by summing the squares of the difference between CPC and trend over each of the preceding n -point periods, dividing the sum by n , and calculating the square root of the result. Since MA is defined as a summation over n -point periods divided by n , we can write:

$$\text{Noise}_2 = \sqrt{\text{MA}[(\text{CPC} - \text{Trend})^2, n]}$$

Unlike the standard deviation, where $n=m$, here an allowance is made for averaging periods: $n>m$.

The Q-indicator is intended to measure trend activity. Some benchmarks can be used to determine the strength of a trend. In the range of Q-indicator values from -1 to +1, the trend is buried beneath noise. It is preferable to stay out of this zone. The greater the Q, the less the risk of trading with a trend, and the more reliable the trading opportunity. The range from +1 to +2, or from -1 to -2, may be treated as zone of weak trending. However, if the trend exceeds this level (absolute value of $Q>2$), it can be qualified as promising.

Readings in the range from +2 to +5, or from -2 to -5, can indicate moderate trending, and readings above $Q=+5$ or

The Q-indicator is a trend detection and estimation tool that is based on a two-step filtering technique.

below $Q=-5$ indicate strong trending. Strong upward trending often leads to the security's overvaluing, and strong downward trending often results in the security's undervaluing. Readings exceeding strong trending benchmarks can indicate overbought or oversold conditions and signal that price action should be monitored closely.

In Figure 1, the short-term Q-indicator of Citrix Systems helps to both identify the trending phase of the price movement and estimate the strength of the trend. It keeps you from responding to every little zigzag in the congestion periods, yet points to the developing trends.

THE B-INDICATOR

The Q-indicator is a centered oscillator that fluctuates around a zero line with no upper or lower limits. Another indicator that estimates trends in terms of noise is the trend-noise balance indicator (B-indicator). This indicator can be calculated by dividing the absolute value of trend by noise added

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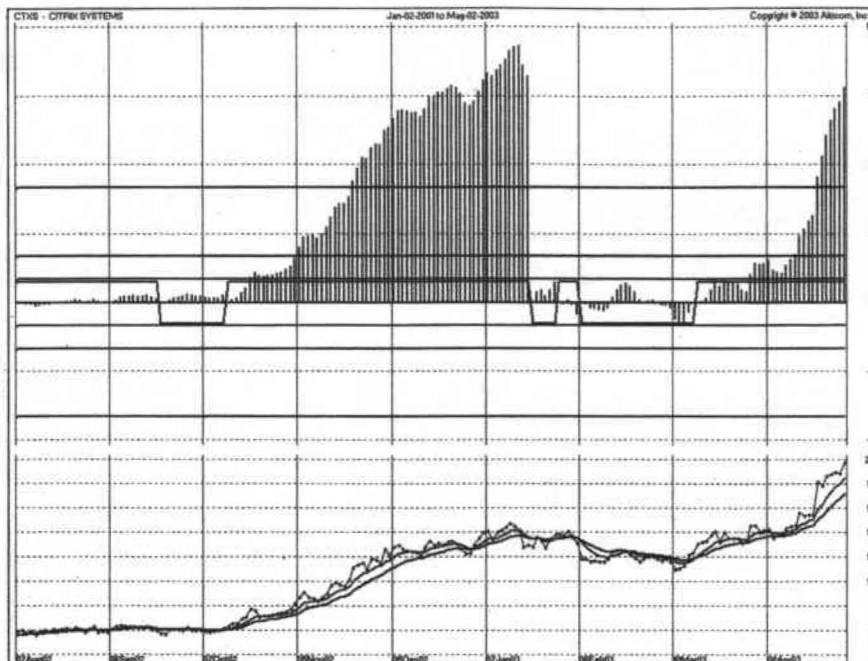


FIGURE 1: THE Q-INDICATOR. Here you see how the Q-indicator evaluates the relative strength of the trends within the semicycles, which were extracted by the seven-day and 15-day period exponential moving averages crossover rule. For convenience, the reversal indicator is built in.

to absolute value of trend, and scaling the result appropriately. The formula for the B-indicator is:

$$BIndicator = \frac{|Trend|}{|Trend| + Noise} \cdot 100$$

The B-indicator is a banded oscillator that fluctuates between zero and 100. The Q-indicator and the B-indicator both estimate the strength of a trend, but the B-indicator better identifies overbought and oversold conditions. Another dis-

tinctive feature is that the B-indicator doesn't show the direction of price movement, but only the existence of the trend and its strength. It requires additional tools for reversal manifestations.

The indicator's interpretation is simple. The central line suggests that the trend and noise are in equilibrium (trend is equal to noise). Readings in the 50–65 range indicate weak trending; those in the 65–80 range indicate moderate trending; and ranges above 80 indicate strong trending. The 65 level can be thought of as the demarcation line of trending and ranging markets and can help determine which type of technical analysis indicator (lagging or leading) is better suited to current market conditions.

Readings exceeding strong trending levels can indicate overbought or oversold conditions. Figure 2 illustrates how the long-term B-indicator of Dell Computer performs to reveal trending and congestion phases of the price movement. The built-in reversal diagram shows up and down semicycles, extracted by 10-week and 40-week exponential moving average crossovers.

Other possible modifications exist of the trend-noise balance indicator, but they are beyond the scope of this article. The moving average crossover system may be used to extract up and down semicycles of price movement for the first stage of filtering. The two indicators discussed, Q-indicator and B-indicator, may then be used to recognize trends and their strengths.

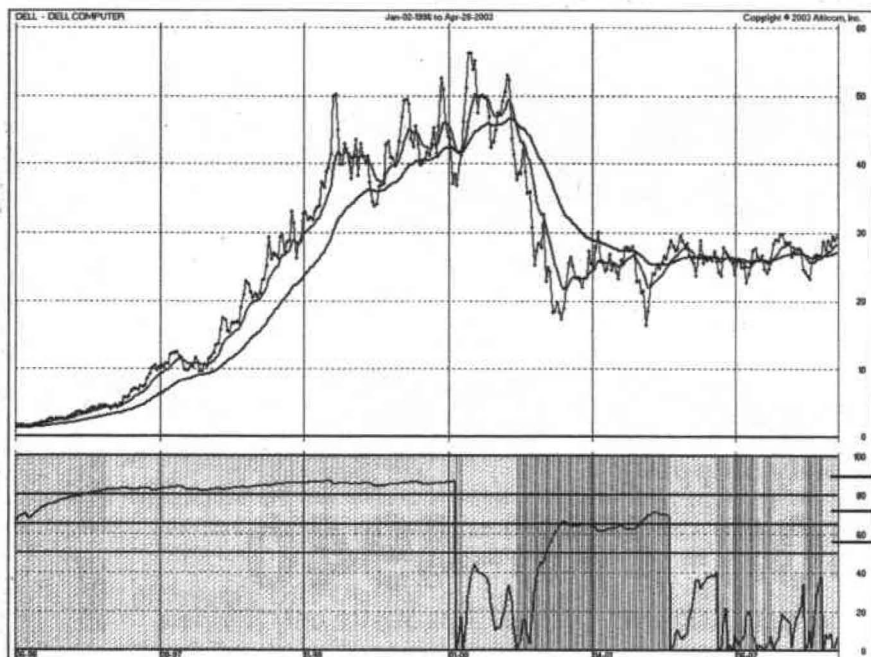


FIGURE 2: THE B-INDICATOR. Here you see that the B-indicator identifies not only up and down trending periods, but also congestion phases, which are better avoided (they tend to be unprofitable).

David Sepiashvili is a doctoral candidate in signal processing (Carnegie Mellon University, Pittsburgh, PA). One of the applications of his scientific efforts is financial time series analysis. He is president of Alticom Inc., which has developed a number of solutions for stock market technical analysis (www.alticom.com). Sepiashvili can be reached via email at dasepi@alticom.com.

‡Alticom

→ Strong trend
→ Moderate trend
→ Weak trend

See our Traders' Tips section for program code implementing David Sepiashvili's technique. See page 90 for details.

‡See Traders' Glossary for definition
‡See Editorial Resource Index

S&C



Here is this month's selection of Traders' Tips, contributed by various developers of technical analysis software, all to help readers more easily implement some of the strategies presented in this issue.

Internet users will also find these and most previous Traders' Tips at our website at www.Traders.com. To locate the various tips, use our site's search engine or click on the STOCKS & COMMODITIES magazine icon on the left-hand side of our homepage, then scroll down to the "This month in S&C" section on the left-hand side and look for "Traders' Tips." For Traders' Tips published earlier, click on the "Back issues archive" located under the "This month in S&C" section, or use the search engine.

Other code presented in the articles in this magazine can be found at our website in a subscribers-only area at <http://technical.traders.com/sub/sublogin.asp>. Login requires your last name and subscriber number.



◆ TRADESTATION: TREND-QUALITY INDICATOR

David Sepiashvili's article in this issue, "Trend-Quality Indicator," describes a method of assessing trend strength. To accomplish this, Sepiashvili uses a summing process to determine the *cumulative price change* (CPC). The CPC is reset to zero at every trend reversal. Trend reversals are based on the crossing of two moving averages. The CPC is "piecewise" averaged to produce the *trend*, which in turn is compared to a *noise* calculation to produce the *quality* indicator.

The code given here performs these calculations. In order to match Figure 2 in Sepiashvili's article, the code plots the *trend-noise balance indicator* (B-indicator). To provide an indication of trend direction, a *TrendPeriods* indicator is included. It plots the *periods* variable.

Indicator: TrendQuality

{ Calculating the Q-Indicator - As an example, we begin with a "fast" moving average length of 7 and a "slow" moving average length of 15 }

inputs:

```
FastAvgLen( 7 ),
SlowAvgLen( 15 ),
M( 4 ), { % scalar trend period }
N( 250 ), { % scalar noise period }
Correction( 2 ); { % scalar correction factor }
```

variables:

```
LPF1( 0 ),
LPF2( 0 ),
Reversals( 0 ),
Periods( 0 ),
DC( 0 ),
CPC( 0 ),
Trend( 0 ),
DT( 0 ),
Noise( 0 ),
QIND( 0 );
```

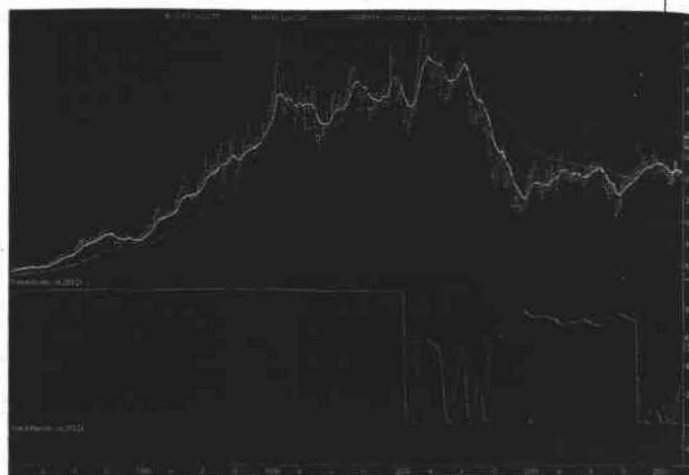


FIGURE 1: TRADESTATION, TREND-QUALITY INDICATOR. This sample TradeStatic chart shows the trend-quality (Q-indicator) and trend-periods indicators on a weekly chart Dell with seven-period and 15-period moving averages. The red line is the trend-quality indicator.

```
{ Generate reversal signals based on XAverage crossover rule }
LPF1 = XAverage( Close, FastAvgLen );
LPF2 = XAverage( Close, SlowAvgLen );
Reversals = LPF1 - LPF2 ;
Periods = Sign( Reversals );
```

```
{ Calculate price minus previous price and compute
cumulative sum over periods given by reversals }
DC = Close - Close[1];
```

```
if Periods <> Periods[1] then
```

```
begin
CPC = 0 ;
Trend = 0 ;
end
```

```
else
```

```
begin
CPC = CPC + DC * Periods ;
{ To calculate trend, smooth CPC by XAverage 4
within the given segments (periods) }
Trend = CPC * 1 / M + Trend[1] * ( 1 - ( 1 / M ) );
end ;
```

```
{ To calculate noise, subtract the trend from CPC, square it, and
then smooth it }
```

```
DT = CPC - Trend ;
Noise = Correction * SquareRoot( Average( DT * DT, N ) );
```

```
{ To calculate Q-indicator divide trend by obtained noise }
```

```
if Noise > 0 then
QIND = Trend / Noise ;
```

```
if AbsValue( Trend ) + AbsValue( Noise ) > 0 then
Plot1( AbsValue( Trend ) / ( AbsValue( Trend )
+ AbsValue( Noise ) ) * 100, "TrendQ" );
```

Indicator: TrendPeriods

inputs:

```
FastAvgLen( 7 ),
SlowAvgLen( 15 );
```

TRADERS' TIPS

variables:

```
LPF1( 0 ),
LPF2( 0 ),
Reversals( 0 ),
Periods( 0 ),
DC( 0 ),
CPC( 0 );
```

```
LPF1 = XAverage( Close, FastAvgLen );
LPF2 = XAverage( Close, SlowAvgLen );
```

```
Reversals = LPF1 - LPF2;
```

```
Periods = Sign( Reversals );
DC = Close - Close[1];
```

```
if Periods <> Periods[1] then
```

```
    CPC = 0
```

```
else
```

```
    CPC = CPC + DC * Periods;
```

```
Plot2( Periods );
```

An ELD file including this EasyLanguage strategy is available at www.tradestationworld.com. Look for the file "TrendQuality.eld." A sample chart is shown in Figure 1.

—Mark Mills

MarkM@TSSec at www.TradeStationWorld.com

EasyLanguage Questions Forum

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MetaStock

◆ METASTOCK: TREND-QUALITY INDICATOR

David Sepiashvili's article "Trend-Quality Indicator" introduces two new indicators: the Q-indicator and B-indicator. Both can be added to MetaStock using the formulas listed here.

To enter this indicator into MetaStock, do the following:

1. In the Tools menu, select Indicator Builder.
2. Click New to open the Indicator Editor for a new indicator.
3. Type the name of the formula.
4. Click in the larger window and type in the formula.

Name: Q-Indicator:

Formula:

```
m:=Input("% Scalar trend period",1,25,4);
n:=Input("% Scalar noise period",1,500,250);
cf:=Input("% Scalar correction factor",1,250,100);
p1:=Input("First moving average periods",1,200,7);
p2:=Input("Second moving average periods",1,200,15);
rev:=BarsSince(Cross(Mov(C,p1,E),Mov(C,p2,E)) OR
Cross(Mov(C,p2,E),Mov(C,p1,E)));
cpc:=Cum(LastValue(Sum(ROC(C,1,$),LastValue(rev+PREV-
PREV))+PREV-PREV));
trend:=Mov(cpc,m,E);
dt:=cpc-trend;
noise:=C*Sqrt(Mov(dt*dt,n,S));
(trend/noise)*cf
```

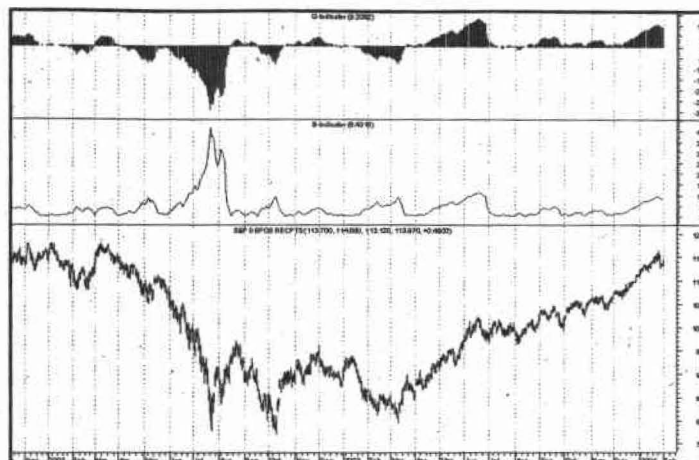


FIGURE 2: METASTOCK, TREND-QUALITY INDICATOR AND B-INDICATOR. Here are the Q-indicator and B-indicator on a chart of SPY.

Name: B-Indicator

Formula:

```
m:=Input("% Scalar trend period",1,25,4);
n:=Input("% Scalar noise period",1,500,250);
cf:=Input("% Scalar correction factor",1,250,100);
p1:=Input("First moving average periods",1,200,7);
p2:=Input("Second moving average periods",1,200,15);
rev:=BarsSince(Cross(Mov(C,p1,E),Mov(C,p2,E)) OR
Cross(Mov(C,p2,E),Mov(C,p1,E)));
cpc:=Cum(LastValue(Sum(ROC(C,1,$),LastValue(rev+PREV-
PREV))+PREV-PREV));
trend:=Mov(cpc,m,E);
dt:=cpc-trend;
noise:=C*Sqrt(Mov(dt*dt,n,S));
(Abs(trend)/Abs(trend+noise))*cf
```

Figure 2 shows how these indicators look on a chart of SPY.

—William Golson

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◆ CQG: TREND-QUALITY INDICATOR AND CUMULATIVE PRICE CHANGE INDICATOR

The TQL_CPC custom study has two curves, the CPC curve and the trend curve. There are three parameters: emaPeriod1, emaPeriod2, and m.

Note that the cumulative price change indicator (CPC) for uptrends is calculated separately from the CPC for downtrends, and they are then joined together at the end of the study.

For the trend curve, I calculated my own EMA of the CPC. This allowed me to restart the calculation whenever the trend switched from up to down or vice-versa. This prevents the tail end of one trend from affecting the beginning of the next trend.

Cumulative price change indicator (CPC)

```
/*
* find the number of bars since the last cross-above and
* the last cross-below
*/
```

```
crossAbove := MA(@,Exp,emaPeriod1) XAbove
MA(@,Exp,emaPeriod2);
crossBelow := MA(@,Exp,emaPeriod1) XBelow
MA(@,Exp,emaPeriod2);
bsXA := BarsSince( crossAbove,1,400);
bsXB := BarsSince( crossBelow,1,400);
```



```
/*
* the market is going up if the number of bars since
* the last cross-above is less than the number of bars
* since the last cross-below and vice-versa
*/
```

```
up := bsXA < bsXB;
```

```
/*
* sum all of price changes since the last cross-above
*/
```

```
delta := Close(@) - Close(@)[-1];
cpcUp := IF( crossAbove, 0, cpcUp[-1]) + delta;
cpcDown := IF( crossBelow, 0, cpcDown[-1]) + delta;
cpc := IF( up, cpcUp, cpcDown);
cpc
```

Trend

```
/*
* calculate the 4-period exponential moving average of CPC.
* re-start the calculation every time there is a cross-above or
* a cross-below.
*/
```

```
crossAbove := MA(@,Exp,emaPeriod1) XAbove
MA(@,Exp,emaPeriod2);
crossBelow := MA(@,Exp,emaPeriod1) XBelow
MA(@,Exp,emaPeriod2);
bsXA := BarsSince( crossAbove,1,400);
bsXB := BarsSince( crossBelow,1,400);
```

```
/*
* the market is going up if the number of bars since the last
* cross-above is less than the number of bars since the last
* cross-below
*/
```

```
up := bsXA < bsXB;
```

```
/*
* calculate the smoothing constant for exp MA period
*/
```

```
sc := IF( m > 1, 2 / ( m + 1 ), m);
```

```
/*
* now calculate the trend
*/
```

```
cpc := TQI_CPC.CPC^(@,emaPeriod1,emaPeriod2);
expMA := IF( crossAbove OR crossBelow, cpc, ( 1 - sc ) * expMA[-1] + sc * cpc);
expMA
```

TREND-QUALITY INDICATOR

The trend quality indicator has a single curve. In addition to the parameters used in the CPC indicator just given, there are two additional parameters, *n* and *c*.

Trend-quality Indicator (Q-Indicator)

```
/*
* calculate the "linear noise"
*/
```

```
dt := TQI_CPC.CPC^(@,emaPeriod1,emaPeriod2) -
TQI_CPC.Trend^(@,emaPeriod1,emaPeriod2,m);
```

```
noise := c * MA( Abs(dt),Sim,n);
```

```
/*
* now calculate the trend quality
*/
```

```
qi := TQI_CPC.Trend^(@,emaPeriod1,emaPeriod2,m) / noise;
qi
```

—Brian Bell, President
Custom Trading Solutions, Inc.
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◆ AMIBROKER: TREND-QUALITY INDICATOR

In "Trend-Quality Indicator" in this issue, David Sepiashvili presents an innovative trend-detection tool — the *trend-quality indicator* — that attempts to estimate the trend in relation to noise.

Calculations presented in the article can be easily reproduced using AmiBroker Formula Language. The only tricky part is a piecewise exponential moving average that restarts the calculations on every moving average crossover, but we managed to implement it in two lines of code, thanks to AmiBroker's powerful AMA2 function, which allows easy implementation of all kinds of single-order infinite impulse response filters.

Listing 1 shows ready-to-use indicator code to plot the Q-indicator. In AmiBroker, select Indicator Builder from the Analysis menu, click the "Add" button, enter the formula, and then press "Apply." Figure 3 shows a sample chart.

LISTING 1

```
// Piecewise EMA is an EMA that restarts calculations each time
// the 'sincebar' argument is true
function PiecewiseEMA( array, range, sincebar )
```

```
{
    factor = If( sincebar, 1, 2/(range+1) );
    return AMA2( array, factor, 1-factor );
}
```

```
// parameters
```

```
m=4;
```

```
n=250;
```

```
// generate reversal signals based on EMA crossover rule
```

```
Lpf1 = EMA( C, 7 );
```

```
Lpf2 = EMA( C, 15 );
```

```
CrossPoint = Cross( Lpf1, Lpf2 ) OR Cross( Lpf2, Lpf1 );
```



FIGURE 3: AMIBROKER, TREND-QUALITY INDICATOR. This AmiBroker screenshot shows the short-term Q-indicator on Citrix Systems [CTXS] (upper pane) and a line price chart with seven- and 15-day exponential moving averages (lower pane), which reproduces the chart presented in Sepiashvili's article.

TRADERS' TIPS

```
Periods = BarsSince( CrossPoint );
```

```
// variable bar sum
DC = Close - Ref( Close, -1 );
CPC = Sum( DC, Periods );
```

```
// smooth CPC by piecewise 4 bar EMA
Trend = PiecewiseEMA( CPC, 4, CrossPoint );
```

```
// noise
DT = CPC - Trend;
Noise = 2 * sqrt( MA( DT^2, n ) );
```

```
// alternative 'linear' noise calculation
// Noise = 2 * MA( abs( DT ), n );
```

```
QIndicator = Trend/Noise;
```

```
Plot( sign( Lp1-Lp2 ), "Rev", colorRed );
Plot( QIndicator, "Qindicator", colorGreen, styleHistogram );
PlotGrid( -1 );
PlotGrid( 1 );
PlotGrid( 2 );
PlotGrid( -2 );
PlotGrid( 5 );
PlotGrid( 5 );
```

—Tomasz Janeczko, AmiBroker.com
www.amibroker.com

eSignal

◆ eSIGNAL: TREND-QUALITY INDICATOR

This eSignal code implements the Q-indicator (Figure 4) and B-indicator (Figure 5) as described in David Sepiashvili's article in this issue.

Editor's note: Only the first few lines of code are shown here. Please visit eSignal.com or the Traders' Tips area of the STOCKS & COMMODITIES website at www.Traders.com for the complete code listing.

Provided By : eSignal. (c) Copyright 2004
Study: B-Indicator
Version: 1.0
2/10/2004

Formula Parameters:	Default:
MA1 Periods	10
MA2 Periods	40
Scalar Trend Periods	10
Scalar Noise Periods	52
Scalar Correction Factor	2
Noise Type	Root-Mean-Squared
CPC Smoothing	Exponential

Notes:

* This version uses an EMA(7)/EMA(15) crossover study for the basis of the indicator calculations in the background. To view the moving averages on the price pane, they must be applied separately with the same inputs for length.
* It is recommended that the advanced chart uses a custom time template equal to at least twice the number of bars than the length specified for the Scalar Noise Periods.

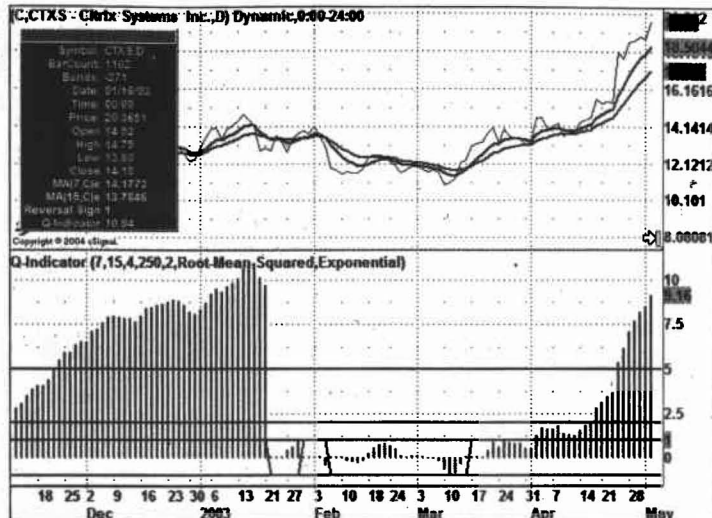


FIGURE 4: eSIGNAL, TREND-QUALITY INDICATOR. This sample eSignal chart plots David Sepiashvili's Q-indicator. Users should make sure they have enough data loaded into the chart to display this indicator properly. Users can either scroll the chart back to load more data, or set up a custom time template to load a fixed number of days, which should number at least 500.

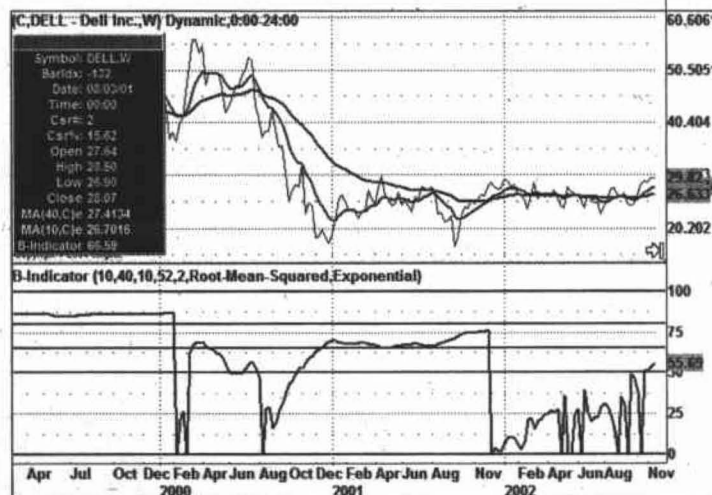


FIGURE 5: eSIGNAL, TREND-NOISE BALANCE INDICATOR. This sample eSignal chart plots David Sepiashvili's B-indicator.

```
function preMain() {
    setStudyTitle("B-Indicator");
    setCursorLabelName("B-Indicator");

    setDefaultBarFgColor(Color.blue, 0);
    setDefaultBarThickness(2, 0);
    setComputeOnClose();
}
```

—Jason Keck
eSignal, a division of Interactive Data Corp.
800 815-8256, www.esignal.com

WealthLab.com

◆ WEALTH-LAB: TREND-QUALITY INDICATOR

The trend-quality indicator (Q-indicator) and trend-noise balance indicator (B-indicator) described by David Sepiashvili in his article, "Trend-Quality Indicator," have been added to

TRADERS' TIPS

the Wealth-Lab code library and are available for download by selecting Community\Download ChartScripts from Wealth-Lab Developer's main menu. Website users also can employ both indicators in their ChartScripts by making the \$Include references as given in the code shown in this tip.

The Trend Q, B system demonstrates how you can use the Q and B indicators to both join and exit a trend. As suggested by Sepiashvili, we constrain the trade entry to the conditions $Q > 1$ AND $B > 50$. While the system will exit a trade if B indicates the end of the trend by dropping to zero, we also include a trailing stop at the 100-period simple moving average. Following an exit, the system is inhibited from rejoining the same trend (Figure 6).

Note that the Q and B scalar parameters, whose values are rather arbitrary here, can be tweaked or optimized to improve performance.

```
{ $I 'TrendB' }
{ $I 'TrendQ' }
var Bar, TB, TQ, p, TBPane, TQPane, hMA: integer;
var EntryInhibit, TBExit: boolean;

hMA := SMASeries( #Close, 100 );
TB := TrendBSeries( #Close, 10, 40, 8, 250, 4, true );
TQ := TrendQSeries( #Close, 10, 40, 8, 250, 4, true );

{ ----- Plot routine ----- }
PlotStops;
HideVolume;
TBPane := CreatePane( 125, false, true );
TQPane := CreatePane( 125, false, true );
PlotSeriesLabel( TB, TBPane, #Teal, #Thick, 'TrendB' );
PlotSeriesLabel( TQ, TQPane, #Navy, #Histogram, 'TrendQ' );
DrawHorzLine( 50, TBPane, #Red, #Dotted );
DrawHorzLine( 65, TBPane, #Black, #Dotted );
DrawHorzLine( 80, TBPane, #Blue, #Dotted );

{ ----- Demo system ----- }
for Bar := 250 to BarCount - 1 do
begin
  if ( @TB[Bar] > 50 ) and ( @TQ[Bar] > 0 ) then
    SetPaneBackgroundColor( Bar, TBPane, #BlueBkg );
  if @TQ[Bar] > 1 then
    SetSeriesBarColor( Bar, TQ, #Green );
  else if @TQ[Bar] < -1 then
    SetSeriesBarColor( Bar, TQ, #Red );

  TBExit := false;
  if CrossUnderValue( Bar, TB, 0.1 ) then
  begin
    EntryInhibit := false;
    TBExit := true;
  end;

  if not LastPositionActive then
  begin { Entry Rules }
    if not EntryInhibit then
      if ( @TQ[Bar] > 1 ) and ( @TB[Bar] > 50 ) then
      begin
        EntryInhibit := true;
        BuyAtMarket( Bar + 1, " );
      end;
    end;
  end;
end;
else
```

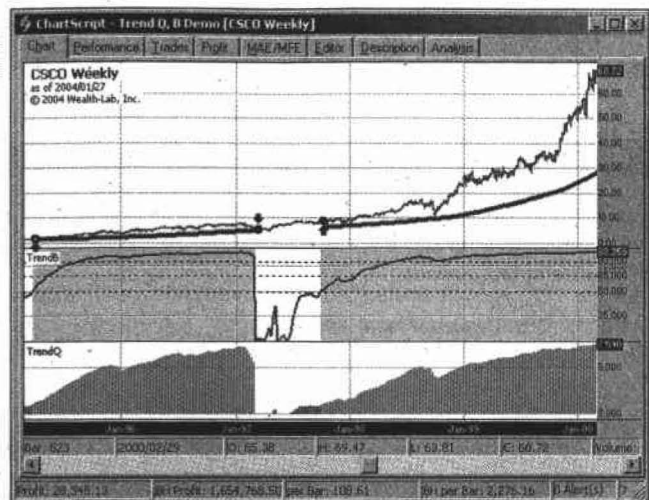


FIGURE 6: WEALTH-LAB, TREND-QUALITY INDICATORS. The Trend Q, B demo system uses the indicators to enter and exit the market.

```
begin { Exit Rules }
  p := LastPosition;
  if not SellAtStop( Bar + 1, @hMA[Bar], p, 'TStp' ) then
    if TBExit then
      SellAtMarket( Bar + 1, p, 'TB_Exit' );
  end;
end;
```

— Robert Sucher, Wealth-Lab, Inc.
www.wealth-lab.com



◆ NEUROSHELL TRADER: TREND-QUALITY INDICATOR

The trend-quality indicators described by David Sepiashvili can be easily implemented in NeuroShell Trader by combining a few of NeuroShell Trader's 800 indicators and two custom indicators. To implement the Q-indicator and B-indicator, select "New Indicator ..." from the Insert menu and use the Indicator Wizard to create the following indicators:

```
REVERSAL:
  OR2 ( ExpCrossAbove( Close, 7, 15 ), ExpCrossBelow( Close, 7, 15 ) )

CPC:
  PiecewiseCumulativeChange ( Close, REVERSAL )

TREND:
  PiecewiseExpAvg ( CPC, REVERSAL, 4 )

DT:
  Sub ( CPC, TREND )

NOISE:
  Mult2 ( 2, Sqrt ( MovAvg ( Mult2 ( DT, DT ), 250 ) ) )

QINDICATOR:
  Divide ( TREND, NOISE )
```

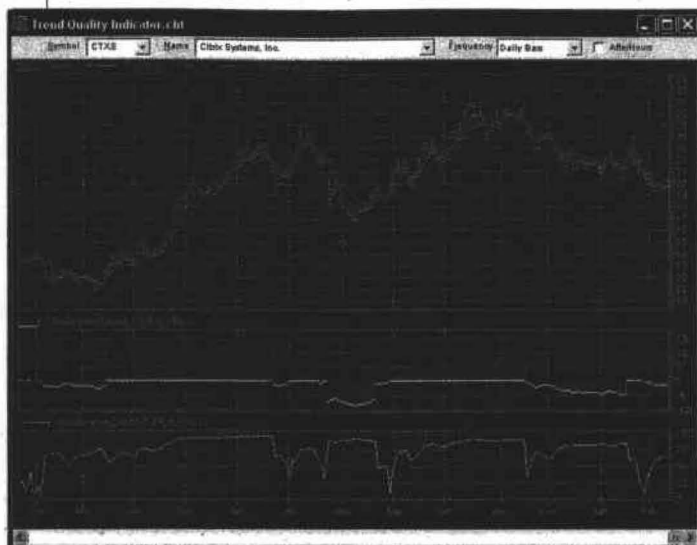


FIGURE 7: NEUROSHELL TRADER, TREND-QUALITY INDICATORS. This sample chart in NeuroShell Trader shows the Q-indicator (middle pane) and the B-indicator (bottom pane) on Citrix Systems [CTXS].

BINDICATOR:

Divide (AbsoluteValue (*TREND*), Add2 (AbsoluteValue (*TREND*), *NOISE*))

Note that the PiecewiseCumulativeChange and PiecewiseExpAvg indicators are custom indicators.

Users of NeuroShell Trader can go to the STOCKS & COMMODITIES section of the NeuroShell Trader free technical support website to download the piecewise custom indicators as well as a sample chart that includes the trend-quality indicators.

A sample chart is shown in Figure 7.

—Marge Sherald, Ward Systems Group, Inc.
301 662-7950, sales@wardsystems.com
www.neuroshell.com



◆ AIQ TRADINGEXPERT: TREND-QUALITY INDICATOR

Here is the code for AIQ TradingExpert, based on David Sepiashvili's article this issue.

```
TREND QUALITY INDICATOR by David Sepiashvili (TASC Mar 2004)
Coded by Rich Denning 2/09/04

m is 4.
n is 250.
c is 2.

LPF1 is expavg([close],7).
LPF2 is expavg([close],15).
Diff is LPF1 - LPF2.
Reversal if Diff > 0 and valresult(Diff,1) <= 0.
HD is Hasdatafor(2000).
```

```
Periods is scanany(Reversal, HD,0) then
offsettodate(month(),day(),year()).
Date is scanany(Reversal, HD,0).
DC is [close] - val([close],1).
CPC is simpleavg(DC,^Periods,0) * ^Periods.
Trend is expavg(CPC,min(m,^Periods)).
DT is CPC - TREND.
NOISE is c * simpleavg(abs(DT),n).
QIND is TREND / NOISE.
```

—Rich Denning
AIQ Systems

TickQuest

◆ NEOTICKER: TREND-QUALITY INDICATOR

The two indicators presented in "Trend-Quality Indicator" by David Sepiashvili, Q-indicator and B-indicator, can be implemented in NeoTicker using formula language.

Q-INDICATOR

The NeoTicker formula language for the Q-indicator (Listing 1) has five parameters: *period 1*, *period 2*, *m*, *n* and *c*, in accordance to the code given in the article. Period 1 and Period 2 are the values used for generating the exponential moving average crossover rule, *PERIODS*. The Q-indicator is plotted as a histogram in a new pane.

To reproduce the chart shown in the article in NeoTicker, load CTXS daily data into a new chart. Add the Q-indicator to the data series (Figure 8).

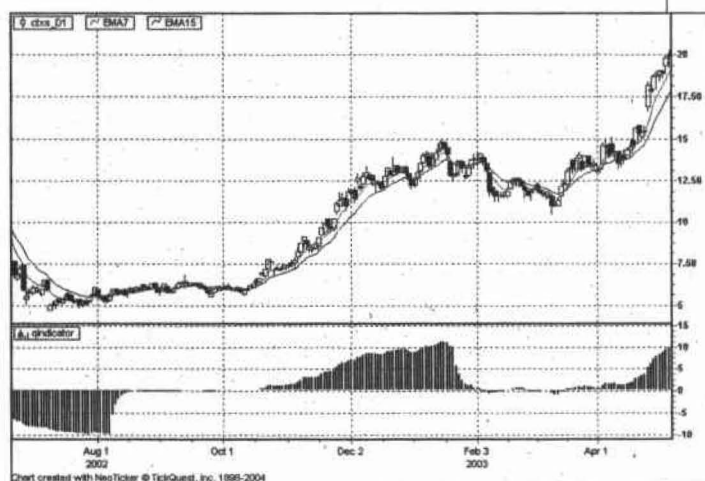


FIGURE 8: NEOTICKER, TREND-QUALITY INDICATOR. Here's a sample chart in NeoTicker.

B-INDICATOR

The NeoTicker formula language for the B-indicator (Listing 2) also has five parameters: *period 1*, *period 2*, *m*, *n*, and *c*. These parameters are used to generate the *trend* and *noise* values. The B-indicator is plotted as a line in the new pane (Figure 9).

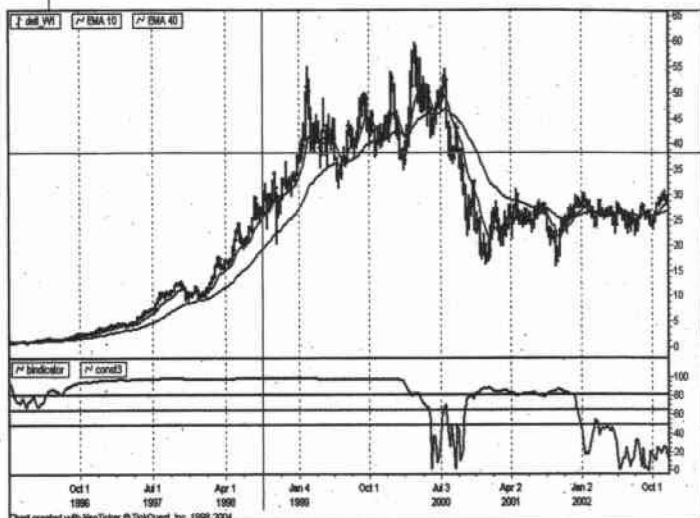


FIGURE 9: NEOTICKER, TREND-NOISE BALANCE INDICATOR. Here's the B-indicator as plotted in NeoTicker.

LISTING 1

```
LPF1 := qc_xaverage(c, param1);
LPF2 := qc_xaverage(c, param2);
REVERSAL := LPF1-LPF2;
PeriodA := if((REVERSAL > 0) and (REVERSAL(1) <= 0), 0,
PeriodA+1);
PeriodB := if((REVERSAL < 0) and (REVERSAL(1) >= 0), 0,
PeriodB+1);
PERIODS := if(REVERSAL > 0, PeriodA, PeriodB);
DC := c-c(1);
CPC := varsum(DC, PERIODS);
TREND := qc_xaverage(CPC, param3);
myDT := CPC - TREND;
myDT_abs := absvalue(myDT);
NOISE := param5*average(myDT_abs, param4);
plot1 := TREND/NOISE;
```

LISTING 2

```
LPF1 := qc_xaverage(c, param1);
LPF2 := qc_xaverage(c, param2);
REVERSAL := LPF1-LPF2;
PeriodA := if((REVERSAL > 0) and (REVERSAL(1) <= 0), 0,
PeriodA+1);
PeriodB := if((REVERSAL < 0) and (REVERSAL(1) >= 0), 0,
PeriodB+1);
PERIODS := if(REVERSAL > 0, PeriodA, PeriodB);
DC := c-c(1);
CPC := varsum(DC, PERIODS);
TREND := qc_xaverage(CPC, param3);
myDT := CPC - TREND;
myDT_abs := absvalue(myDT);
NOISE := param5*average(myDT_abs, param4);
plot1 := if((absvalue(TREND)+absvalue(NOISE)) > 0,
absvalue(TREND)/
(absvalue(TREND)+absvalue(NOISE))*100, 0);
success1 := if((absvalue(TREND)+absvalue(NOISE)) > 0, 1, 0);
```

A downloadable version of the indicators will be available from the Yahoo! NeoTicker user group file area at <http://groups.yahoo.com/group/neoticker/>.

—Kenneth Yuen, TickQuest Inc.
www.tickquest.com

prophet

◆ PROPHET.NET: TREND-QUALITY INDICATOR

The two indicators, *trend-quality* and *trend-noise balance*, described by David Sepiashvili in his article in this issue, are available on the Prophet.Net website to all premium members. No coding is required on the part of the user.

The trend-quality indicator (Q-indicator) shows the direction and strength of a trend. The trend-noise balance indicator (B-indicator), also shows the trend, but indicates overbought and oversold conditions as well. For one-click access to these indicators, go to JavaCharts from your computer's browser:

Prophet.Net : Analyze : JavaCharts

<http://www.prophet.net/analyze/javacharts.jsp>

Click on the Tools menu (which you can also access by right-clicking anywhere on a chart) and choose "Apply studies" from the Studies menu item. The list of available studies (approximately 150 of them, shown in alphabetical order) are in the second dropdown menu; you can choose trend-quality and trend-noise balance from this list. You may also adjust the parameters for either of these studies if you desire.

Figure 10 shows an example of the QQQ chart over a nine-month period with both of these indicators applied. Note that with the Q-indicator, red horizontal lines are provided to show the significant values cited in the article (-5, -2, +2, and +5) to determine trend strength.

Premium memberships at Prophet.Net start at \$14.95 per month; real-time market data is available for equities, options,



FIGURE 10: PROPHET.NET, TREND-QUALITY INDICATORS. Here's a sample QQQ chart with the Q-indicator and B-indicator plotted. Note that with the Q-indicator, red horizontal lines show the significant values with which to determine trend strength.

and futures. The following link will provide immediate access to all premium studies: <http://www.prophet.net/tasc>

—Prophet.net

TechniFilter Plus

◆ TECHNIFILTER PLUS: TREND-QUALITY INDICATOR

Here are the formulas and a filter report for TechniFilter Plus based on the trend-quality indicator (Figure 11) and B-indicator (Figure 12) discussed in David Sepiashvili's article in this issue. To use different time periods, simply change the parameter as required.

Formulas

NAME: CPC

SWITCHES: multiline

PARAMETERS: 7,15,4,0,5,250

FORMULA:

[1]: (((((cx&1-cx&2)u2)=1)*(((cx&1-cx&2)u2)=1)U7))+((1-(((cx&1-cx&2)u2)=1))*(((cx&1-cx&2)u3)=1)U7)) (Periods)

[2]: C-Cy1 {DC}

[3]: [2]F[1]{CPC}

NAME: Q-Indicator

SWITCHES: multiline

PARAMETERS: 7,15,4,0,5,250

FORMULA:

[1]: (((((cx&1-cx&2)u2)=1)*(((cx&1-cx&2)u2)=1)U7))+((1-(((cx&1-cx&2)u2)=1))*(((cx&1-cx&2)u3)=1)U7)) (Periods)

[2]: C-Cy1 {DC}

[3]: [2]F[1]{CPC}

[4]: ([3]x&3)x[1] {Trend}

[5]: [3]-[4] {DT}

[6]: ([5]u0X&5)* &4{Noise}

[7]: [4]/[6]{c}{NQ-Ind}{nc}{a}{h} {rgb#255}

NAME: B-Indicator

SWITCHES: multiline

PARAMETERS: 7,15,4,0,5,250

FORMULA:

[1]: (((((cx&1-cx&2)u2)=1)*(((cx&1-cx&2)u2)=1)U7))+((1-(((cx&1-cx&2)u2)=1))*(((cx&1-cx&2)u3)=1)U7)) (Periods)

[2]: C-Cy1 {DC}

[3]: [2]F[1]{CPC}

[4]: ([3]x&3)x[1]u0{Trend}

[5]: [3]-[4] {DT}

[6]: ([5]u0X&5)* &4u0{Noise}

[7]: ([4]/([4]+[6]))*100{c}{NB-Ind}{nc}{a} {rgb#16711680}

TREND-QUALITY INDICATOR FILTER / SCREENING REPORT

The following filter report (see sample in Figure 13) can be used to scan a database and then filter out those issues that meet the required Q-indicator or B-indicator limits.

NAME: Trend Quality Indicator

UNITS TO READ: 750

FORMULAS

[1] Symbol

[2] CPC(7,15,4,0,5,250)

[1]: (((((cx&1-cx&2)u2)=1)*(((cx&1-cx&2)u2)=1)U7))+

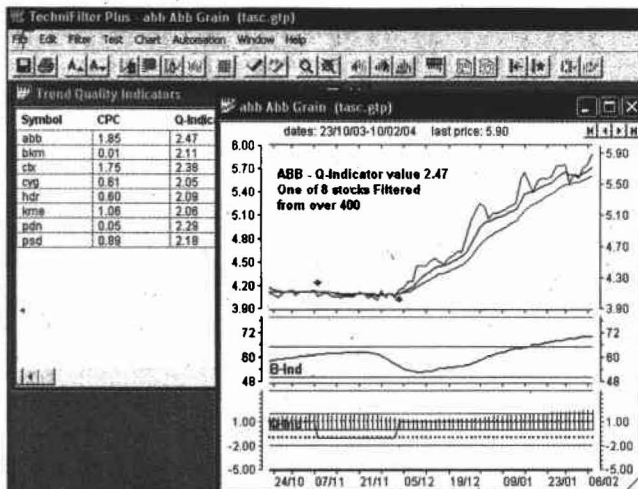


FIGURE 11: TECHNIFILTER PLUS, TREND-QUALITY INDICATOR. Here's a sample chart of the Q-indicator in TechniFilter Plus.

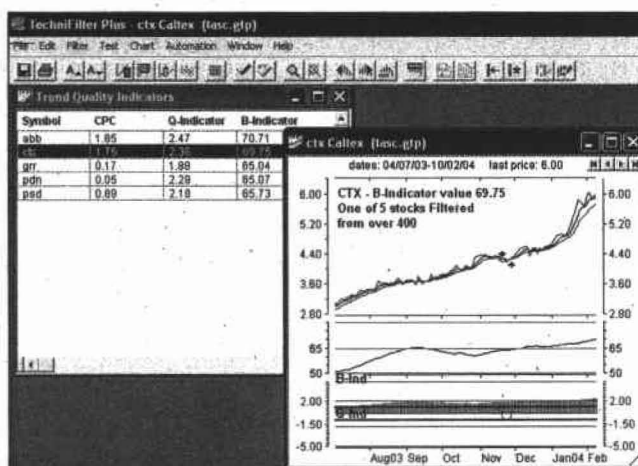


FIGURE 12: TECHNIFILTER PLUS, TREND-NOISE BALANCE INDICATOR. Here's a sample chart of the B-indicator in TechniFilter Plus.

TechniFilter Plus - Trend Quality Indicators			
File Edit Filter Test Chart Automation Window Help			
Trend Quality Indicators			
Symbol	CPC	Q-Indicator	B-Indicator
aac	0.19	0.80	38.78
aat	0.01	0.56	28.32
abb	1.85	2.47	70.71
abg	(0.12)	(0.06)	5.69
abs	0.51	0.73	36.87
abx	0.05	0.21	16.12
acu	0.14	1.17	46.79
ada	(0.03)	(0.63)	28.85
adg	0.30	0.35	25.34
adu	(0.06)	(0.81)	40.12
adz	(0.09)	(1.08)	43.19
aec	0.37	0.73	41.88
aei	0.12	0.85	43.81
aen	0.21	0.64	37.60
aex	(0.01)	(0.51)	27.02
afi	0.00	(0.54)	30.29

FIGURE 13: TECHNIFILTER PLUS, FILTER COMPUTED REPORT. Note the latest values for the Q-Indicator and B-Indicator.

TRADERS' TIPS

```
(1-(((cx&1-cx&2)u2)=1))*(((cx&1-cx&2)u3)=-1)U7)) {Periods}
[2]: C-Cy1 {DC}
[3]: [2]F[1]{CPC}
```

```
[3] Q-Indicator(7,15,4,0.5,250)
[1]: (((cx&1-cx&2)u2)=1)*(((cx&1-cx&2)u3)=-1)U7))+
((1-(((cx&1-cx&2)u2)=1))*(((cx&1-cx&2)u3)=-1)U7)) {Periods}
[2]: C-Cy1 {DC}
[3]: [2]F[1]{CPC}
[4]: ([3]x&3)x[1] {Trend}
[5]: [3]-[4] {DT}
[6]: ([5]u0X&5)* &4{Noise}
[7]: [4]/[6]
```

```
[4] B-Indicator(7,15,4,0.5,250)
[1]: (((cx&1-cx&2)u2)=1)*(((cx&1-cx&2)u3)=-1)U7))+
((1-(((cx&1-cx&2)u2)=1))*(((cx&1-cx&2)u3)=-1)U7)) {Periods}
[2]: C-Cy1 {DC}
[3]: [2]F[1]{CPC}
[4]: ([3]x&3)x[1]u0{Trend}
[5]: [3]-[4] {DT}
[6]: ([5]u0X&5)* &4u0{Noise}
[7]: ([4]/([4]+[6]))*100
```

FILTERS

```
[1] Q_Weak Trending UP
[3] >= 1 & [3] <= 2
[2] Q_moderate Trending UP
[3] >= 2 & [3] <= 5
[3] Q_Strong Trending UP
[3] > 5
[4] Q_Weak TrendingDown
[3] <= -1 & [3] >= -2
[5] Q_Moderate TrendingDown
[3] <= -2 & [3] >= -5
[6] Q_Strong Trending Down
[3] < -5
[7] B_Weak Trending UP
[4] >= 50 & [3] <= 65
[8] B_Moderate Trending UP
[4] >65 & [3] <= 80
[9] B_Strong Trending UP
[4] >80
```

Visit the new home of TechniFilter Plus at www.technifilter.com to download these reports and formulas.

—Benzie Pikoos
Brightspark

Tel +61 8 9375-1178, sales@technifilter.com
www.technifilter.com



◆ TRADE NAVIGATOR: TREND-QUALITY INDICATOR

David Sepiashvili's article "Trend-Quality Indicator" examines trend detection and strength in a new way by introducing the trend-quality indicator (Figure 14).

Here is the TradeSense code for five indicators: reversal, cumulative price change (CPC), trend, noise, and the Q-indicator. The formulas are intended for use within the Trade Navigator Gold and Platinum versions, but we could also provide a special file for Trade Navigator Silver users.

To enter each of these indicators into Trade Navigator, first

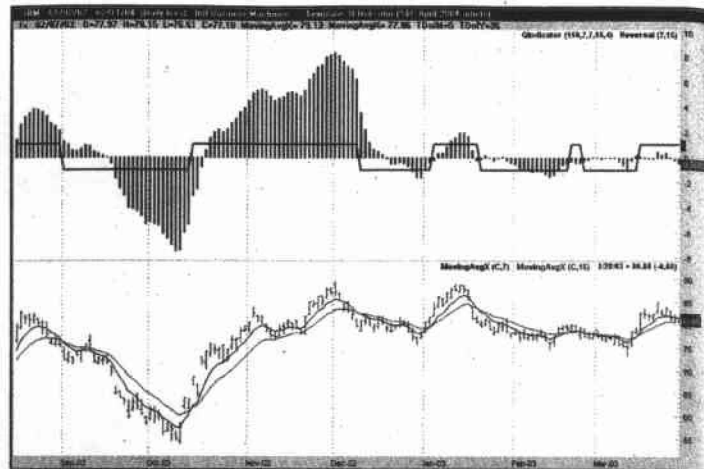


FIGURE 14: TRADE NAVIGATOR, Q-INDICATOR. This sample Trade Navigator chart shows the Q-indicator along with the reversal indicator on an IBM daily chart.

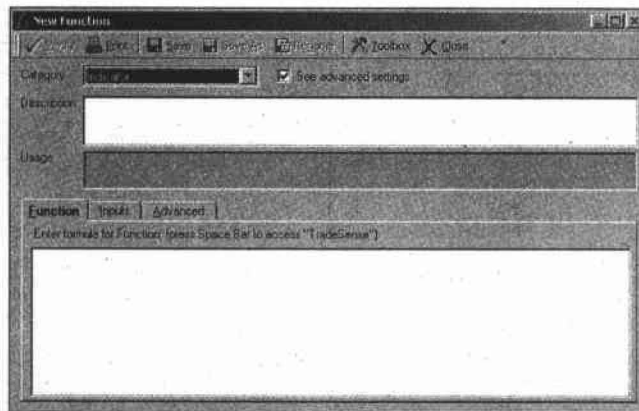


FIGURE 15: TRADE NAVIGATOR, Q-INDICATOR. Enter the formula for the reversal function in the New Function window. To create the next function, go back to the toolbox by clicking the Toolbox button.

pull up your Traders Toolbox. Continue to the Functions tab, and click on New. You will now have a New Function window (Figure 15) where you will enter the formula for the reversal function.

In order to calculate CPC, trend, noise and Q-indicator, you must first create the reversal function. The reversal function uses an exponential moving average crossover rule to generate starting points for the CPC indicator. Once you finish typing in the formula, click on Save, and name it appropriately. To create the next function, go back to the toolbox by clicking the Toolbox button (Figure 15), and click the New button on the Functions tab. Each of these indicators, once created, can be added to the charts by clicking the letter "A" on the keyboard, selecting the Indicators tab, and then double-clicking on the name of the desired indicator.

Note: Each indicator has inputs that need to be defined on the Inputs tab of the Function editor (please see the default values for inputs under each formula).

Reversal

Formula:

Sign (MovingAvgX (Close, XMA1) - MovingAvgX (Close, XMA2))

Default values for inputs:

XMA1 = 7

XMA2 = 15

TRADERS' TIPS

CPC

Formula:

$\text{CumulativeSum}(\text{Close} - \text{Close.1}, 0) - \text{CumulativeSum}(\text{Close} - \text{Close.1}, 0) \cdot \text{Bars Since (Reversal (XMA1, XMA2) \leftrightarrow \text{Reversal (XMA1, XMA2).1, 1, 0})}$

Default values for inputs:

XMA1 = 7

XMA2 = 15

Trend

Formula:

$\text{MovingAvgX}(\text{CPC}(\text{XMA1}, \text{XMA2}), \text{TrendPeriod})$

Default values for inputs:

XMA1 = 7

XMA2 = 15

TrendPeriod = 4

Noise

Formula:

$\text{CorrFactor} * \text{SqrRoot}(\text{MovingAvg}((\text{CPC}(\text{XMA1}, \text{XMA2}) - \text{Trend}(\text{XMA1}, \text{XMA2}, \text{TrendPeriod})) * (\text{CPC}(\text{XMA1}, \text{XMA2}) - \text{Trend}(\text{XMA1}, \text{XMA2}, \text{TrendPeriod}))), \text{NoisePeriod}))$

Default values for inputs:

CorrFactor = 2

XMA1 = 7

XMA2 = 15

TrendPeriod = 4

NoisePeriod = 250

QIndicator

Formula:

$\text{Trend}(\text{XMA1}, \text{XMA2}, \text{TrendPeriod}) / \text{Noise}(\text{NoisePeriod}, \text{CorrFactor}, \text{XMA1}, \text{XMA2}, \text{TrendPeriod})$

Default values for inputs:

NoisePeriod = 250

CorrFactor = 2

XMA1 = 7

XMA2 = 15

TrendPeriod = 4

For more information on Trade Navigator, please visit www.GenesisFT.com.

—Chad Noble

GFT Strategic Development

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719 884-0245, Support@GFDS.com

S&C

Traders.com



Visit the Message-Boards at Traders.com, the STOCKS & COMMODITIES website, to exchange trading tips, comments, and observations with other S&C readers. Simply click on the icon, log in, and post your message!

WEBSITES

CANSLIM.NET

When veteran traders and stockpickers are asked, "How do I get started in the stock market?" many point to one book: William O'Neil's classic, *How To Make Money In Stocks*. This book, which was first published in 1988, is infused with both an optimism that is exceptional for its directness and simplicity ("Success in a free country is simple. Get a job, get an education, and learn to save and invest wisely. Anyone can do it. You can do it"), as well as a hard-as-nails attitude toward investing in stocks (O'Neil is credited for the slogan: "There are no good stocks. They are all bad — unless they go up.")

One of O'Neil's biggest contributions, however, was his combination of fundamental and technical analysis into a methodology generally referred to by its acronym, CANSLIM. CANSLIM stands for the seven characteristics O'Neil believes stock investors need to consider when selecting stocks. These specific characteristics are:

C: Current quarterly earnings per share

A: Annual earnings increases

N: New products, new management, new highs

S: Supply and demand

L: Leader or laggard?

I: Institutional sponsorship

M: Market direction

Unfortunately, while there have been updates to O'Neil's classic (*How to Make Money In Stocks* is in its third edition), many of those who have been intrigued by O'Neil's methodology have had few places they could go to see it at work in real time. Certainly O'Neil's website, Investors.com — an extension of his daily national newspaper, *Investor's Business Daily* — is one place. But for those primarily concerned with the opportunities presented by the CANSLIM method itself, there really hasn't been a perfect, one-stop shop.

At least, not until now.

If you are a CANSLIM fan, then CANSLIM.net is a must-visit website. Its developers have provided what must seem to the uninitiated like a veritable waterfall of CANSLIM-related stock service. With free (premium) and paid subscriber options, daily commentaries and free email reports, CANSLIM.net picks up where *How To Make Money In Stocks* leaves off, providing those interested in this methodology a continuing education that can be the foundation of a successful investing and stock-trading practice.

THE SKINNY ON CANSLIM.NET

At first blush, CANSLIM.net is dizzying to browse. The homepage is packed with charts and commentary. The left-hand side of the website lists the various departments, grouped into categories like "Featured Stocks," "Articles and News," and "Corporate." This latter category includes an FAQ section, an "About Us" page, and advertising and partnership information. But most premium members and subscribers will likely spend their time in the first two sections.

"Featured Stocks" is further divided into four sections: "Breakouts," "Portfolios," "Message Board," and "The Lead-