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Releasing the Code to the Schaff Trend Cycle
By Doug Schaff, CEO FX-Strategy.com

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Who is Doug Schaff?

Doug Schaff is the president and founder of FX-Strategy, Inc. Schaff is a pioneer in building technical forex trading tools, including automated trading systems. He brings more than 25 years forex trading experience to FXS. He has held multi-million dollar spot positions in all the major currencies and was the first person to trade a 10-year forex option.

His trading background includes stints as senior bank trader for Bankers Trust New York and Paris, and Chief dealer at Merrill Lynch Bank, where he established the Bank's currency options trading desk. As head of FX-Strategy, Inc, Schaff has been a leader in developing cutting-edge forex trading tools, including the Schaff Trend Cycle & automated trading systems on Pro Charts. He and Terry Schaff are the co-authors of "Getting Ready to Trade FX" and "The Forex Strategy Manual" now being printed in its 2nd Edition.

What is the STC?

Schaff Trend Cycle (STC) is a popular indicator commonly used to identify or confirm price direction and market turning points. It was created by Doug Schaff and is based on the assumption that currency trends accelerate and decelerate in a cyclical pattern that can reflect the dominant price cycle of any currency in any timeframe.
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Schaff created the STC after trying to resolve the discrepancies that he observed between two widely used methods of determining trend:

- Moving Average Convergence and Divergence (MACD), the movement of two moving averages away from and towards each other.
- Price Cycles, the direction of the dominant price cycle as shown by various Smoothed Stochastics.

The STC is created by running a MACD Line (the difference between two exponential moving averages) through a Double Smoothed Stochastic algorithm. The resulting oscillator combines the benefits of trend and momentum indicators. In trending markets it moves between 0 and 100, rising when an uptrend is accelerating and falling when a downtrend is accelerating.

In sideways markets the STC is used as a range-trading indicator and can be interpreted similarly to standard oscillators. That is, the STC can signal oversold conditions when it turns up from below the 25-Line, and overbought conditions when it turns down from above the 75-Line.

Why is the STC important?

The STC has several benefits compared to its component indicators. It produces less whipsaw and fewer false signals than the MACD or Price Cycle oscillators. By combining the two, Schaff created an indicator that is more accurate and more adaptive than either original indicator is by itself.

The STC usually turns up or down earlier than the MACD crossover, highlighting prospective trend changes sooner. In sideways markets, the STC generally travels in a clear path from under 25 to over 75, making it easier to interpret than the MACD which has no maximum or minimum values.

The STC is an improvement compared to Cycle Oscillators which can give out wrong signals when the dominant cycle changes in length. In a strongly uptrending market, for instance, a 20-bar Cycle can be absorbed and practically disappear into the longer rise to the top of a

40-bar Cycle. At those times a Cycle Oscillator set to the 20-bar cycle can give false signals, turning down in an accelerating bull market or rising into a rapidly declining bear market.

The STC adapts when the dominant cycle lengthens or shortens, and so often it identifies cycle tops and bottoms more accurately than fixed or multiple-length oscillators. In strong rising markets the STC moves up to its ceiling of 100 and can stay there, reflecting an extended bullish move, until the trend slows and prices begin a sideways or downwards retracement after the longer cycle peaks. Likewise, in strong bear markets the STC usually falls quickly to 0 and can remain there until trend slows and prices drop, confirming that a longer price cycle low has occurred.

TA Principles that the STC is based on
The first step to making a currency trading decision is to identify a market trend. The earlier you can confirm a trend the better. Traders are constantly looking for a better way to do this, a better trend indicator, one that identifies trend faster, *without giving up accuracy*. This tradeoff between speed and reliability is a continual challenge for analysts.

The history of technical analysis is driven by analysts, traders and other trying to develop theories, indicators and patterns in order to more promptly and accurately predict the direction of market prices.   Computers and programmers make it easier these days to create and test out new ideas, but it all is built on the work of past analysts and traders.

The Schaff Trend Cycle combines tested technical analysis principles that underlie the MACD, Stochastics and Time Cycles, three well known technical indicators (and three of my favorites). I wanted to build upon past successful innovation and, hopefully, to improve upon them.

Each of these indicators is discussed further on in the article and how each is used in the STC is presented.

Why release the STC Code now?
I'm definitely ready to do it. Over the years that I worked with and applied the STC in my trading, I also was training currency traders. And I found that I learned something valuable from each one, "tweaks" to an input or new ideas on how to apply it that helped my trading. At this point I want to see what other traders can do with it. I look forward to seeing how traders will use and adapt the STC.

I have included, below, some of my personal development as a forex trader, in the form of "frequently asked questions" from trading students and then answers. At a minimum you may better understand what stubbornly motivated me to keep trying to resolve the disagreements between two of my favorite technical indicators. Better yet, I hope that some essential financial principles may come through for you and that it will help you succeed more often and accumulate more profit so that you can accomplish your trading goals.

Personal
Q. How did you get interested in trading?
I have been fascinated with trading and investing for as long as I can remember. My Dad gave me three shares of Kellogg's stock when I was 11. He and I talked a lot about

markets when I was growing up, and eventually I'd go with him to annual meetings on everything from oil drilling ventures to hedge fund investments.

Growing up near Chicago had a subtle influence. One of my schoolmates' parents worked in the corn pit at the Chicago Board of Trade. Others managed money. Over the years I have become more impressed at how savvy and entrepreneurial the Chicago financial community is.

Q. What interested you to get into currency trading, specifically?
By the time I went to Northwestern University I knew I wanted something international. I had some fascinating work experience and travel in Europe and Asia. One of my best friends was Japanese and the other was Russian.
After college I worked on the Chicago Board of Options Exchange (CBOE) while getting my MBA at night at the University of Chicago. By the way, regarding my time as a phone clerk on the CBOE, I learned two things about my interests: 1) I definitely wanted to be a trader and 2) I definitely did not want to trade on the floor of an exchange. Of course that eventually made me suited for interbank trading, which I learned about in a course on International Finance.

A "famous" professor was teaching it but frankly it started out quite boring. Then we got to the section on currency exchange rates, and my interested perked up. I had never heard of the Interbank Foreign Exchange Market and could not believe how huge it was. The world of interbank trading sounded intriguing. It suited my interest to trade and be in an international business.

Graduation approached and I was interviewing with corporations. I chose Bankers Trust Company, New York[1]. They were the only bank that said if I did well in their training program, and if the Foreign Exchange program needed somebody, that they would let me interview for the job.

Fortunately it worked out and I did get a job on Bankers Trust's FX Dealing Desk. The environment was more relaxed than elsewhere in the bank and I liked that right away. You had to wear a suit jacket to work but no one wore them at the trading desk. Everyone was down-to-earth compared to the rest of the bank. It turns out most of the traders had come from the bank's back office, where they had learned practical skills, like sorting out wire transfers that had gone wrong. That came in handy because interbank trading requires lots of wires transfers, and the former bank office clerks, turned forex traders, could quickly sort that sort of thing out.

In the dealing room I never mentioned I had an MBA. There were two reasons for that: 1) the best FX traders there, including the Chief Trader, had not attended college, and b) business school had not taught me anything that would help me succeed in this world.

Q. Did you trade right away?
No, it doesn't work like that. I started out as a general assistant in the trading room and work up to being a Senior Trader and working in the bank's Paris office. Here how it went for me.

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[1] Note: In November 1998, Deutsche Bank agreed to buy Bankers Trust for $9.8 billion; the purchase was finalized on June 4, 1999.

Assistant: Doing whatever I was asked, from something as sedate as putting together a comprehensive list of each country's bank holidays, to (eventually) working several clacking telex machines during hectic times, shouting for a Dollar-Swiss quote being requested from one machine and madly typing a price on Saudi Riyals onto another.

Trader's Clerk: I sat next to the Chief Trader and "kept his blotter," which means I had to correctly write down the details of every trade he did, including what bank or customer was on the other side. I had to know and be able to tell him his position any time he asked. At the end of the day I checked all the trades out with the counterparties or the back office, to make sure the details were correct.

Junior Trader: In addition to the Dollar-Mark, the Chief Trader was in charge of making prices for the Dutch Guilder, which was closely tied to the German Mark. Under his guidance I became because the Dollar-Guilder trader. My first positions were taken in the Guilder. My position limit was $500,000.

Senior Trader: One day I was asked to assist the Trader in charge of the Dollar-Yen (USDJPY) and Dollar-Canada (USDCAD). Believe it or not the Dollar-Yen was only then becoming a hotly traded currency in the late 1970's. At the time the bank had more customer trading volume in the Canadian Dollar and so I initially became the Junior Trader for USDCAD.

USDJPY trading really took off to the point where the trader watching over me had to give up the Canadian Dollar. That's when I became a "Senior Trader". I enjoyed it a lot, including starting and running currency futures versus interbank arbitrage in the Canadian.

I stayed on the Canadian for a year or two and then I was asked to trade the British Pound. That was a big step for me as the Pound always had a lot of volume and volatility. I'll never forget the day when the Global Head of Foreign Exchange, who is Swiss, sat next to me and started chatting about regular things; who was buying and selling and where the pound might go. Then he said, "Why not sell 5 million pounds here." I looked at him to double check. He encouraged me and so I did. That day we built up a larger position than I'd ever had. Later after I calmed down I realized he was wanting to help me get comfortable with larger positions.

Interbank traders often have to specialize in one currency pair at a time. If you stay around a dealing room long enough, though, you get to sub for other traders when they are on vacation, for example. By the time I left the bank I had traded all the major currencies.

Q. Did you work at any other banks?
I worked as Chief Trader at Merrill Lynch Bank. I also started the currency options desk there.

Q. When did you start trading on your own?
1987

Q. Why did you go out on you own?
Fortunately I could afford to. I'd had success as a bank forex and currency options trader. And I'd received generous performance-based bonuses. By the time I left Wall Street I had confidence in my abilities and wanted the opportunity to trade on my own.

Q. What differences did you find trading on your own compared to trading in a bank?

That is an excellent question. The best way to understand the difference is to know what I did not have. Then you will see what I needed to learn in order to replace that.

<u>Information</u>
You pick up a lot of information just sitting in a bank dealing room, from what economic events are coming out and what the bank's economist thinks about them, to customers and banks are buying and selling.

After working with the same traders for years, you pick up a lot of by just by being there. You know their moods. You can tell what their position they have whether they are making or losing money by their tone of voice.

<u>Taking Positions</u>
After I traded the British Pound for the bank I never trouble taking on risk. Fine-tuning when to get into the market was another matter. At the bank we mostly took short-term positions based on the flow of trading volume that we saw or heard about. There was a method of sorts to doing it but basically it was informed instinct.

That's what eventually drove me to learn technical analysis, to be able to make informed trading decisions.

I went through all the various stages, relying on fundamental analysis, getting completely fascinated with an indicator and then becoming frustrated that it would not do everything right at all times.

Eventually I used combinations of indicators, developed trading signals, systems and backtested them. But I had a lot to learn first. In between that my charts got awfully messy and I came to the point of simplifying.

<u>At the Bank, Risk Control was Built-in</u>
Back to the bank, and with no disrespect to Societe Generale or Jerome Kerviel, when I traded at the bank there was a hierarchy of bosses checking on me. There was no way to be over my limit without somebody finding out relatively quickly.

Risk control is key. Believe it or not, on my own I needed to learn about placing stop losses. Position sizing came much later, and is very important.

<u>Understudy to an Analyst</u>
Towards the mid-1990's I realized that I wanted to really sharpen my analytic skills, so I looked for a mentor who whose indicators and style I connected with. I read market commentaries by about 20 different market analysts, and I was drawn to Walter Bressert's cycle analysis work.

How the STC improves on previous indicators
The Schaff Trend Cycle utilizes the following technical analysis tools and concepts found in the MACD, Stochastics and Time Cycles. These are more fully explored below.

MACD (Moving Average Convergence Divergence)
Characteristic: Trend Direction

Parameters:
First EMA input, 23, controls the measurement for the short average.
Second EMA input, 50, controls the measurement for the long average.
Signal EMA input, 9, controls the measurement for the signal average.

Plots:
MACD, the MACD line[2].
MACD Signal, the signal line for MACD.
MACD Histogram, the spread between the MACD and Signal lines.

The MACD indicator was developed by Gerald Appel and is simply a method of identifying the potential for two exponential moving averages to cross. MACD is calculated using a short length and a long length exponential moving averages (such as 23 and 50) and calculating the difference between these two averages. In other words, it is the spread between the two averages.

The MACD signal line is derived by calculating an exponential moving average of the MACD. This is plotted as the MACD signal. Finally, the difference between the MACD and the MACD signal is calculated and plotted in the histogram.

The MACD is often used as a trend following indicator, and may be interpreted similarly to other moving averages. That is, when the MACD crosses above the MACD Signal, an uptrend may be beginning, indicating a buy signal. Similarly, when the MACD crosses below the MACD Signal, a downtrend may be beginning.

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[2] In this article, when we use the term, "MACD", we will be referring to the MACD Line unless otherwise stated. The MACD Line is the difference between two exponential moving averages.

Point A displays an example of how the MACD can rise even though for a while both averages are declining. That is because the spread between the averages is narrowing. A similar event occurs at point B where it can be seen that the MACD is diverging against price while both averages are pointing lower.

Note at point C how the MACD Histogram is displaying a slowing of the rise in the spread between MACD and Signal and on a break of the trend line price reverses lower.
Finally, Point D gives another example of a bullish divergence between MACD and price.

Potential Problems/Pitfalls:
It must be noted that while MACD is often used as a trending indicator, when price direction slows it will result in the spread between the two exponential moving averages reducing, thus causing the MACD line to decline in the case of an uptrend or rise in the case of a down trend. This will cause losses if MACD is utilized for crossovers of MACD line across the Signal line.

An interesting way to compare the MACD and STC is to copy them over the pricebars. That is how they are drawn in the 1-hour EURGBP chart below. That way you can more clearly see the pricebar when the gold STC indicator turned up and the one when the STC turned down, both highlighted in purple.

Buying at the close of the first highlighted bar and selling when it turns down at the close of the second one would result in a tiny loss on a long trade, but the short trade taken is looking good at the moment.

Meanwhile, the MACD is having troubles. After a small whipsaw circled in brown, the green MACD Line crosses above the black Signal line on the same bar as the STC turns up. But then the market falls so fast that the MACD Line cannot catch up with the black Signal line to go square on the long crossover trade and get short.

How is the MACD used in the STC indicator?

The STC is calculated or run on a MACD Line. Where a standard indicator uses price, the STC uses the MACD. Therefore you could say that the Schaff trend cycle is an indicator run on another indicator. The STC is an indicator study of the MACD.

Fast Stochastics

Characteristic: Momentum

Parameters:
%K Period input, 10, controls the measurement period for the %FastK line ('FastK')
%D Period input, 10, controls the measurement period for the %FastD line ('FastD')

Plots: FastK, FastD

Stochastics were developed by George Lane in the 1950's and are based on the observation that as price rises the close of the bar will tend to be towards the high of the recent range. Equally, as price declines, the close of the bar will tend to be towards the low of the recent range. It is often used to confirm price movement or identify turning points in price.

The high and low of the number of periods requested by the input parameter is taken to establish a range, and the current price is then compared to this range and expressed as a percentage. The resulting calculation is %FastK or FastK.

A type of smoothed average of %FastK, called %FastD or FastD, is also calculated. FastK and FastD are plotted as oscillators with values from 0 to 100. The direction of the Stochastics reflects or confirms recent price movement, i.e. Rising prices confirm rising Stochastics and the potential for further moves in that direction.

Potential Problems / Pitfalls that the STC addresses:
As can be seen from the chart displayed, Fast Stochastics produce a very choppy FastK line with an equally choppy FastD line. The general usage of Stochastics is as an overbought and oversold indicator in consolidating markets. It can be seen that the trending markets, Fast Stochastics can produce many extremes <u>where price continues in the direction of the extreme</u>. Thus, this indicator should not be used by itself to enter the market.

Take a look at the next chart. Instead of the choppy Fast Stochastic, the STC is drawn in the lower chart panel and experiences none of the Fast Stochastic's whipsaws and false signals.

When the STC turns down in early January, it catches a good profit to the downside. The upturn in February is followed by consolidation. A long trade taken then would result in a small loss, followed by quite a good sell trade initiated after the STC turned down in Mid-February.

How are Stochastics used in the STC indicator?
The STC uses a Fast Stochastics formula that includes the original %FastK and a smoothed variation of the %FastD. The STC runs that reworked stochastic <u>twice</u>, as follows:

1st STC Stochastic:
  ▪ Original %FastK formula is run on a MACD ("Frac1" for "Fraction 1" in the formula).
  ▪ The %FastK is run through a smoothed variation of the original Percent FastD.
  ▪ Result: A %FastD of the MACD.
  ▪ This %FastD (which is called "PF" in the formula), becomes the input for the next Stochastic.

2nd STC Stochastic:
  ▪ Original %FastK formula is run on PF, the %FastD result from the 1st STC Stochastic.
  ▪ This 2nd %FastK is run through the smoothed variation of the original Percent FastD.

- Result: A %FastD of the %FastD from the first Stochastic.
- This 2nd %FastD (which is called "PFF" in the STC formula) is the STC output value that gets plotted on the chart.

Time Cycles

From the moon's orbit around the earth to predictable patterns of molecules, cycles are around us and affect our lives and world. Birds migrate and bears hibernate because the seasons have been so regular for so long that the knowledge is hard-wired in. "It'll happen again so we better head south." Knowledge of cycles allows for accurate predictions. Knowing when the sun will rise and set may not seem like a prediction, at first, because we associate prediction with uncertainty and risk, but it is a prediction of future events that is highly accurate.

This would all be academic if currency markets did not have regular repeating cycles that affect price movement. However, research on historical prices show individual cycle profiles. I wrote several articles on currency cycles with Walter Bressert, a man John Murphy says is "one of the two leading experts in the application of cycles" to futures markets.[3] The Chicago Mercantile Exchange (CME) asked us before the Euro launched on January 1, 1999, to write an article forecasting the Euro's longer term cycles.[4]

Cycle length is typically measured from one cycle low to the next cycle low. It turns out that most currencies have 10-day, 20 and 40-day cycles. And there are weekly and monthly cycles. The goal is to use the direction of the "dominant cycle" that affects the chart timeframe you trade.

How reliable are time cycles in currency markets? Currency time cycles are reliable enough to integrate into the technical analysis you use, but not reliable enough to use by themselves. (For a good example of what I mean, see FX-Strategy's Pro Commentary Long Term Reports. They are free and the author, Ian Copsey, often incorporates cycles into his overall forecasts.) In my experience time cycles are useful on longer-term charts, down to the 4-hour chart, but unreliable at shorter timeframes.

Walter Bressert developed the use of Stochastics to analyze time cycles. His popular "Double Stochastic" indicator remains proprietary but is available for use on several popular chart platforms[5]. And in recent years there have been articles on Double Smoothed Stochastics which may be similar. Bressert uses the "Double Stoch," as it is nicknamed, along with other cycle analysis tools to identify and confirm cycle highs and cycle lows, and to help identify turning points in the market.

I used Bressert's indicators to put out a daily commentary from the late 1990's. I became very familiar with it, in my trading, and especially from authoring the daily commentary for a number of years. The Double Stochastic indicator uses a single parameter, a length input, which gets set for half the length of the cycle to be analyzed. The default is 10 periods which tracks the 20-bar cycle. The assumption is that cycle highs will occur at or near

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[3] "Technical Analysis of the Futures Markets," by John J. Murphy, New York Institute of Finance, 1986, p. 450

[4] "The Challenge of Analyzing the Euro," by Walter Bressert and Doug Schaff, published by the Chicago Mercantile Exchange

[5] See www.walterbressert.com for more information.

swing highs[6], near which time the Double Stochastic will turn down from about 80 to confirm them. Price will then tend to decline into the next cycle low, at a swing low that gets confirmed by the indicator turning up below 20.

With apologies to Walter Bressert, below is a daily USDCHF chart with a rough approximation of a double smoothed stochastic oscillator in blue, in the lower chart panel. A red 23-day EMA and a blue 50-day EMA are drawn across price and show a downtrend. The red EMA moves faster than the blue EMA and when it is below the blue EMA and both are falling, trend is down.

During a downtrend we want to look for high-probability sell opportunities. The blue stochastic works nicely during the cycle A, B and C. It turns down above 80 just one bar after the cycle high, providing good risk/reward chances to sell into the downtrend. However, during cycle D the indicator wiggles a bit and takes longer to travel to above the 80 line. Remember the indicator on the chart is one I made for the example and is not the Double Stochastic.

Potential Problems / Pitfalls addressed by the STC:

The above chart shows that cycle highs and lows are not exact. No cycle in any market is. At times they arrive like clockwork. But a cycle can arrive late or merge entirely into a larger length cycle. Therefore, time cycles should be used along with confirming indicators.

 The gold STC indicator is added to the above chart below and placed in the same panel as the blue Smoothed Stochastic. At points A and B the blue indicator turns down but price does not follow lower. Using that oscillator by itself would have resulted in two losing trades.

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[6] Click here for an introduction to Swing Highs and Lows.

The STC indicator is bullish at points A and B and so avoids this problem. One idea is to use the STC indicator as a filter for turns in the blue Stochastic. That would eliminate the losses at A and B.

In fact, a long trade could be taken when the stochastic turns up after the bar after it bottoms above the red x, and heads towards the STC which is still at 100, showing the uptrend is still in tact. Using this logic you would take profit on the long trade after the blue Stochastic turns down at C, and so on.

The Code for the Schaff Trend Cycle

The code for the STC indicator and function are below, in TradeStation EasyLanguage format.
Comments to the code are written in light green.

```
{**************************************************************
Description    : This Indicator plots the Schaff Trend Cycle
Provided By   : FX-Strategy, Inc. (c) Copyright 1999
**************************************************************}

Inputs: TCLen(10), MA1(23), MA2(50);

plot1(_SchaffTC(TCLen,MA1,MA2),"Schaff_TLC");
plot2(25);
plot3(75);


{**************************************************************
Description    : This is the Schaff Trend Cycle function
Provided By   : FX-Strategy.com (c) Copyright 1999
**************************************************************}
```

Inputs: TCLen(NumericSimple), MA1(NumericSimple), MA2(NumericSimple);
Variables: XMac(0), Frac1(0), PF(0), PFF(0), Frac2(0), Factor(.5);

{Calculate a MACD Line}
XMac = MACD(c,MA1,MA2) ;

{1st Stochastic: Calculate Stochastic of a MACD}
Value1 = Lowest(XMac, TCLen);
Value2 = Highest(XMac, TCLen) - Value1;

{%FastK of MACD}
Frac1 = IFF(Value2 > 0, ((XMac - Value1) / Value2) * 100, Frac1[1]);

{Smoothed calculation for %FastD of MACD}
PF = IFF(CurrentBar<=1, Frac1, PF[1] + (Factor * (Frac1 - PF[1])));

{2nd Stochastic: Calculate Stochastic of Smoothed Percent FastD, 'PF', above.}
Value3 = Lowest(PF, TCLen);
Value4 = Highest(PF, TCLen) - Value3;

{%FastK of PF}
Frac2 = IFF(Value4 > 0, ((PF - Value3) / Value4) * 100, Frac2[1]);

{Smoothed calculation for %FastD of PF}
PFF = IFF(CurrentBar<=1, Frac2, PFF[1] + (Factor * (Frac2 - PFF[1])));

{The STC function is the %FastD of PF}
 _SchaffTC= PFF;

Application of the Schaff Trend Cycle

I use the STC to find trends, and specifically the cycles within trends. The peaks and troughs within these "trend cycles" can help identify trends, and pinpoint low-risk trading opportunities -- buying within uptrends, and selling within downtrends. The STC is also a useful overbought / oversold indicator in sideways markets.

Chart 1 – GBP/USD Six Hour Chart
The Schaff Trend Cycle Indicator identifies trend cycle highs and lows.

Tracking Trend Cycles with Moving Averages
Many analysts use two exponential moving averages (EMA's) together to identify trends.[7]
Ideally the longer EMA mirrors a currency's trend, and the shorter average follows the
intermediate or minor retracements within the trend.

Trend action in the Australian dollar chart shown below is tracked using EMA lines. When
the faster yellow EMA line is above the slower green EMA line, and both are rising, an
uptrend is taking place.

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[7] This is similar to the MACD, but looks at both EMA lines, rather than at their difference.

Chart 3 — AUD/USD 1 Hour Chart
This chart shows 23-period and 50-period EMA lines (yellow and green, respectively).

Notice how the distance between the two EMA lines contracts and expands in a wave-like motion. That movement shows what I refer to as a trend cycle. When the faster yellow line pulls up and away from the rising green line, the trend cycle is rising. When the distance between the two EMA lines narrows, the trend cycle is narrowing.

Schaff Trend Cycle Inputs
The Schaff Trend Cycle indicator uses three inputs:

1. TC Period: Set at half the estimated time cycle length.
2. MA1 Period: Shorter-term Exponential Moving Average.
3. MA2 Period: Longer-term Exponential Moving Average.

The default inputs are set at 23 and 50 for the EMA lengths. But traders can choose their own MA period inputs, based on the moving averages that they prefer to follow.
The Schaff Trend Cycle works well with the default inputs in most timeframes. But I also vary them. I sometimes use smaller EMA length inputs for longer timeframes. With weekly charts I might try 12 and 26, or 7 and 13.

For shorter-term charts, I tend to increase the EMA lengths. For example, on a 10-minute Aussie Dollar chart, I have experimented with using 115 and 240 for EMA lengths.

The "TC Period" uses half the estimated length of a currency's standard time cycle. Most currencies exhibit a 17-22 period recurring cycle (called the 20-bar cycle). The default TC length is therefore 10, or about half the length of a time cycle that regularly occurs in most

currencies and timeframes. Traders can vary this input to study shorter or longer cycles, or to speed up or slow down the STC indicator. A shorter TC Period, such as 5, will produce more oscillator turns. A longer TC Period will produce fewer, but perhaps more accurate turns.

Finding Trend Cycle Lows in an Uptrend
The movement of trend cycles is often mirrored in currency prices. In an uptrend, when the Schaff Trend Cycle Indicator is rising, prices tend to stabilize or follow the cycle higher. Similarly in a downtrend, when the STC is falling, prices follow the cycle down.

In the chart Chart 3, Aussie prices were sharply rising. The ideal time to buy into this uptrend is after a trend cycle bottoms out, after a pause or retracement in the uptrend had ends. That can be hard to determine or see, though, using EMA lines alone (see Chart 3). But look what happens when we add the Schaff Trend Cycle indicator (see Chart 4).

Chart 4— AUD/USD 1 Hour Chart
The yellow Schaff Trend Cycle Indicator is shown in the lower chart panel.

The yellow STC oscillator highlights trend cycle bottoms and tops.

The first Trend Cycle Low occurs where the Schaff Trend Cycle indicator (STC) turns up from below the 25-line. The trend cycle continues to rise until the STC turns down from above the 75-line. From there, the trend cycle declines to the second Trend Cycle Low.

Notice how the Aussie prices move sideways as the trend cycle moves from the Trend Cycle High to the second Trend Cycle Low. This is consistent with what typically occurs during a consolidation within an uptrend. The market pauses, and then, takes off again, near the second Trend Cycle Low, along with the beginning of a new trend cycle.

If the place to buy into an uptrend is after a trend cycle has bottomed, then we need to clearly see the price bar associated with the STC turn. To find this entry point we can add the Schaff TC Trigger to the price chart.
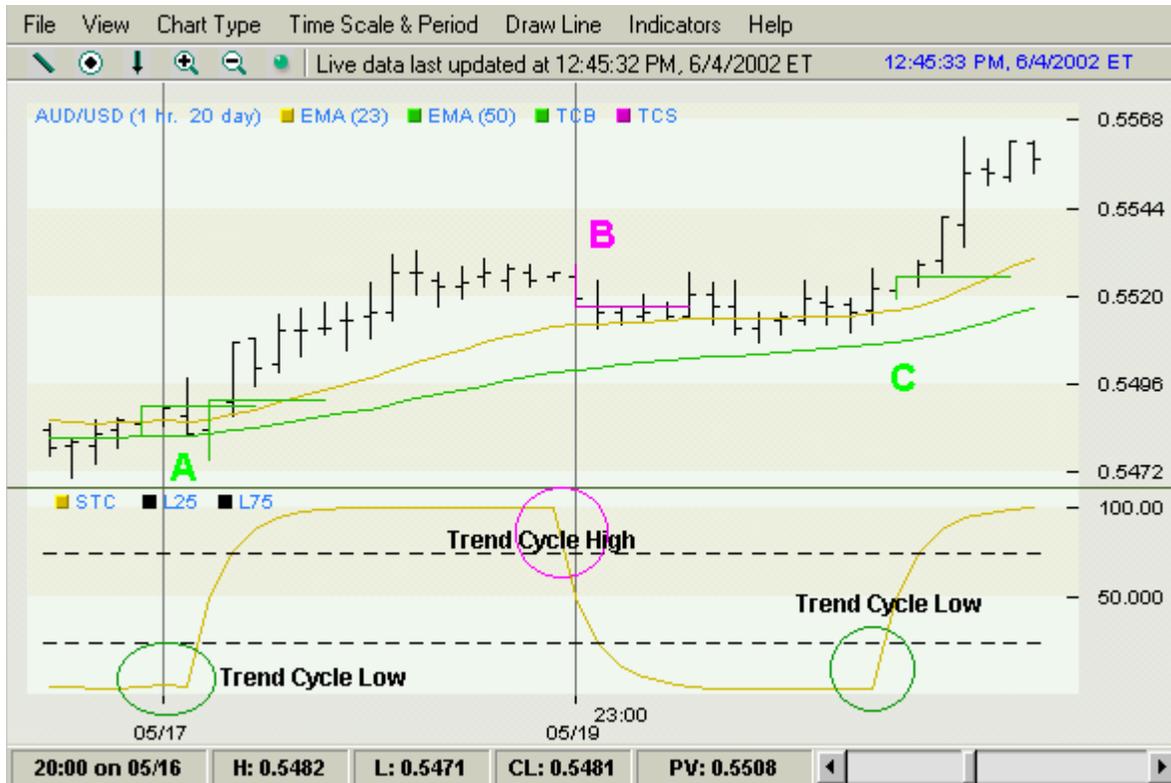
Chart 5– AUD/USD 1 Hour Chart
The green and magenta Schaff TC Trigger bars show potential buy and sell points within an uptrend.

Using the Schaff TC Trigger

The Schaff TC Trigger provides a setup and trigger approach to create automatic trade entry and exit signals, based on the Schaff Trend Cycle Indicator (STC).

In the chart above, buy signals are constructed in a three-step process.

- The yellow Schaff Trend Cycle indicator drops below a buy line.
- The STC turns up. The price bar above it is colored green and is called a setup bar.
- A high of the setup bar is exceeded or "triggered"[8] initiates a long position.

The same process, in reverse is used to create short signals.

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[8] Traders can employ various trigger rules. For shorter intraday timeframes I require that a market close above a buy setup bar in order to consider it "triggered". For a sell setup bar, I require that a market close below it to consider it "triggered". Another variation is to require that the market trade a certain number of points above a buy setup (or below a sell setup bar) in order to consider the setup bar triggered.

- The Schaff Trend Cycle indicator rises above the sell line.
- The STC turns down. The price bar below it is colored magenta and is called a setup bar.
- A low of the setup bar is exceeded or "triggered"[5] initiates a short position.

In Chart 5, the green STC Trigger at **A** is a buy setup bar in an uptrend and, if triggered, can be used to go long. An end of this trend cycle occurs at the magenta TC Trigger at **B**. This is a sell setup bar in an uptrend, which can be used to take profit on a long position. The green STC trigger bar at **C** shows another low-risk buy point within the uptrend.

Finding Sell Entry Points in a Downtrend

Chart 6 – USD/CHF 4-Hour Chart
The green and magenta Schaff TC Trigger bars show potential buy and sell points in a downtrend.

The Schaff TC Trigger highlights two trend cycles in the 4-hour Dollar-Swiss chart. The first green buy setup bar triggered at **A** and prices rose over 200 points. The magenta sell setup bar triggered at **B**, and prices fell nearly 300 points. The trend cycle is complete when green buy setup bar is triggered at **C**, and a new trend cycle begins. Although the market did not close above the green buy setup bar, at **E**, it traded sufficiently above it so that most traders would have covered a short position, if they had not done so already. And so the trend cycle low was marked at **E**.

Note how the two green setup bars, before Point **C**, did not trigger. This illustrates how the "setup and trigger" method, that we use to enter trades, can save you money. In the first case, the market barely exceeded the buy setup bar. In neither case did it close above.

This allowed traders to maintain short positions (or refrain from buying) for another 100+ points.

Confirming the STC
The most consistently profitable trades occur in the direction of trend. Therefore the STC can be an effective method of entering into strongly trending currency markets.

It is recommended that traders consider other indicators and/or price patterns to confirm the STC. Depending on traders' styles and preferences, the STC can be used as a timing indicator in conjunction with other trend identification tools, such as a MACD or double-EMA measure, to buy into uptrends and sell into downtrends.

In particular, a structured approach to using the STC in multiple timeframes gives a powerful context within which to make currency trading decisions.

I look forward to being a part of the forum for the STC on FXstreet.