

Charting Glossary

September 2008

Version 1



Contents

1	Price.....	1
2	Charts.....	1
2.1	Line, Step, Scatter, Histogram/Mountain charts	1
2.2	Open/High/Low/Close charts (Bar Charts)	1
2.3	Candle charts.....	2
2.4	Heikin-Ashi	2
2.5	Price Charts (Point and Figure, Renko, Kagi and 3 Line Break)	3
3	Studies.....	4
3.1	Moving Averages	4
3.1.1	SMA - Simple Moving Average	4
3.1.2	WMA - Weighted Moving Average	5
3.1.3	EMA - Exponential Moving Average.....	5
3.1.4	TMA - Triangular moving averages.....	5
3.1.5	MA Envelopes - Trading bands	6
3.2	Bollinger Bands.....	6
3.3	Chande Kroll Stop.....	7
3.4	DEMA - Double Exponential Moving Average	7
3.5	Donchian Channels.....	8
3.6	EMA - Exponential Moving Average	8
3.7	Fibo-Gann Retracement.....	8
3.8	Ichi Moku.....	9
3.9	Keltner Channels.....	10
3.10	Linear Regression	10
3.10.1	Linear Regression Trend line	10
3.10.2	Linear Regression Channels.....	10
3.10.3	Linear Regression Var.....	12
3.10.4	Standard Error Channel.....	12
3.10.5	Linear Regression (Moving Linear Regression)	13
3.10.6	Linear Regression Channel.....	13
3.11	Parabolic SAR (Stop and Reverse)	14
3.12	Pivot Points	15
3.13	SMA - Simple Moving Average.....	15
3.14	Standard Deviation Channel.....	16
3.15	Standard. Error Channel	16
3.16	TEMA - Triple Exponential Moving Average	16
3.17	TMA - Triangular Moving Average	16
3.18	Wilder's Smoothing.....	16
3.19	Wilder's Volatility System.....	17



3.20	WMA - Weighted Moving Average	17
3.21	Zig-Zag	17
3.21.1	Zig Zag -Price.....	18
3.21.2	Zig-Zag-%.....	18
4	Oscillators	19
4.1	ADX / ADXR.....	19
4.1.1	DMI - Directional Movement Indicator	19
4.2	Aroon Indicator	19
4.3	Aroon Oscillator	20
4.4	ATR - Average True Range	20
4.5	Bollinger Band Width	21
4.6	CCI - Commodity Channel Index.....	21
4.7	Chaikin's Volatility	22
4.8	Chande Momentum Oscillator	22
4.9	Change.....	23
4.10	DeMarker.....	23
4.11	DPO - Detrended Price Oscillator	24
4.12	DMI- Directional Movement Indicator.....	24
4.13	Donchian Channel Width	24
4.14	Elder Ray	25
4.15	Fisher Transform	25
4.16	Heikin - Ashi Differences	26
4.17	Historical Volatility	26
4.18	Intraday Momentum Index.....	27
4.19	Linear Regression Reversal	27
4.20	Linear Regression Slope.....	28
4.21	MACD - Moving Average Convergence Divergence.....	28
4.22	Mass Index	29
4.23	Momentum.....	30
4.24	Percentage Price Oscillator.....	30
4.25	Price Action Indicator / PAIN	31
4.26	R-Squared.....	31
4.27	Rate of Change	32
4.28	RVI - Relative Volatility Index	32
4.29	Repulse.....	33
4.30	RMI - Relative Momentum Index	33
4.31	RSI / RSI Classic - Relative Strength Index.....	34
4.32	Stochastics.....	34
4.32.1	Fast Stochastic.....	35



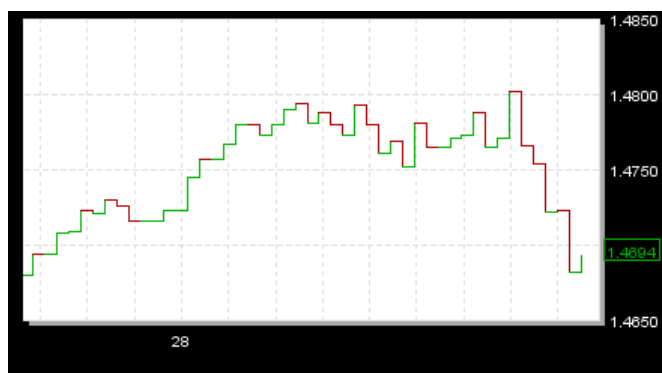
4.32.2	Slow Stochastics	35
4.32.3	Stochastic.....	36
4.32.4	Stochastic Momentum Index.....	36
4.32.5	Stochastic RSI	37
4.33	TD REI	37
4.34	TRIX	38
4.35	True Strength Indicator.....	38
4.36	Trend Trigger Factor	39
4.37	Ultimate Oscillator.....	39
4.38	Williams' %R.....	40

1 Price

The price of an instrument can be displayed in a number of ways (typically as a line, bar chart, candlestick or mountain). Most users choose Candlestick charts for the depth of information they provide.

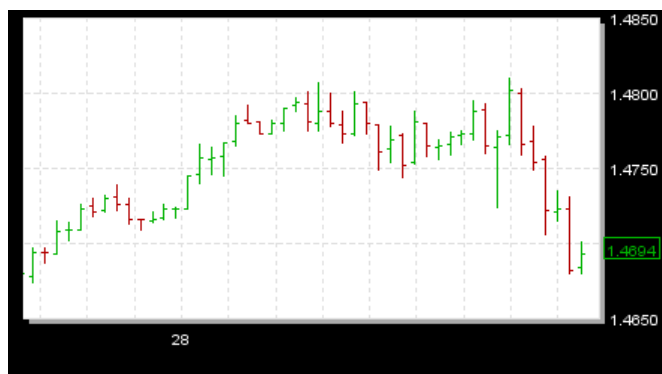
2 Charts

2.1 Line, Step, Scatter, Histogram/Mountain charts



Line, Step, Scatter and Histogram charts display closing prices in a linear format to make the rising and falling of an instrument easy to detect. In addition, Histogram charts shade the area below this line, emphasising market peaks and troughs

2.2 Open/High/Low/Close charts (Bar Charts)



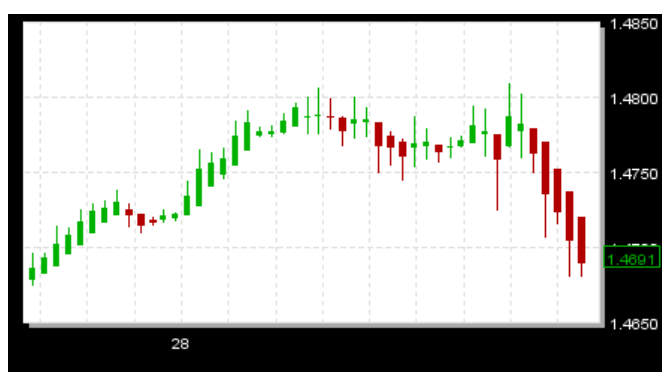
Open/High/Low/Close charts (or Bar charts as they are better known), show four price points for each day on a vertical line. The top and bottom of the line represent the high and low respectively. Notches on the left and right of the line represent the open and close respectively.

2.3 Candle charts



Candle charts show the same information as a bar chart, with the difference between the open and the close displayed as a solid body. The shadows, or wicks, indicate the highest and lowest prices traded over the same time period. The colour of the body indicates that the close on a certain day was either above or below the market's opening price (typically green and red respectively).

2.4 Heikin-Ashi



Heikin-Ashi charts appear similar to standard candlestick charts, but use different values for each bar. The Heikin-Ashi technique modifies the open-high-low-close (OHLC) bars of standard candlestick charts, using Close Open High Low instead:

$\text{Close} = \frac{(\text{Open} + \text{High} + \text{Low} + \text{Close})}{4}$ $\text{Open} = \frac{(\text{Open} (\text{PreviousBar}) + \text{Close} (\text{PreviousBar}))}{2}$ $\text{High} = \text{Max} (\text{High}, \text{Open}, \text{Close})$ $\text{Low} = \text{Min} (\text{Low}, \text{Open}, \text{Close})$

2.5 Price Charts (Point and Figure, Renko, Kagi and 3 Line Break)



These chart types are variations on a theme that plot pure price movement only and remove the time element from the equation. If the price does not move the chart does not change.

Price charts use box sizes to plot initial price movement and use a reversal factor to identify when the price has started to change its direction.

The parameters can vary according to the sensitivity required by the user. For example in Point and Figure a box can be ten pips or one hundred pips which means that every ten or hundred point move equates to one "X" - the reversal required is the price movement required to generate a new column. Therefore a three box reversal will require a thirty or three hundred point move in the opposite direction.

Price charts are a very effective way of identifying support and resistance levels, but require careful configuration before use.

3 Studies

3.1 Moving Averages



One of the most popular technical analysis tools, Moving Averages are used to determine upwards and downwards trends in the market. By using averages, Moving Average studies smooth out short-term fluctuations making it easier to identify general trends, and identify potential market turning points.

Moving Averages work best in markets displaying a definite trend: be careful when using Moving Averages in a trendless market. The calculation lags behind the current price, and can lead to misleading trend information. This lag is affected by the number of events used to calculate the average, which can vary 2 / 3 events to over 200 events.

The Moving Average studies can be divided into four main types:

- Simple (also known as Standard)
- Weighted
- Exponential
- Triangular

Selecting the correct moving average for your needs is a process of trial and error. More than one type of MA can be shown on a chart to make it easier to identify market trends.

Look for price moves above or below the Moving Average to indicate when you may wish to buy or sell.

3.1.1 SMA - Simple Moving Average

The most basic of the moving averages, the Simple Moving Average calculates an average over a set number of days. For example, to calculate a 10 Day Moving Average, add together the previous 10 closing prices, then divide by 10.

Compare Simple Moving Averages against an instrument's price to provide a basic view of a market's trends.



3.1.2 WMA - Weighted Moving Average

Weighted Moving Averages place more emphasis on recent price changes than the SMA. Each day's price is given a weight depending on how recently it occurred.

This example shows a 5 day WMA. CP=Closing Price, with CP5 being the most recent:

$$WMA = \frac{(CP5 \times 5) + (CP4 \times 4) + (CP3 \times 3) + (CP2 \times 2) + CP1}{(5 + 4 + 3 + 2 + 1)}$$

3.1.3 EMA - Exponential Moving Average

Exponential Moving Averages consider all previous price changes when calculating the Moving Average, with the prices weighted exponentially. This weighting places a greater importance on recent prices than in the WMA.

The weighting for an EMA is calculated by dividing 2 by the number of days. So, for a five day average you would use:

$$\frac{2}{5 + 1} = 0.3333$$

To calculate an EMA, multiply the current closing price by 0.3333, and add the previous day's EMA multiplied by 1-0.3333. In this example, we have used α to indicate the 5 day or 0.3333 weighting:

$$(\alpha \times \text{Today's CP}) + ((1 - \alpha) \times \text{Yesterday's EMA})$$

If the previous day's EMA is not known, substitute the previous 5 day Simple Moving Average.

Popular EMA charts are calculated over 12 and 26 days, and are used with the Moving Average Convergence Divergence oscillator (MACD) and Percentage Price Oscillator (PPO).

DEMA - Double Exponential Moving Average

Double Exponential Moving Average (DEMA) combines a Double Exponential Moving Average and a single EMA to produce an indicator which is faster and smoother than a standard MA or EMA.

TEMA - Triple Exponential Moving Average

The Triple Exponential Moving Average (TEMA) combines a Treble Exponential Moving Average, a DEMA and a single EMA. This indicator is faster and smoother than a standard DEMA study.

3.1.4 TMA - Triangular moving averages

Triangular moving averages place more emphasis on the prices in the middle of the period, and is equivalent to a double-smoothed SMA. Using our five day example, day 3 would have the greatest importance, followed by days 2 and 4.

The TMA is smoother than a Simple Moving Average, and helps identify trends in a volatile market.

3.1.5 MA Envelopes - Trading bands



Moving Average envelopes are percentage bands placed around a Simple Moving Average.

3.2 Bollinger Bands



Bollinger Bands are placed at a distance of two standard deviations from an SMA (typically over a period of 20 events). If prices follow a normal bell curve (Gaussian distribution), 95% of the prices must be inside the bands.

Bollinger Bands act as a measure of volatility and constitute strong zones of support and resistance when the market is without a clear trend. A trending market is reflected by the bands moving away from the SMA. When the difference between the two envelopes drops, the trend loses its force.

3.3 Chande Kroll Stop



This trend following indicator indicates the stop loss for a position whether it be short or long by using a variation on directional movement.

It is calculated on the average true range of the assets volatility. The stops are placed under (and on) the high (low) of the last “n” bars. The difference is proportional to the average True Range on “N” bars.

You can use it to trade in a number of ways:

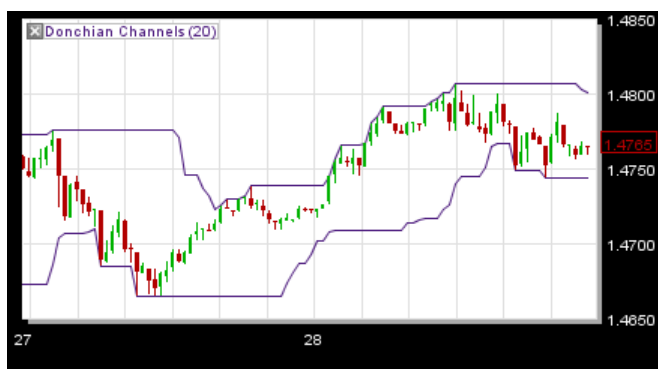
- Sell when the price crosses below both lines
- Buy when the price crosses above both lines
- Or you can trade when the two lines cross each other.

Always trade in the direction of the trend. As the price moves sideways you will note that the lines begin to flatten out and the price will trade broadly between the two lines.

3.4 DEMA - Double Exponential Moving Average

Please see 3.1 Moving Averages for information on Double Exponential MA studies.

3.5 Donchian Channels



Donchian Channels examine previous days trading and plot the highest high and lowest low for each day. This is typically done for a period of 20 days, giving the alternative name, the *Four-Week Rule*.

Breakouts from the channel signal long and short positions. A *Long* is established when the price exceeds the highs of the previous 20 days, and a *Short* is established when the price falls below the lows of the previous 20 days.

Donchian Channels can also be used to determine the volatility of a market. When a price is stable, the channel is narrow. As the price fluctuates, the channel widens.

3.6 EMA - Exponential Moving Average

Please see 3.1 Moving Averages for information on Exponential MA studies.

3.7 Fibo-Gann Retracement



This tool works on the premise that prices move up with longer upswings and smaller downswings, which is typical in an uptrend. In sideways markets the upswings tend to be equal in length to the downswings.

Any downswings in an uptrend will be fraction of the length of the primary up move and vice-versa. By using Fibonacci fractions like 0.382, 0.5 or 0.618, this tool calculates percentage retracements on zigzags which can then be used to calculate future pivot valleys or peaks.

3.8 Ichi Moku



Ichimoku (from *Ichimoku Kinko Hyo*, literally *one glance balanced chart*) is a complex charting system which can be used as part of many trading strategies. It contains 5 lines, which each indicate an average or price:

$$\text{Tenkan Line} = \frac{(\text{Highest High} + \text{Lowest Low})}{2} \text{ (for the past } p1 \text{ periods)}$$

$$\text{Kijun Line} = \frac{(\text{Highest High} + \text{Lowest Low})}{2} \text{ (for the past } p2 \text{ periods)}$$

$$\text{Chikou Span} = \text{Most current closing price (for the last } p2 \text{ periods)}$$

$$\text{Senkou Span A} = \frac{(\text{Tenkan Line} + \text{Kijun Line})}{2} \text{ (plotted } p2 \text{ periods ahead)}$$

$$\text{Senkou Span B} = \frac{(\text{Highest High} + \text{Lowest Low})}{2} \text{ (for the past } p3 \text{ periods, plotted } p2 \text{ periods ahead)}$$

By default, the values used in these calculations are $p1=9$, $p2=26$, $p3=52$.

The most distinctive feature of Ichimoku is *Kumo* (literally, *Cloud*), the area between Senkou Span A and Senkou Span B. This feature is given its name by the appearance of this area when shaded.

Using Ichimoku

Typically, a buy signal is generated when the Tenkan Line crosses the Kijun Line from below. A sell signal is generated when the Tenkan Line crosses the Kijun Line from above.

Kumo indicates support and resistance levels. If the price is above the cloud, the overall trend is bullish; if the price is below the cloud, the overall trend is bearish.

Unlike typical support or resistance indicators, Kumo has depth, which indicates how likely it is for a price to break through the cloud.

3.9 Keltner Channels



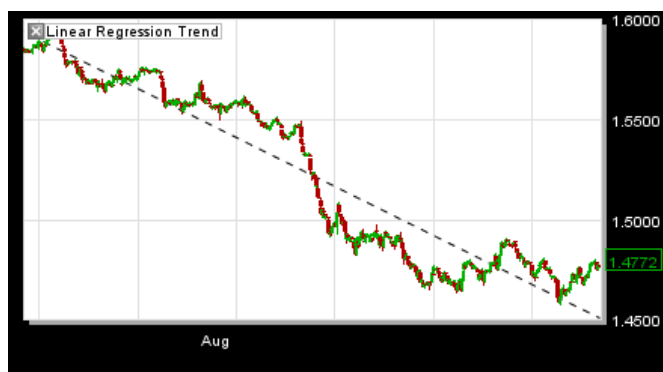
Keltner Channels show two channel lines drawn a defined distance above and below a central moving average.

The centre line is a 10 day SMA of typical price (that is, the average of each day's high, low and close prices). The distance between the channel lines and the central line is the SMA of the past 10 days' trading ranges (that is, the range between the high and low price for each day).

Keltner Channels were described by Chester W. Keltner in his book *How To Make Money in Commodities*, where they were known as the Ten-Day Moving Average Trading Rule

3.10 Linear Regression

3.10.1 Linear Regression Trend line



Linear Regression is a mathematical way of identifying the relationships between independent and dependent variables (in trading, this would be price and period). This is shown by the trend line, a straight line which represents the best fit between the data points.

3.10.2 Linear Regression Channels

Linear Regression Channels are obtained by drawing parallel lines either side of the Linear Regression line. The distance for this line is determined by the type of channel to be created.

Linear Regression channels are used to indicate possible price fluctuations. The top line shows resistance and the bottom shows support. Ordinarily, prices will be contained within the channel, and while you may see prices temporarily crossing these lines, longer periods outside the channel indicate the current trend may reverse.

Linear Regression Channel 100%



The Linear Regression Channel 100% uses parallel lines drawn two standard deviations from the Linear Regression line.

Linear Regression Channel. 50%



The Linear Regression Channel 50% uses parallel lines drawn one standard deviation from the Linear Regression line.

Standard Deviation Channel



The Standard Deviation Channel uses parallel lines drawn a specified number of standard deviations from the Linear Regression line.

3.10.3 Linear Regression Var



Linear Regression Var combines the Linear Regression line and the Linear Regression Channel 100% lines.

3.10.4 Standard Error Channel



The Standard Error Channel uses parallel lines drawn a specified number of standard errors from the Linear Regression.

3.10.5 Linear Regression (Moving Linear Regression)



Also known as the Moving Linear Regression indicator or Time Series Forecast, the Linear Regression line plots the path of endpoint values for previous Linear Regression trend lines over a specified period.

Although the moving Linear Regression indicator looks like an SMA, it is much more reactive to changes in the market. It can also be used to forecast future prices, using the trend of the prices over the analysis period to predict the next period's price.

3.10.6 Linear Regression Channel



The Linear Regression channel is similar to a Bollinger Bands study, in that lines are placed around the moving Linear Regression line, at a distance of two standard deviations.

An instrument's price touching the upper or lower lines of a Linear Regression channel can be taken as a signal to buy or sell.

3.11 Parabolic SAR (Stop and Reverse)



Parabolic SAR is used to find trends, and works on the assumption that the longer a trend continues, the more likely it is to reverse. The methods used to calculate the SAR points accelerate the curve towards the price each time a new high is reached.

Parabolic SAR Calculations

The parameters typically used by Parabolic SARs are:

initial acceleration factor : 0.02
 addition factor : 0.02
 acceleration factor limit : 0.2

The amount by which the stop moves up or down is a function of:

- Extreme Point (EP) = the most favourable price reached since the trade was initiated. (I.e. The highest high when long or the lowest low when short).
- Acceleration Factor (AF). The AF value starts at 0.02 and is increased by 0.02 each time a new EP for the trade is made until it reaches 0.2

Three situations are encountered during a trend period and usually occur in the following order:

- Both the values of EP and AF increase. Every time a new EP is reached for the trade, AF is increased by 0.02. As the AF increases, the SAR curve begins to move faster towards the price.
- The EP value increases and AF has reached its maximum value of 0.2. The SAR is then a function of price only.
- The values of both EP and AF are constant. No new EP (no higher high or lower low) is made for the trade (AF value is not increased). The trend falters and the result is usually that the SAR curve catches up with the price action.

Using Parabolic SAR

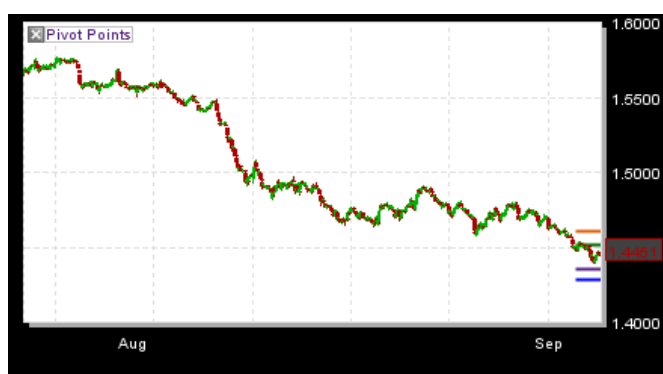
During a trend, SAR direction remains the same. If the parabola is below the price, the trend is bullish; if the parabola is above the price, the trend is bearish.

It is important to note that the SAR moves only in the direction in which the trade has been initiated. If long, the stop will move up every day; if short, the stop will move down (regardless of the direction any price movement).

When a new trade is initiated, the initial SAR is the previous trade's extreme point (EP), allowing time for the trend to materialise. If the trend fails to materialise, then the system is stopped and the position reversed. Prices passing a SAR point indicate that your position should be liquidated.

The Parabolic SAR is of most use while a market is trending. During non-trending periods it tends to get whipsawed. One method of reducing this is to use the Parabolic SAR in conjunction with the Directional Movement Indicator.

3.12 Pivot Points



Pivot Points indicate when a market is likely to reach the point at which it changes direction, enabling you to take action. The chart indicates two support and resistance levels.

The pivot point (P) is calculated as being:

$$P = \frac{\text{High} + \text{Low} + \text{Close}}{3}$$

The first Support (S1) and Resistance (R1) levels are:

$$\begin{aligned} S1 &= (2P) - \text{High} \\ R1 &= (2P) - \text{Low} \end{aligned}$$

The secondary Support (S2) and Resistance (S2) levels are:

$$\begin{aligned} S2 &= P - (\text{High} - \text{Low}) \\ R2 &= P + (\text{High} - \text{Low}) \end{aligned}$$

3.13 SMA – Simple Moving Average

Please see 3.1 Moving Averages for information on Simple Moving Average studies.

3.14 Standard Deviation Channel

Please see 3.1 Moving Averages for information on Standard Deviation Channels

3.15 Standard. Error Channel

Please see 3.1 Moving Averages for information on Standard Deviation Channels

3.16 TEMA - Triple Exponential Moving Average

Please see 3.1 Moving Averages for information on TEMA studies.

3.17 TMA - Triangular Moving Average

Please see 3.1 Moving Averages for information on Triangular MA studies.

3.18 Wilder's Smoothing



Wilder's Smoothing calculates a moving average similar to the Exponential Moving Average, but with a weighting system devised by Welles Wilder.

3.19 Wilder's Volatility System



Wilder's Volatility tracks True Range over a defined time period.

True Range is the greatest value of the differences between:

- This period's High and Low
- The previous period's Close and this period's High
- The previous period's Close and this period's Low

More than one day's range is needed to meaningfully track volatility. Use an average of the daily True Range over a number of days. Wilder used a value of 14 to give the best indicator of volatility over time.

3.20 WMA - Weighted Moving Average

Please see 3.1 Moving Averages for information on Weighted MA studies.

3.21 Zig-Zag

Zig-Zag indicators highlight trend reversals. By eliminating smaller fluctuations, they display the most relevant price movements.

Be aware that the last line plotted on a Zig-Zag chart reflects current prices, and can change depending on market movement. As a result, Zig-Zag indicators should be used for their hindsight – they should not be used to predict future trends.

3.21.1 Zig Zag -Price



Zig-Zag Price uses price when calculating the trend line.

3.21.2 Zig-Zag-%



Zig-Zag % uses a defined percentage value when calculating the trend line.

4 Oscillators

4.1 ADX / ADXR



The Average Directional Index (ADX) is used when determining the strength of the current trend. Knowing if a market is trending, or if it is moving sideways (trading) is useful when selecting which indicators to use.

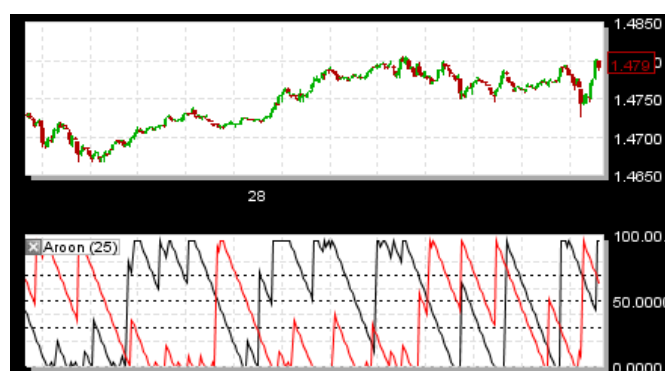
ADX is a moving average of DMI and has a scale of 0 to 100, but readings tend to be below 60. Weak trends are indicated by readings below 20, and strong trends tend to be above 40. Markets are said to be trending when ADX or ADXR rises above 17 or 23. When ADX falls below ADXR, a trend is almost complete.

Please be aware that these strong trends may be downtrends as well as uptrends – we are monitoring the strength of the trend, not its direction.

4.1.1 DMI - Directional Movement Indicator

The DMI identifies when trends are present. It is used in the calculations for ADX, which is a moving average of DMI.

4.2 Aroon Indicator



The Aroon up and the Aroon down indicators fluctuate between zero and 100. Strong trends are indicated by values close to 100; weak trends are indicated by values close to 0.

Use the Aroon indicator to identify trends. Uptrends are indicated by the Aroon Up staying above 70 and the Aroon Down staying below 30 (and the opposite for a downtrend). A new trend is signalled when the Up and Down lines cross.

4.3 Aroon Oscillator



The Aroon oscillator. Is calculated by subtracting Aroon down from Aroon up, with a range between -100 and 100. Readings above the central zero point indicate that an uptrend. A downtrend is indicated by readings below zero.

4.4 ATR - Average True Range



ATR represents the volatility of an instrument.

True Range is the greatest value of the differences between:

- This period's High and Low
- The previous period's Close and this period's High
- The previous period's Close and this period's Low

Apply a moving average to calculate the Average True Range.

This indicator of volatility measures selling pressure and buying pressure. As the ATR rises there is strong volatility. When the ATR decreases there a low volatility.

4.5 Bollinger Band Width



$$\frac{\text{upper band} - \text{lower band}}{\text{Moving Average}}$$

If the Bollinger Band Width indicator rises, the market is forming a trend. When the indicator declines, the trend is finishing. In a market with no clear trend use Bollinger Bands.

4.6 CCI - Commodity Channel Index



The Commodity Channel index is used to monitor instruments which have clear cyclical patterns. It does not identify the length of cycles, instead indicating when cycles begin and identifying entry points when breakouts occur.

When the CCI rises above +100, it is a bullish signal. When it falls below -100, it is a bearish signal.

4.7 Chaikin's Volatility



Chaikin's Volatility compares the range between an instrument's high and low prices to measure the volatility of an instrument.

As a market peaks, it is likely that there will be increased volatility, which may indicate a change in trend. Conversely, as a market bottoms it is likely that volatility will decrease while fewer trades are being placed.

4.8 Chande Momentum Oscillator



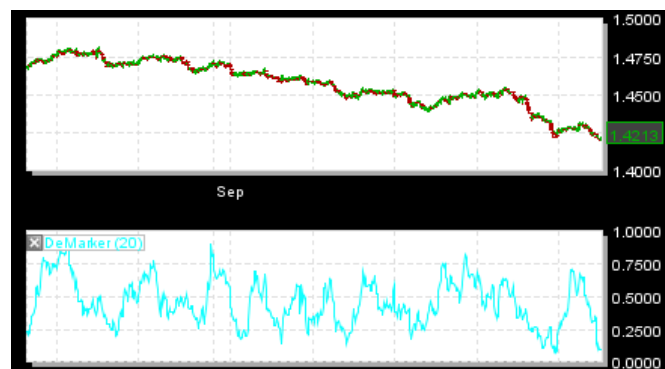
The Chande Momentum Oscillator is similar to RSI, monitoring overbought and oversold situations. Scaled between -100 and 100, buy signals occur when the oscillator passes -50, and sell signals when the oscillator passes +50.

4.9 Change



This indicator plots the change between the current bar and the previous bar

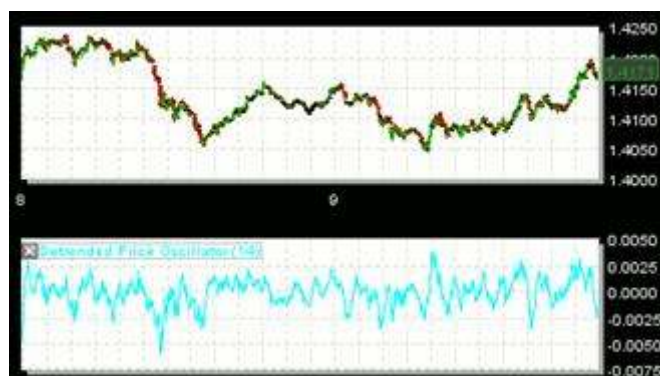
4.10 DeMarker



The DeMarker compares a period high against the previous period's high to measure the demand of the underlying instrument. Unlike many other oscillators, DeMarker does not use smoothed data.

When the DeMarker indicator is below 0.3, an upwards trend is predicted. When the indicator is above 0.7, a downwards trend is predicted. It also measures the risk levels of a trade, with values above 0.6 indicating prices are less volatile, and below 0.4 indicating an increased risk.

4.11 DPO - Detrended Price Oscillator



The Detrended Price Oscillator compares price to a previous Moving Average. It isolates short term cycles, disregarding cycles longer than the time frame of the moving average. Estimate the maximum length of cycle you wish to track, then use half this period for your Moving Average.

The DPO can be used to identify turning points in longer cycles. When it shows a higher peak, there is likely to be an upturn. Conversely, when there is a lower trough, there is likely to be a downturn.

4.12 DMI- Directional Movement Indicator

Please see 4.1 ADX / ADXR for information on DMI Oscillators.

4.13 Donchian Channel Width



This is an indicator that displays the width of the upper and lower Donchian channels. This indicator is designed to catch trends and unlike the Donchian Channel is displayed below the chart – low values indicate a trendless market but increasing values indicate a market that is starting to trend.

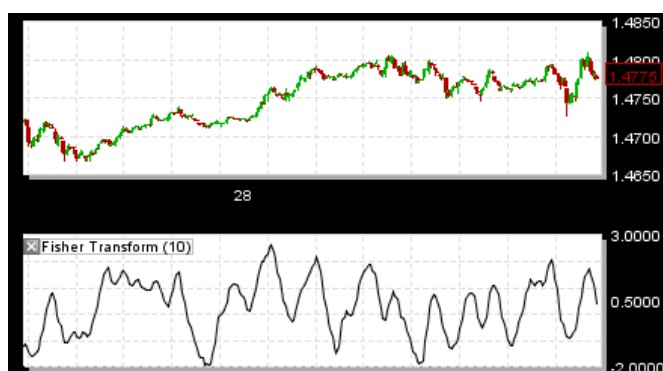
4.14 Elder Ray



The Elder-Ray oscillator provides a simple way to compare the highs and lows of a day to a smoothed average (EMA). It provides an insight into bullish and bearish attitudes to the instrument

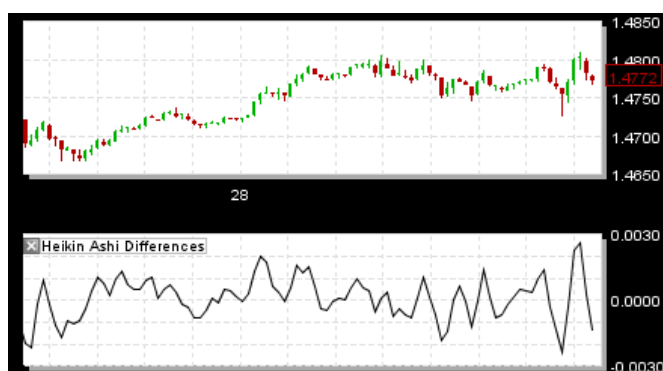
If a Bear Power is shown as positive and rising, the market can be considered bullish; conversely, if Bull Power is shown as negative and falling, the market is bearish.

4.15 Fisher Transform



The Fisher Transform is used to identify major market turning points. It uses the assumption that while prices do not have normal bell-curve characteristics you can create a Gaussian probability density by normalising price and applying the Fisher Transform. The oscillator indicates peak fluctuations which can be used to determine potential reversals.

4.16 Heikin - Ashi Differences



This oscillator displays the difference between the previous Heikin-Ashi candle and the current underlying price.

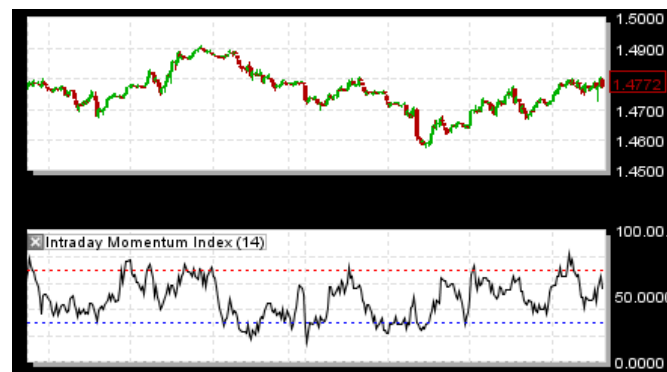
4.17 Historical Volatility



Historical Volatility measures price fluctuation over time. It is used to determine the volatility of a market.

Historical price data is used to determine the actual volatility of an instrument (rather than predict future volatility). The calculation determines the average deviation from the average price over the specified period.

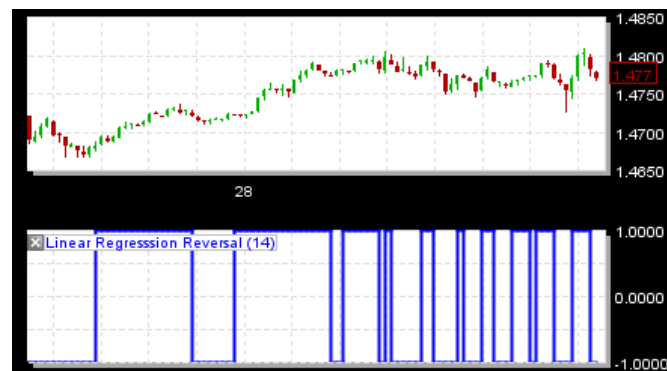
4.18 Intraday Momentum Index



The Intraday Momentum Index combines the RSI oscillator and candlestick analysis. The IMI is calculated in the same way as RSI, but instead of using averages, it uses the relationship between the day's open and close prices to determine whether a day is up or down.

Like a candle, if it closes above the open it is an up day and vice versa. As with the RSI overbought and oversold conditions are indicated by values above 70% and below 30%.

4.19 Linear Regression Reversal



This binary indicator shows +1 when price goes up and -1 when price goes down, changing direction when the price is lower (or higher) than the previous price.

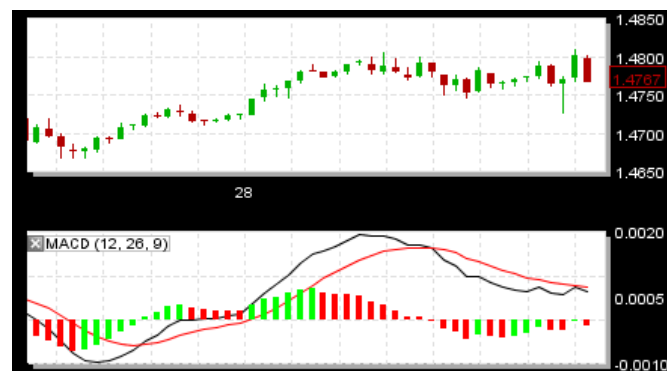
This indicator provides long and short signals. +1 is a long position, -1 is short.

4.20 Linear Regression Slope



The Linear Regression Slope shows how much prices are expected to change per unit of time. Use this indicator with R-Squared to determine possible trend changes.

4.21 MACD - Moving Average Convergence Divergence



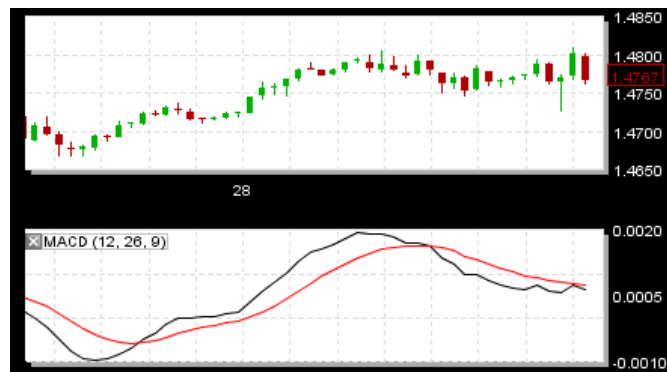
MACD shows the MACD line (the difference between a fast and a slow EMA) and a Signal line (a moving average of the MACD line), together with a histogram which is simply the difference between the MACD and the Signal.

A positive MACD value is considered bullish, and a negative value is considered bearish.

Entry and exit points are indicated when the signal line crosses the MACD line. You can predict when this is likely to happen by the shape of the histogram.

Divergences between the histogram and price can be used to identify reversals.

MACD Simplified



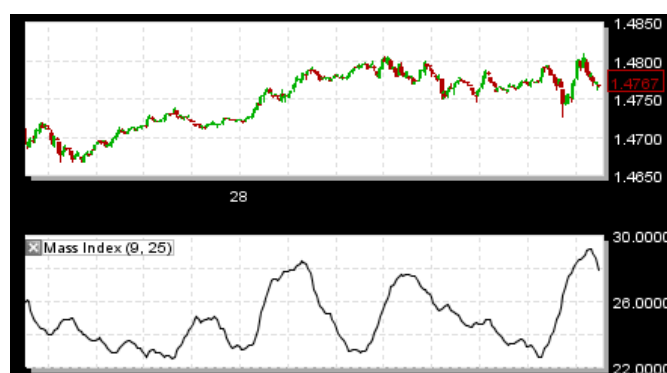
This indicator is the same as the MACD indicator, but shows only the indicator lines.

MACD Histogram



This indicator is the same as the MACD indicator, but shows only the histogram.

4.22 Mass Index



The Mass Indicator detects trend reversals. Based on the difference between high and low, the Mass Index increases and decreases in line with volatility. Mass Index is best used with a 9 day EMA.

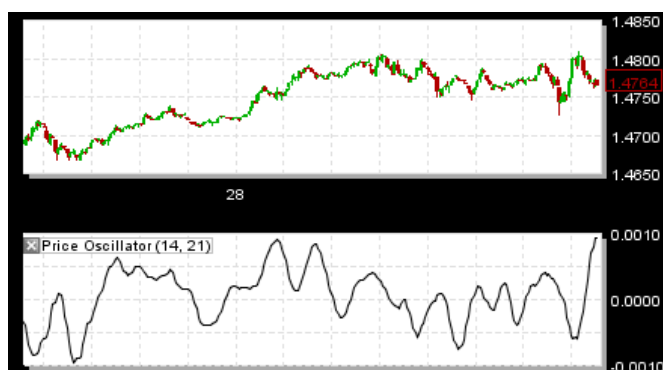
4.23 Momentum



The Momentum oscillator is calculated by subtracting a previous close price from the current close price. The distance between these two events is configurable.

Momentum should not be used to indicate whether an instrument has been overbought or oversold. However, you can consider buy and sell opportunities as it crosses the 0 mid point. It also gives good divergence indicators.

4.24 Percentage Price Oscillator

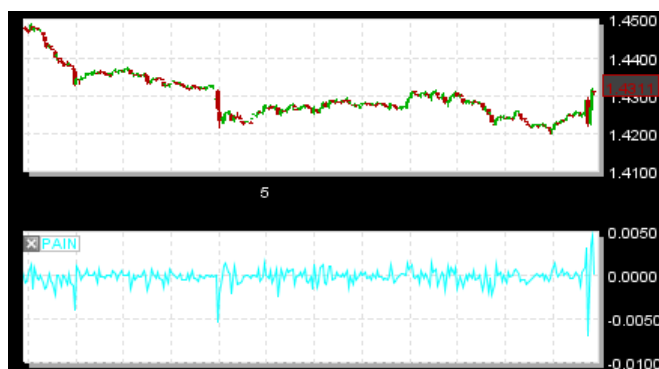


The Percentage Price oscillator shows the relationship between two moving averages.

It is calculated by subtracting the 26 day EMA from the 9 day EMA. This difference is then divided by the 26 day EMA. The resulting percentage gives an indication of the position of the short term average in relation to the longer term average.

The PPO is very similar to the MACD, with the PPO expressing the difference between the two EMAs as a percentage rather than as a simple difference.

4.25 Price Action Indicator / PAIN



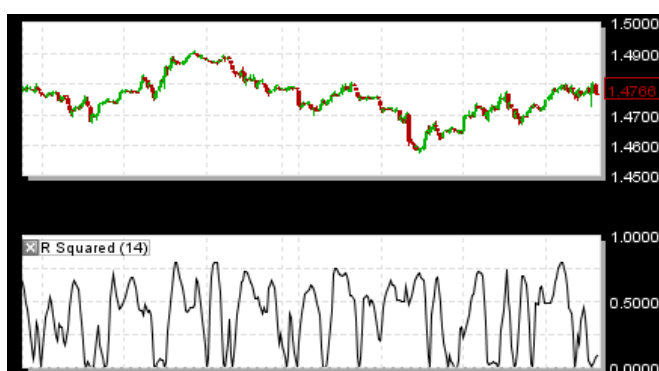
The Price Action Indicator (PAIN) provides a lot of helpful information from today's open, high, low and close, using the formula:

$$\frac{(C - O) + (C - H) + (C - L)}{2}$$

- (C-O) defines momentum plus or minus
- (C-L) defines late selling pressure
- (C-H) defines late buying pressure

The instrument's price is under selling pressure if the Close is near the Low, and under buying pressure (that is, there are more buyers than sellers) if the Close is near the High. A high PAIN value with the Close near the High identifies an excellent potential long, if the overall market conditions stay positive.

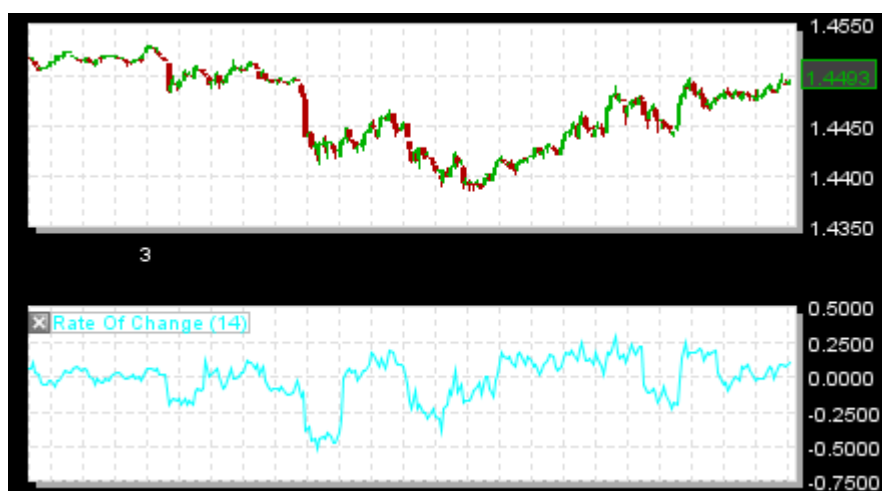
4.26 R-Squared



The R Squared indicator confirms trends, and should be used with the Linear Regression Slope, which indicates trend direction.

When the Linear Regression Slope and R-Squared rises above the 0 during an up, the trend is confirmed.

4.27 Rate of Change



Rate of change divides the day's price with that of a previous, specified, day.

Similar to Momentum, this oscillator indicates overbought and oversold. Consider buy and sell opportunities as it crosses 0.

4.28 RVI - Relative Volatility Index



The Relative Volatility Index is similar to the RSI. Instead of using daily price change, it shows standard deviation over a specified period (typically, the past 10 days).

The indicator measures the direction of volatility on a scale from zero to 1. Readings >0.5 indicate that the volatility is more to the upside. Readings <0.5 indicate that the direction of volatility is to the downside.

4.29 Repulse



Repulse represents the push contained in each candlestick, and offers information on the feeling and confidence that traders have about the markets. It is not related to price movement in the same way as RSI, MACD or the stochastic indicators.

4.30 RMI - Relative Momentum Index



The Relative Momentum Index is similar to the RSI. Instead of calculating from one close period to another, the RMI examines the differences between one close and another a specified number of periods ago.

RMI indicates overbought / oversold situations. Buy signals are triggered when the RSI crosses the 30 level and sell signals are triggered when the RSI crosses the 70 level.

4.31 RSI / RSI Classic - Relative Strength Index



This indicator compares the price of an instrument to the instrument's previous performance. This figure is calculated from the average closing price from an up day versus the average closing price from a down day over a specified period. The exact formula for this average differs for classic and standard RSI oscillators:

RSI indicates overbought / oversold situations. Buy signals are triggered when the RSI crosses the 30 level and sell signals are triggered when the RSI crosses the 70 level.

RSI is always scaled between 0 and 100.

The RSI and RSI Classic are known as 'smoothed' oscillators. This differs to other oscillators, such as Momentum or MACD, which can reflect previous erratic price movements, even in a currently stable market.

4.32 Stochastics



Stochastic oscillators are momentum indicators used to compare an instrument's closing price to its price range over a specified period. They use the basic assumptions that in an uptrend, today's closing price is likely to be close to the highest recent close price, and that in a down trend, today's closing price is likely to be close to the lowest recent close price.

Stochastic oscillators display two lines, %K, the Percentage Alert line, and %D, the Percent Definite line. The Percentage Alert line %K measures on a percentage basis the last closing price within the price range of a defined period. The Percent Definite line %D is a moving average of %K.

Overbought and oversold situations are indicated by the 25% and 80% lines. Divergences between %D and the underlying price when %D is in the overbought or oversold area are a signal to buy or sell.

4.32.1 Fast Stochastic



The Fast Stochastic is calculated using the average of the last three %K.

4.32.2 Slow Stochastics



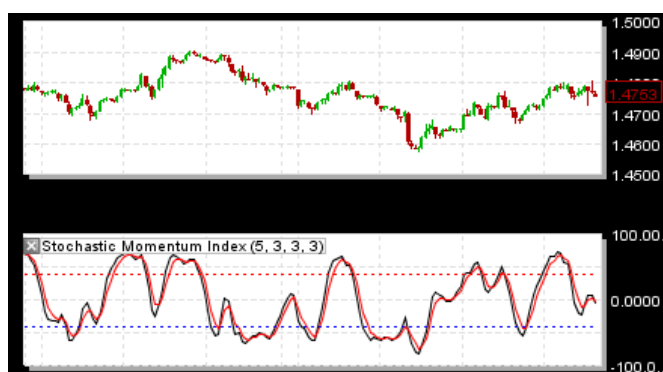
The Slow Stochastic indicator removes false signals to provide a smoother view of the market. It uses a new %Dn line which replaces %K. %Dn is the moving 3 day average of %D.

4.32.3 Stochastic



The Stochastic indicator is calculated using a defined value for the moving average. A value of 1 is equivalent to a Fast Stochastic, a value of 3 is equivalent to a Slow Stochastic.

4.32.4 Stochastic Momentum Index



The Stochastic Momentum Index shows the position of the close price in relation to the median point (as opposed to the highest and lowest points of a normal Stochastic). It is double smoothed with an Exponential Moving Average to produce a consistent signal.

The SMI gives good divergence signals. Sell signals are given when the instrument price reaches new highs, but the SMI does not. Conversely, buy signals are given the instrument price reaches new lows, but the SMI does not.

4.32.5 Stochastic RSI



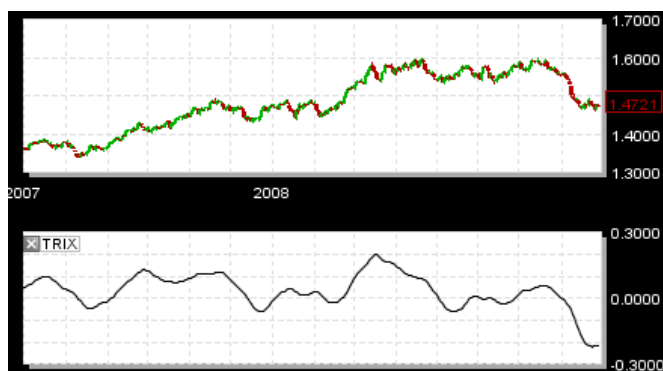
This oscillator is used to identify overbought and oversold readings in the RSI indicator, providing an alternative method of identifying extremes over 70 and under 30.

4.33 TD REI



TD REI monitors oversold and overbought conditions. An instrument can be considered overbought if the oscillator passes +45 (or higher), it is oversold if the oscillator passes -45 (or lower).

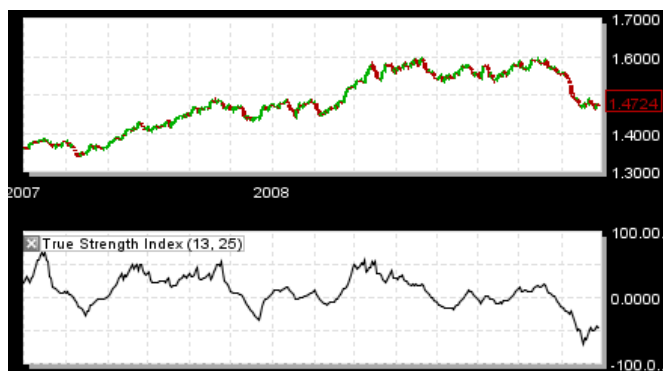
4.34 TRIX



TRIX is a momentum indicator that displays the percent rate-of-change of a TEMA of an instrument's closing price. It keeps you in trends equal to or shorter than the specified periods

TRIX oscillates around zero. Buy when TRIX rises above zero; sell when TRIX falls below zero.

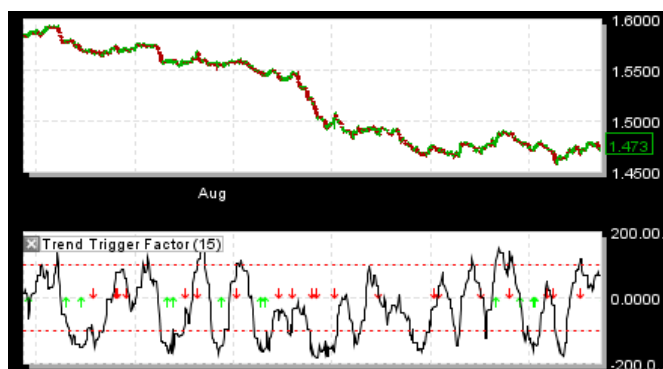
4.35 True Strength Indicator



The True Strength Index (TSI) is a momentum-based indicator which is used to define trends and identify oversold / overbought conditions. A version of the Relative Strength indicator, it uses a double smoothed EMA to can identify trend shifts with little or zero lag.

An increasing True Strength value demonstrates increasing momentum in the direction of the price movement.

4.36 Trend Trigger Factor



This indicator measures buying and selling power in an up or down trend. Monitor a trend until you see weakness, when you can change your position.

The Trend Trigger Factor measures the average range of 15 events over two time periods (for example, days 1 to 15, and days 16 to 30)

4.37 Ultimate Oscillator



The ultimate oscillator combines information for three different time periods (initially 7, 14 and 21 days) into one number. The oscillator moves between 0 - 1, with a centre line of 0.5. 0.7 indicates overbought, and 0.3 indicates oversold.

4.38 Williams' %R



Williams %R measures previous close values in relation to a specified price range. It is similar to the Stochastic oscillator, and is used to identify overbought and oversold levels.

Unlike the Stochastic oscillator, the scale is reversed, so a reading below 20% indicates an instrument has been overbought, and above 80% indicates it has been oversold.