Trend Determination
- a Quick, Accurate, & Effective Methodology

By; John Hayden

Over the years, friends who are traders have often asked me how I can quickly determine a trend when looking at a chart. My answer is that I have examined tens of thousands of charts. However, one fundamental indicator I faithfully use is the Relative Strength Index (RSI). The RSI was developed by J. Welles Wilder, Jr. and presented in his 1978 book, *New Concepts in Technical Trading Systems.* Welles developed the RSI for trading pork bellies. My belief is that a valid indicator will work in all markets, and in all time periods. The RSI is used for:

1.   **Trend Analysis**
2.   **To Help Determine Price Objectives** (not covered here)

I am very much indebted to Andrew Cardwell, a Commodity Trading Advisor (CTA), for teaching me much of what I know about applying the RSI to trade with. Whereas, Wilder no longer uses the indicator that he developed, Andrew developed his understanding of the RSI to encompass much more than Wilder ever dreamed. Apparently, Wilder is putting all of his effort into his Adam Theory, and Delta Phenomena.

Momentum-derived oscillators are very popular among future traders, and increasingly stock traders. The first of the four most popular is; the <u>Momentum Indicator</u> that measures the change in the closing price over time. The momentum indicator measures the absolute change in price by calculating, (present price)-(price 'N' time periods ago). The second most popular momentum indicator is the <u>Rate of Change Indicator</u>, which measures relative change by the formula, (present price)/(price 'N' time periods ago). The third momentum-derived oscillator is the <u>Stochastics Indicator</u> developed by George Lane. This indicator measures the relationship between the closing price to the high, and low price for the period under consideration. The formula is [(closing price now – lowest low 'N' time periods ago)/(highest high 'N' time periods ago – lowest low 'N' time periods ago)] * 100. The formula is a little bit more involved than the simple momentum indicator formula. The fourth most popular momentum-derived oscillator is the <u>Relative Strength Indicator (RSI)</u>. Its formula is, 100-[100/[1+(average of 'N' periods of where the close was higher)/ (average of 'N' periods of where the close was lower)]].

The problem with the first three oscillators; Momentum, Rate of Change, and the Stochastics is that when large price movements are dropped from the formula during the period under consideration, the indicator will move (oscillate) more frequently than it should.

For example, here is a current chart of the March 2000 contract of Silver in which we look at two consecutive days for both Rate of Change and Momentum indicators:

Silver - COMEX
March 2000
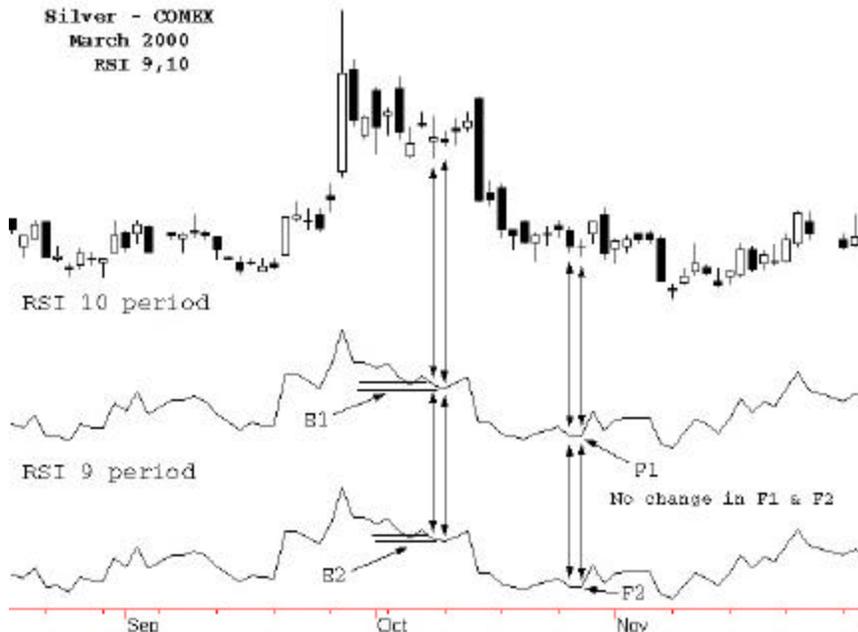9 Period

Rate of Change 9p
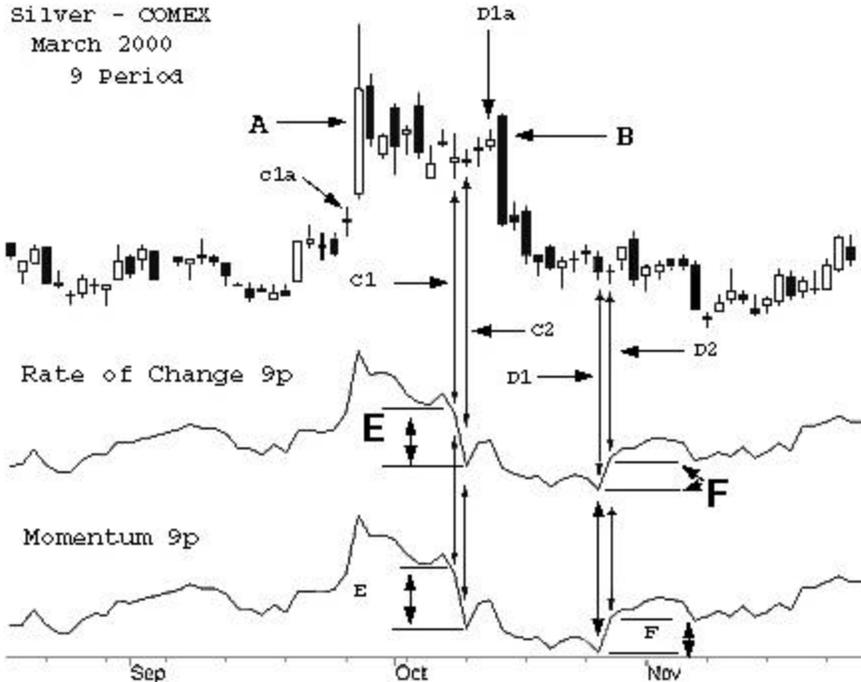
Momentum 9p

In early October, Silver had a large one-day advance (A), at C1 when the 9 period Rate of Change (or the Momentum Indicator) is calculated it is based upon the closing price at (C1a), and the current closing price at (C1). The next day (C2) the closing price barely changes from (C1), however when the calculations are redone using the closing price of (A) and the closing price of (C2) the large up move is dropped, and yet the value of the Rate of Change or Momentum Indicator moves quite a bit as measured by (E) – yet the price at (C1 & C2) barely moved! This can be observed also with the large down move (B). Now observe what happens when we change the look back period to 10 days. Immediately, we notice that the large moves at (A & B) are still included in the look back calculated on the second day.

Silver - COMEX
March 2000
10 period

Rate of Change 10p

Momentum 10p

Sep   Oct   Nov

As we can see, the amount the oscillator changed (E & F) is much less when the look back period is extended to 10 days. This is because the oscillator for both consecutive days is looking at the price before the large move. Additionally, the oscillators continued to drop at (F), where in the 9 day look back the oscillators actually increased. It is interesting that the price of silver actually dropped a tenth of a cent! This is a major problem with using these simple momentum oscillators.

The RSI due to the way it is constructed will dampen, or smooth out these distortions. Below are the RSI with a 9, and 10-day look back period:

Silver - COMEX
March 2000
RSI 9,10

RSI 10 period

RSI 9 period

No change in F1 & F2

Sep   Oct   Nov

As we can see, the vertical distance the RSI moves (E1 vs. E2, and F1 vs. F2) regardless if the large moves are included or not remains basically the same. This allows us to place more significance into the actual

values of the RSI. In addition, the RSI indicator is always contained within a vertical range from 0 to 100. This saves us from constantly referring to the past indicator values when determining overbought or oversold levels. This problem of comparing past highs or lows occurs because typical momentum indicators are not contained within a predefined vertical range.

Most books on technical analysis when discussing RSI will typically use a 14-day look back period to perform its calculation. The longer the time period, the less sensitive the RSI becomes to oscillate and the smaller its amplitude changes. I prefer a look back period of 14 as it works the best in all time frames, and it is one half the lunar cycle. For intra-day time frames, some traders will use a nine period look back. In the gold, silver, crude and financials a 25-day look back period performs well. There seems to be a 50-day cycle on these markets, and a 25-day look back is half the cycle length. It is important to realize the RSI formula requires at least 90 periods worth of data to provide valid results. Otherwise, the RSI formula will not give accurate results for trend analysis. When I look at daily charts, I prefer at least 200 days worth of data to earn my trust in the validity of the RSI data.

Every book on technical analysis I have read when discussing the RSI will state that, any movement above 70 is considered overbought, while any movement under 30 is oversold. An important fact to remember is that any oscillator (RSI included) in a strongly trending market will become either oversold (bear market), or overbought (bull market), and consequently will remain oversold or overbought for quite a while. A few books on technical analysis will adjust these levels. They recommend that in a strong bull market, the 80 level becomes the effective overbought level, and the 20 level becomes the effective oversold level in a bear market.

Wilder states in his opinion that the greatest value of the RSI is in pointing out a divergence between the graphs for the RSI and price behavior. Their graphical behavior reveals a bullish divergence (or as he calls it a bottom failure swing) when the price makes a new low, while the RSI continues under 30 and fails to make a new low. When the RSI proceeds to exceed the previous RSI peak, a short-term buy signal occurs according to Wilder.

Similarly, the opposite event would apply to a bearish divergence (a top failure swing), and would be considered a short-term selling opportunity! The typical trader continues to use the RSI to identify a bearish divergence when the RSI is over 70, and a bullish divergence when the RSI is under 30.

This synopsis sums up public knowledge about RSI. However, what the average investor comprehends is a small part of the dynamic overall picture. For example, if the range effectively shifts in a bull market so that 80 is overbought, then Andrew Cardwell realized that the support level must also shift. Inversely if the oversold level in a bear market will shift down to 20, then the resistance level in a bear market must also shift.


Determining the RSI Range

An up trending market will typically find support at the 40 level, with effective resistance at the 80 level. A down trending market will find resistance at 60, with effective support at the 20 level. Often times a primary indication that the trend has shifted from a bear trend to a possible bull market occurs when the RSI which previously was respecting the 60 level, rallies up to 70 or higher. When the inevitable decline arrives, the RSI will respect the 40 level, before rallying again.

In an 80/40 range (bull market), you will see the RSI make higher tops and higher bottoms – a classical indication of a bull market! Likewise, in a 60/20 range (bear market) you will see the RSI making lower bottoms and lower tops. Recognizing this RSI behavior is very useful when first looking at a chart of a

commodity or stock. Inspecting the range the RSI is in, is the first clue indicating the trend. The RSI will also find resistance or support at previous tops, or bottoms in the RSI values themselves. Old resistance points could become new resistance points, and if broken a new support level upon a retracement. Likewise, old support levels could prove to be effective support again, and if broken will prove to be effective resistance.

Here is a longer term Japanese Yen chart:
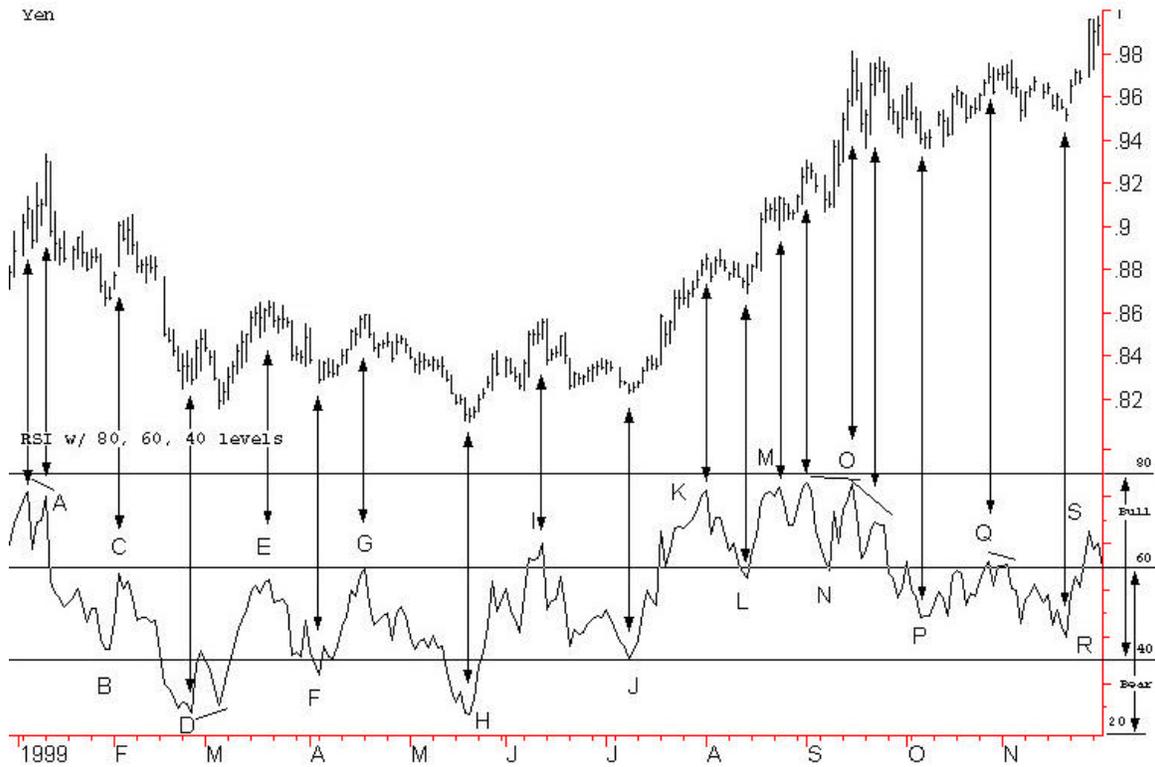
At (A) there is a small bearish divergence indicating that the prior uptrend is about to take a detour. Price subsequently declines to (B) finding support at the 40 level. The rally to (C) is our first hint that a trend change could be coming, as the 60 level proves to be effective resistance. The decline in prices to (D) violates the previous support line at 40. At this point, we realize that what should have been support failed, that 60 was effective resistance at (C), and that the trend has probably changed. The price rallies a little bit after (D) before faltering, and declining to a new low, however the RSI fails to make a new low. Instead, it makes a bullish divergence! At this point, we can safely say that the prior bull market died! The RSI level of 60 (C) proved to be resistance because the 40 level failed to provide support (decline C to D), and a bullish divergence was made. Where the bulls got excited about the bullish divergence, is where we should be looking for a place to get short!

The rally to (E) respects the 60 level again before dropping to (F). However, the RSI finds some support at (F) indicating that the bulls might be getting ready to rally prices. When the rally falters at (G) we can safely assume that the bear market is still in effect. The low at (H) was not followed by a bullish divergence; a minor indication that a trend change could be coming. This was somewhat confirmed at (I) as the RSI managed to rally above 60 to 64.93 before dropping. Our suspicion became more valid as the subsequent decline to J found support at the 40 level. This was similar to the RSI finding resistance at the 60 level at (C). The rally to (K) violated the 60-resistance level, and the decline at (L) finding support at the 60 level confirmed that we were now back in a bull market. In fact just as we were looking for a place to get short prior to (E), we should also be looking for a place to get long prior to (L). Remember, RSI itself tends to find support (L) at old resistance levels (C, E, G, H) in a bull market.

In any, case the rally to (M) found resistance at the 80 level. The decline to (N) found support again at the 60 level. Notice that this is the second time that 60 acted as support. This behavior by the RSI indicates that we are in a strong bull market. In contrast, this would be similar to the 40 level acting as resistance in a bear market. In fact, after the bear decline to (D) the market rallied a little bit finding resistance at the 40 level – six days later (a six period bullish divergence).

Following the rally from (N) we had a bearish divergence at (O), followed by another divergence a few days later. The subsequent decline in price to (P) was followed by a warning that the trend could be changing came at (Q) as the RSI found resistance at the 60 level (with a small bear divergence) that led to a decline to (R). The explosive rally to (S) was a strong indication that the bull market is still alive and well. It is interesting to note that (S) is itself a longer-term bearish divergence against (O).

The first indication by the RSI that the bull market in Yen has ended will be the 60 level acting as resistance followed by a violation of the 40 level – or the price will negate the 40 support level without first encountering resistance at the 60 level.

Determining Support & Resistance Levels

It is important to look for former support, and resistance levels on the price and RSI charts. I look at the RSI chart to determine at what price and at what level the RSI found effective resistance, and support. In an uptrending market, the charts reveal that the current support levels were actually former resistance levels (on the price and RSI chart) during previous days and weeks. However, is a down trending market, the charts reveal that the price or RSI values will eventually violate former support levels. Consequently, these former support levels during previous days and weeks were eventually transformed into current resistance levels by the down trending markets behavior.

Looking for a Divergence

A very significant clue that the trend is about to change occurs when a divergence is present. A possible bullish divergence occurs when the price makes a new low, yet the momentum oscillator fails to also make a new low. It becomes a valid bullish divergence when the price turns up from the low, and the oscillator turns up. Likewise, a possible bearish divergence occurs when price makes a new high, yet the RSI doesn't. It becomes a valid bearish divergence when the price drops. I hinted at this in the above section. What I am about to say next will shock traditional traders. Whenever I see a bearish divergence, I immediately start thinking that we are in a *BULL* market. Whenever I see a bullish divergence, I start thinking that we are in a *BEARISH* market! Yes, I know that this flies in the face of what all the textbooks say. Remember, we want to detect the moment the market might change its direction. The important point is that in the *majority* of the cases my claim is very true. You will only find repeated bearish divergences in an uptrending market. Similarly, bullish divergences will repeatedly occur in a bearish market. If you find this hard to accept then get a chart (weekly, daily) of the Japanese Yen, and start looking at what the RSI did after July 1995 to July

1998. You will be hard pressed to find a bearish divergence in the daily chart, and there is no bearish divergence in the weekly chart! Detecting a divergence is one of my favorite tools.

This next chart shows how stocks behave the same as a futures, or commodity contract. Notice how the 80/40 RSI levels were respected with multiple bearish divergences, – but no bullish divergences! The stock of Cisco experienced multiple Bearish Divergences, and yet the price continued to rally. Bearish Divergences usually come in a BULL MARKET!

Think of a divergence as a detour; the overall trend will resume once the price can get past this temporary resistance or support area. Divergences always are associated with any momentum-based indicator. It typically shows up at the momentum high, or low. For example when a bull market is overbought, inevitably there will be a correction. Before the correction, there will be a loss of momentum. When a bearish divergence occurs the market is telling you that it is currently overbought/overextended. You might want to take partial profits on your long position, as your prices could be about to take a detour! The bearish divergence during the bull market is not telling you to get short!
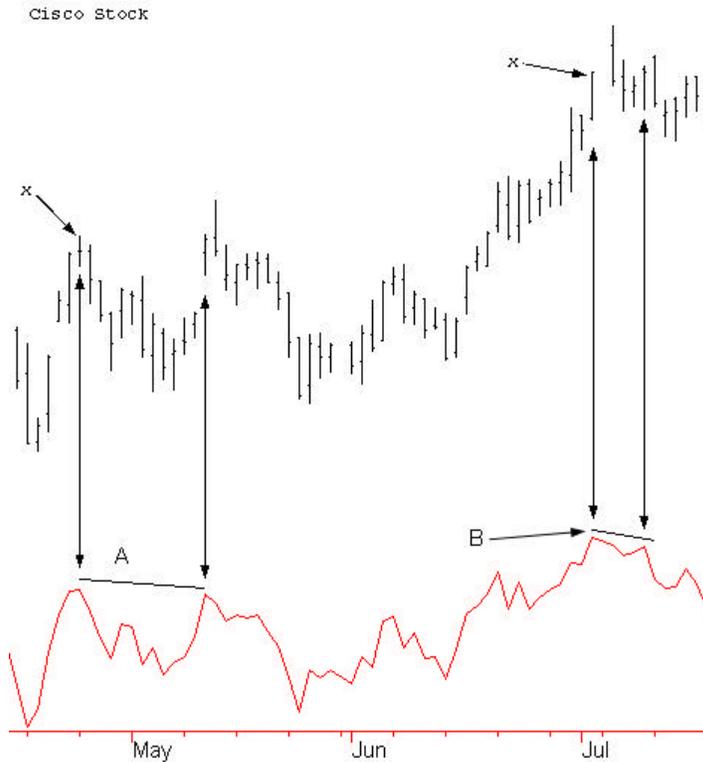
Cisco Stock

A divergence will take a certain number of days to form. The strength of a divergence is based on this period of time. Calculate the period of a divergence as follows: the above Cisco stock chart prices have been advancing into late April (A), making a high close at 'x'. The price and RSI are both making new highs (A). For the next 8 days both price and RSI drop – with the RSI or the price never going over the previous value at 'x'. Following this decline, both the price and RSI reverse then rally for four days. At the close of the fourth day of this short rally, the price is higher than it was 12 days earlier at 'x'. Yet, the RSI is under its previous peak. Consequently, we may have a 12 – day divergence during the 2nd week of May.

It is a possible divergence because to become "locked in" becoming an actual divergence the price will need to drop. It is the dropping price that will prevent the RSI value from exceeding (X), and will "hook" the RSI over (or turn the RSI value down), making the divergence real. It is important to remember that until the RSI value actually drops under its previous value, the divergence remains only a tentative divergence. Why? Because if the price continues up the RSI could exceed the (X) value – hence no divergence. Consequently, this means that we must wait one day (or one period of time) to confirm a valid divergence according to the definition.

Our next example (B) shows a 4 period divergence. The period of a divergence is important, A two to six-day divergence usually indicatives that a detour in price is more likely, than during a longer period. A longer divergence period of weeks and even months (if using daily charts), is usually less indicative that a price detour is coming. The most powerful divergence occurs during a 2 or 3 period divergence. In the overall context of RSI applications as a trading tool, the divergence signals are relative minor signals. I enjoy using divergence to detect clues in what the overall trend is. Divergence is very useful to decide where to take partial profits in a multiple contract position.
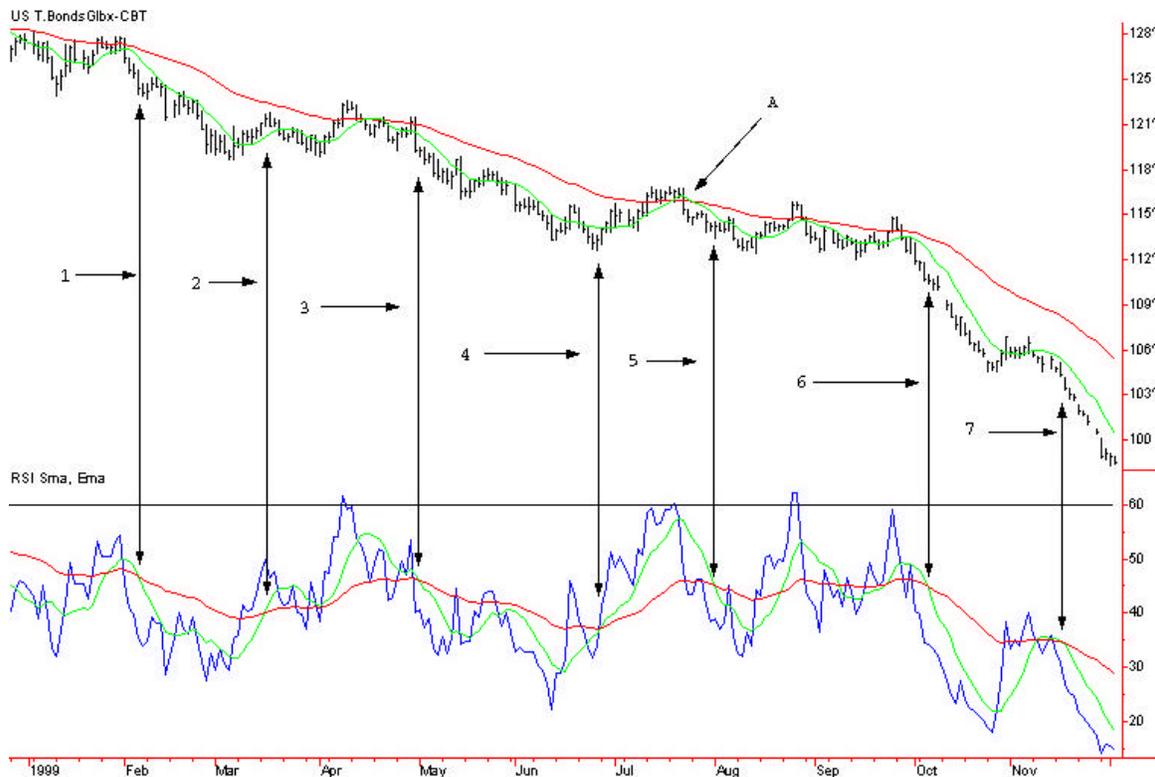
Using Moving Averages

Another tools I prefer to use to indicate trend is moving averages, the standard workhorse used by most technical traders. Moving averages are valuable, as they will remove the volatility from whatever they are calculated from. For example, calculating a moving average based on the RSI, effectively removes the volatility and gives a smoother signal. In fact, the trend can be confirmed by calculating a 9 period simple moving average and a second 45 period weighted moving average on both the RSI and price. When the:

1.   The 9 period on price is above the 45 period on price, and
       The 9 period on RSI   is above the 45 period on RSI the trend is *up*.

2.   The 9 period on price is below the 45 period on price, and
       The 9 period on RSI   is below the 45 period on RSI the trend is *down*.

3.   The 9 period on price is above the 45 period on price, and
       The 9 period on RSI   is below the 45 period on RSI the trend is *sideways to up*.

4.   The 9 period on price is below the 45 period on price, and
       The 9 period on RSI   is above the 45 period on RSI the trend is *sideways to down*.

Since the RSI is more volatile than the price, the 9 period simple moving average (SMA) on RSI will cross its respective 45 period weighted moving average (WMA) before the 9 period (SMA) on price will cross its respective 45 period moving average. I place more emphasis on the moving averages based on price than those based on RSI. Staying aware of what the moving averages are doing will help you to stay focused on the overall trend. When I am talking to another trader, I will often say that the moving average on price is positive.

This implies that the short term, 9 period SMA is, above the longer term, 45 WMA. The largest moves will frequently come when both moving averages are moving in the same direction. One more thought on moving averages. You will find the moving average 45 WMA will prove to be support or resistance on both price and RSI. For example, you will often see a bullish market retrace to its respective 45 period moving average (price and/or RSI). When this is observed it is another sign of what the trend actually is.

Here is an example of the U.S Treasury 30 year bond:

It is obvious that the trend has been down since the beginning of 1999. However, by applying the above rules we can see the following. At (1) (with the close at: 124^14), the price found resistance at the 45 period moving average (the red line). Also, notice that the 9 period moving average (the green line) on the RSI crossed under the 45 period moving average thereby resuming the <u>downtrend</u>. At point (2) (122^09) the trend changed to <u>sideways to down</u>, thus preventing us from looking for a place to get long. Instead, it forced us to look for a place to get short. This became obvious at point (3) (120^04) where the trend went back to <u>down</u>. The trend shifted back to <u>sideways to up</u> at point (4) (114^20). After the rally to (A), many traders began to believe that the price would continue higher. At (A) several things are occurring. First, the trend is now <u>up</u>, as the moving average on price, and the RSI are positive. Second, the RSI is unable to overcome the 60-resistance level. Third, the price is not able to distance itself from the 45 period moving average on price. This is indicating that the probable direction would remain down. Moreover, the following decline into early August shows that the RSI broke possible support at 40 – indicating probable lower prices. Shortly afterwards at (6) (111^03), the trend turned <u>down again.</u> Between points 5 (114^26) & 6 (111^03) the moving average went positive, and negative a couple times. However, notice that the RSI continued to respect the 60-resistance level, and the moving average on price continued to be negative. Then at point (6) (111^03) the trend resumed its <u>downward trend</u>. At point (7) (103^19) the trend briefly went to <u>sideways to down</u>; however, it was a false move. This was evident because the RSI was finding resistance at the 40 level – the fact that the 40 level acted as support in late August was also significant. Remember that in a bear market, what was support will often become resistance on a subsequent rally. This was signifying the probability of a major downward move in price.

In conclusion, what I ask myself when determining trend is:

1. What is the range? Has there been a range shift?
2. Is the market respecting former support, and resistance areas, or is the market violating them, and reversing their roles?
3. Have we broken an important trendline in the price, or RSI chart?
4. What type of divergences is present?
5. What is my moving averages showing me?

This quick checklist is how I can accurately, and quickly determine the trend. My book <u>The 21 Irrefutable Truths of Trading – A Traders Guide To Developing A Mind To Win</u> provides much more in-depth technical analysis methodologies to determine the trend, when to enter and exit a trade. There is much more that needs to be discussed. However, this short essay lays the foundation on how I determine what the trend is.

If you have any questions, or comments please feel free to send me an e-mail. My address is; jhayden@sente.net or you may visit my web site at: http://sente.net . Andrew Cardwell has a web site at: http://cardwellfg.com with more information about the RSI.

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<u>Credits</u>

I am very thankful, that my brother Joseph Hayden took the time to edit this essay. His efforts made this readable. I am thinking far faster than I can type, consequently Joseph was able to clarify some rather fundamental concepts that I failed to mention.