

The wide-range vertical horizontal filter identifies trending and ranging phases of the market. The indicator works in both short-term and long-term analysis.

Here's how to calculate it.

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Going wide with VHF indicator

BY DAVID SEPIASHVILI

Some traders think of markets as being in either an uptrend or a downtrend. However, a security's price can move in three directions — up, down or sideways. The sideways direction is not less important than up or down movement, as prices spend a large share of their time in a flat pattern.

Consider the results of these studies. Through the past 20 years, the S&P 500 and the Dow Jones Industrial Index have spent about 33% of their time in 10% ranges. More than half the time, they trade in 20% ranges, during a period of one month or more.

It is usually in these sideways phases that the market can cause a lot of frustration for the trader, and those who use trend indicators can suffer a lot of losses, getting whipsawed and losing money on both sides of a price swing. Conversely, momentum indicators, which work well in ranging markets, produce a lot of false trading signals during trending markets. Here is an indicator that will show you how to profit more consistently in these conditions.

VHF DEFINED

The Vertical Horizontal Filter (VHF), which is discussed in this article, determines whether prices are in a trending phase or a congestion phase. The VHF was introduced by Adam White in the August 1991 issue in the article "Tuning into trendiness with VHF indicator." In the author's original description, the VHF is used for "measuring how tightly prices are 'folded into a box.'"

CLASSIC VHF

The Vertical Horizontal Filter (VHF) indicates the degree of trend. Unfortunately, it only works with a certain time frame, specifically with a 28-day period. It therefore cannot fit all practical needs.

As observations show, not only trending zones, but ranging phases also are mainly specific to intermediate and long-term cycles of price movement. Besides, the indicator assumes a qualitative approach to the estimation of trendiness: the higher the VHF, the higher the degree of trending. VHF values above or below certain levels indicate the degree of trending. The truth is that these "certain levels" are

not specified either by the indicator's developers or by its proponents, especially for windows other than the conventional 28-day period.

Establishing a trending/non-trending benchmark is tricky. It varies from one time frame to another and it also depends on volatility, leaving a lot of room for subjectivity. Defining a benchmark remains a broad and indefinite notion and is often left to the judgment of the users. As a result, errors in application often occur. We can solve this problem with a more modern approach to the indicator that provides an objective interpretation:

- The magnitude of the VHF shows the degree of trending.

• The direction of the indicator is also important. A rising curve indicates a developing trend. A falling curve indicates that the prices may be entering a ranging phase.

• The VHF can be used as a contrarian indicator. Its high values precede the end of a trend. Its low values precede the start of a trend.

BENCHMARKING

To overcome the interpretation problem, the indicator needs a quantitative estimation of trendiness and a method of establishing a strict demarcation line between trending and ranging phases. The method would need to be the same regardless of market phase or time frame observed.

To design such an indicator, we will need to determine its benchmark level and adjust it to the period of time that fits the price cycle of our choice. But while it sounds simple, this is a difficult thing to obtain in objective fashion. Our solution lies in the specifics of price movement in different time terms.

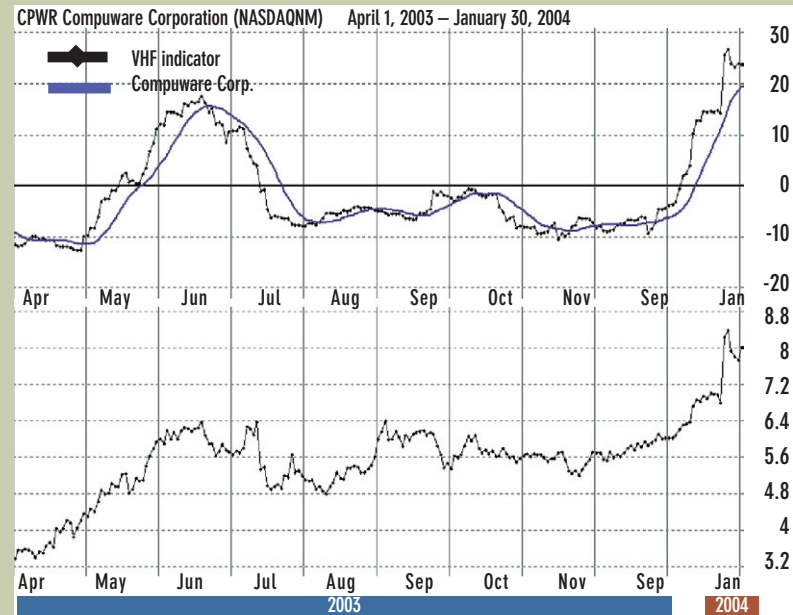
Our theoretical study of the problem of price unfolding over time and its cyclical behavior point us to a dissipation factor in the cyclical movement of price. To do this, we will introduce a "tuning parameter" into the original VHF indicator. The parameter accounts for a price dissipation rate when determining and adjusting trending/non-trending benchmarks for various periods.

Including this factor solves the problem of benchmarking — it lets us draw a demarcation line between trending and non-trending zones and make the indicator applicable to whatever time frame we want. Here is how the turning factor $B(n)$ relates to inputs of the VHF indicator, given a moderate level of volatility:

n	12	25	50
100			
B(n)	0.45	0.37	0.26
0.17			

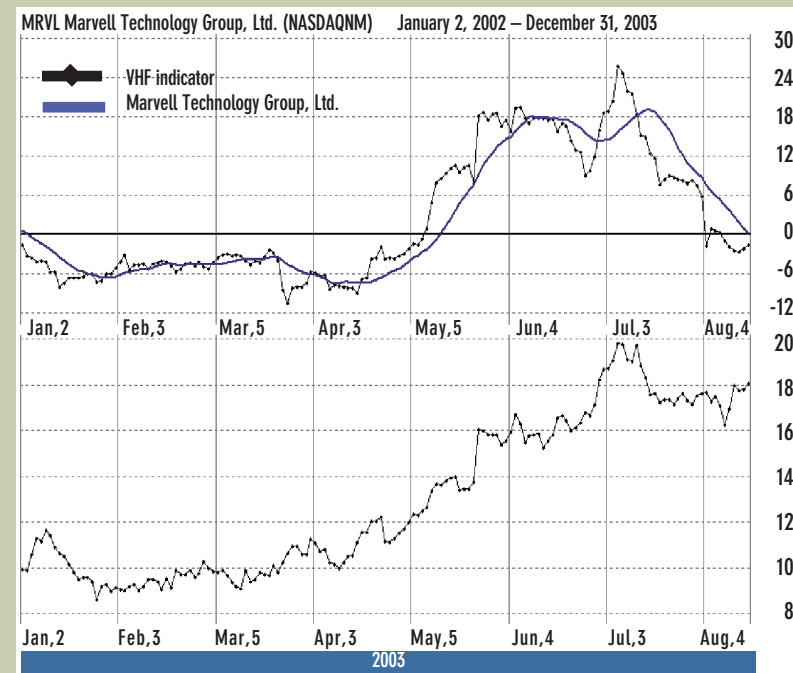
TRENDING/NON-TRENDING ALTERNATIVE

You can see how accurately the midterm wide-range VHF indicator tracks trending and non-trending periods of Compuware Corp.



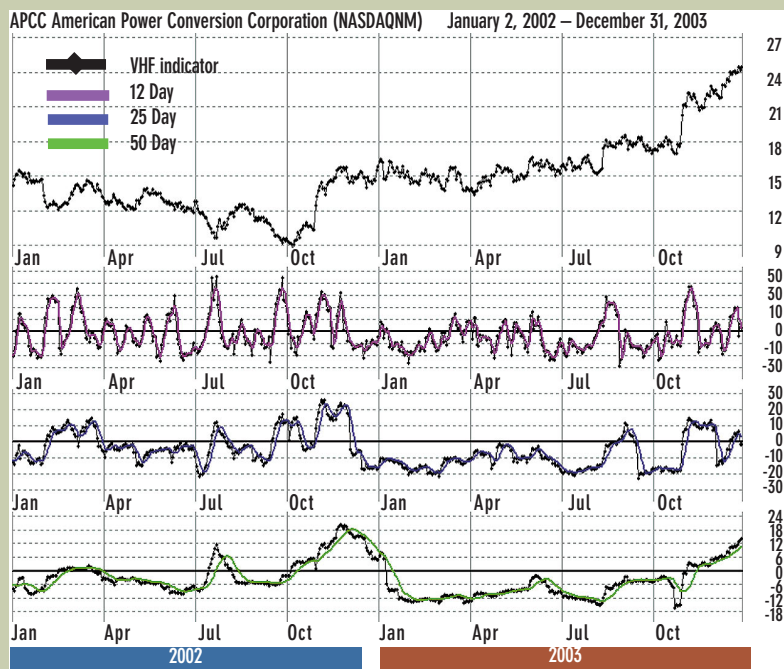
CHANGING DIRECTION

A directional divergence between the midterm W-VHF indicator and price movement signals an upcoming reversal in upward trend of Marvell Technology Group Ltd.



MULTI-FRAME ANALYSIS

The three W-VHF indicators of 12-day, 25-day and 50-day periods complement each other by demonstrating their inherent advantages in multi-frame representation of American Power Conversion Corp.'s technical condition.



Source: Alticom, Inc.

As the data show, the widening of the VHF application area requires significant changes in the turning factor. We will use these factors in the W-VHF formula.

CALCULATING W-VHF

The calculation of the wide-range VHF (W-VHF) is based on the classic VHF. The transition from the classic VHF to wide-range VHF is carried out by formula:

$$\begin{aligned} \text{W-VHF} &= (\text{VHF} - \text{B}(n)) * 100 \\ &= ((\text{H}(n) - \text{L}(n)) / \text{S}(n)) - \text{B}(n)) \\ &\quad * 100 \end{aligned}$$

Where,

H(n) is the highest price in N periods
L(n) is the lowest price in N periods
S(n) is the sum of absolute values of price differences in N periods
B(n) is the turning benchmark

The indicator is multiplied by 100 for display purposes.

To eliminate some false readings produced by the W-VHF due to its high frequency components, it helps to smooth the values. Consider using a moving average with a length four times shorter than the input used to calculate the original indicator:

$$\text{Smoothed W-VHF} = \text{MA}(\text{W-VHF}, n/4)$$

Trending/non-trending conditions are defined by the indicator as:

Trending: Smoothed W-VHF > 0
Non-trending: Smoothed W-VHF < 0

Positive readings of the Smoothed W-VHF indicate that the security is trending. Negative readings indicate that the security is in a range-bound market.

INTERPRETATION OF W-VHF

The quantitative estimation of the demarcation line between the trending (positive values) and non-trending (negative values) zones is the main advantage of the indicator.

Another distinctive feature of the W-VHF, most frequently manifesting itself in intermediate and long terms, is that the indicator can exhibit bullish and bearish divergences. Thus, one more way of interpretation is by looking for divergence between the W-VHF and the price to predict trend reversals, as is often the case with other momentum indicators. A loss of momentum in price's upward or downward movement can serve as an early warning signal of an upcoming reversal of the trend.

The three conventional interpretations of the classic VHF can also be used here: higher values of the indicator correspond to the higher degree of trending; its direction indicates a developing trend or entering into a ranging phase; extreme values precede the end or the start of a trend.

"Trending/non-trending alternative" (page 37) demonstrates the performance of the 50-day period W-VHF on Compuware Corp. During an uptrend, the values of the indicator rise sharply up to the middle of June 2003, indicating the trend is strong. The indicator then declines and crosses the demarcation line, indicating a ranging phase. Six months later it starts rising and leaves the consolidation zone, indicating the stock is again primed to trend.

A typical divergence between price and the W-VHF is illustrated in "Changing direction" (page 37). You can see while the price of Marvell Technology Group Ltd. is trending up, the 50-day W-VHF, starting from the middle of July 2003, fails to follow through and begins sloping in the opposite direction, showing a condition of bearish divergence.

MULTI-FRAME ANALYSIS

A W-VHF indicator of one size does

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not fit all practical needs. It's more reliable to identify trend strength using W-VHF indicators based on different time frames. Multi-frame representation allows the trader to see a number of W-VHF indicators simultaneously and get a complete and complementary picture of the security's technical condition.

In "Multi-frame analysis" (page 38), you can see different phases of American Power Conversion Corp. as identified by W-VHF indicators of three different periods. Here, we have a set of 12-day, 25-day and 50-day period indicators.

The lower the calculation period, the more sensitive and erratic the indicator is. The 25-day period indicator, as compared with the 12-day period, provides a more consistent picture, while the 50-day W-VHF completely avoids the con-

fusion during a 10-month sideways consolidation. However, the 12-day period W-VHF makes up for its erratic behavior by indicating the beginning of the congestion period earlier than the two other indicators.

EXPANDING OUR OPTIONS

The crucial issues in expanding the usefulness of the VHF indicator are identifying uniquely trending and ranging phases of the market, and extending its application area beyond the short-term analysis. The W-VHF acts as a new innovative mode of the VHF, which can adjust its benchmark levels to the time period used in calculation.

The W-VHF opens up an opportunity to cover longer time frames, for which it's most critical to identify the trading phase of the market correctly.

The W-VHF also allows new methods of interpretation. The basic approach deals with a quantitative estimation of the benchmark: W-VHF values above or below specified benchmarks indicate trending and non-trending zones, offering an accurate estimate. It also allows for readings of divergences between the W-VHF and price, which provide early warning signals of upcoming trend changes. Expanding the capabilities of the indicator makes it applicable to multi-frame analysis. **FM**

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