Bollinger Bands [ChartSchool]

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Table of Contents

- [Bollinger Bands](#)

Bollinger Bands

Introduction

Developed by John Bollinger, Bollinger Bands® are volatility bands placed above and below a moving average. Volatility is based on the standard deviation, which changes as volatility increases and decreases. The bands automatically widen when volatility increases and narrow when volatility decreases. This dynamic nature of Bollinger Bands also means they can be used on different securities with the standard settings. For signals, Bollinger Bands can be used to identify M-Tops and W-Bottoms or to determine the strength of the trend. Signals derived from narrowing BandWidth are discussed in the ChartSchool article on BandWidth.

Note: Bollinger Bands® is a registered trademark of John Bollinger.

SharpCharts Calculation

```
* Middle Band = 20-day simple moving average (SMA)
* Upper Band = 20-day SMA + (20-day standard deviation of price x 2)
* Lower Band = 20-day SMA - (20-day standard deviation of price x 2)
```

| Bollinger Bands (20,2) | | | 20-day | Upper Band | Lower Band |
Date	Price	Middle Band 20-day SMA	Standard Deviation	20-day SMA + STDEVx2	20-day SMA - STDEVx2
29-May-09	90.70	88.71	1.29	91.29	86.12
1-Jun-09	92.90	89.05	1.45	91.95	86.14
2-Jun-09	92.98	89.24	1.69	92.61	85.87
3-Jun-09	91.80	89.39	1.77	92.93	85.85
4-Jun-09	92.66	89.51	1.90	93.31	85.70
5-Jun-09	92.68	89.69	2.02	93.73	85.65
8-Jun-09	92.30	89.75	2.08	93.90	85.59
9-Jun-09	92.77	89.91	2.18	94.27	85.56
10-Jun-09	92.54	90.08	2.24	94.57	85.60
11-Jun-09	92.95	90.38	2.20	94.79	85.98
12-Jun-09	93.20	90.66	2.19	95.04	86.27
15-Jun-09	91.07	90.86	2.02	94.91	86.82
16-Jun-09	89.83	90.88	2.01	94.90	86.87
17-Jun-09	89.74	90.91	2.00	94.90	86.91
18-Jun-09	90.40	90.99	1.94	94.86	87.12
19-Jun-09	90.74	91.15	1.76	94.67	87.63
22-Jun-09	88.02	91.19	1.68	94.56	87.83
23-Jun-09	88.09	91.12	1.78	94.68	87.56
24-Jun-09	88.84	91.17	1.70	94.58	87.76
25-Jun-09	90.78	91.25	1.64	94.53	87.97
26-Jun-09	90.54	91.24	1.65	94.53	87.95
29-Jun-09	91.39	91.17	1.60	94.37	87.96
30-Jun-09	90.65	91.05	1.55	94.15	87.95

Click here to download this spreadsheet example.

Bollinger Bands consist of a middle band with two outer bands. The middle band is a simple moving average that is usually set at 20 periods. A simple moving average is used because the standard deviation formula also uses a simple moving average. The look-back period for the standard deviation is the same as for the simple moving average. The outer bands are usually set 2 standard deviations above and below the middle band.

SPY (S&P 500 SPDRs) NYSE
30-Jun-2009 4:00pm   O 91.41 H 91.74 L 89.98 Last 90.65 V 232.1M Chg -0.74 (-0.81%) ▼
W SPY (Daily) 90.65
— BB(20,2.0) 87.95 - 91.05 - 94.15

Upper Band

20-day SMA

Lower Band

SPY on June 30, 2009
20-day SMA = 91.05
20-day Standard Deviation = 1.55
Upper Band = 91.05 + (1.55 x 2) = 94.15
Lower Band = 91.05 - (1.55 x 2) = 87.95

— STDDEV(20) 1.55

Settings can be adjusted to suit the characteristics of particular securities or trading styles. Bollinger recommends making small incremental adjustments to the standard deviation multiplier. Changing the number of periods for the moving average also affects the number of periods used to calculate the standard deviation. Therefore, only small adjustments are required for the standard deviation **multiplier**. An increase in the moving average period would automatically increase the number of periods used to calculate the standard deviation and would also warrant an increase in the standard deviation **multiplier**. With a 20-day SMA and 20-day Standard Deviation, the standard deviation multiplier is set at 2. Bollinger suggests increasing the standard deviation multiplier to 2.1 for a 50-period SMA and decreasing the standard deviation multiplier to 1.9 for a 10-period SMA.

Signal: W-Bottoms

W-Bottoms were part of Arthur Merrill's work that identified 16 patterns with a basic W shape. Bollinger uses these various W patterns with Bollinger Bands to identify W-Bottoms. A "W-Bottom" forms in a downtrend and involves two reaction lows. In particular, Bollinger looks for W-Bottoms where the second low is lower than the first but holds above the lower band. There are four steps to confirm a W-Bottom with Bollinger Bands. First, a reaction low forms. This low is usually, but not always, below the lower band. Second, there is a bounce towards the middle band. Third, there is a new price low in the security. This low holds **above** the lower band. The ability to hold above the lower band on the test shows less weakness on the last decline. Fourth, the pattern is confirmed with a strong move off the second low and a resistance break.

Chart 2 shows Nordstrom (JWN) with a W-Bottom in January-February 2010. First, the stock formed a reaction low in January (black arrow) and broke below the lower band. Second, there was a bounce back above the middle band. Third, the stock moved below its January low and held above the lower band. Even though the 5-Feb spike low broke the lower band, Bollinger Bands are calculated using closing prices so signals should also be based on closing prices. Fourth, the stock surged with expanding volume in late February and broke above the early February high. Chart 3 shows Sandisk with a smaller W-Bottom in July-August 2009.

Signal: M-Tops

M-Tops were also part of Arthur Merrill's work that identified 16 patterns with a basic M shape. Bollinger uses these various M patterns with Bollinger Bands to identify M-Tops. According to Bollinger, tops are usually more complicated and drawn out than bottoms. Double tops, head-and-shoulders patterns, and diamonds represent evolving tops.

In its most basic form, an M-Top is similar to a double top. However, the reaction highs are not always equal. The first high can be higher or lower than the second high. Bollinger suggests looking for signs of non-confirmation when a security is making new highs. This is basically the opposite of the W-Bottom. A non-confirmation occurs with three steps. First, a security creates a reaction high above the upper band. Second, there is a pullback towards the middle band. Third, prices move above the prior high but fail to reach the upper band. This is a warning sign. The inability of the second reaction high to reach the upper band shows waning momentum, which can foreshadow a trend reversal. Final confirmation comes with a support break or bearish indicator signal.

Chart 4 shows Exxon Mobil (XOM) with an M-Top in April-May 2008. The stock moved above the upper band in April. There was a pullback in May and then another push above 90. Even though the stock moved above the upper band on an intraday basis, it did not CLOSE above the upper band. The M-Top was confirmed with a support break two weeks later. Also, notice that MACD formed a bearish divergence and moved below its signal line for confirmation.
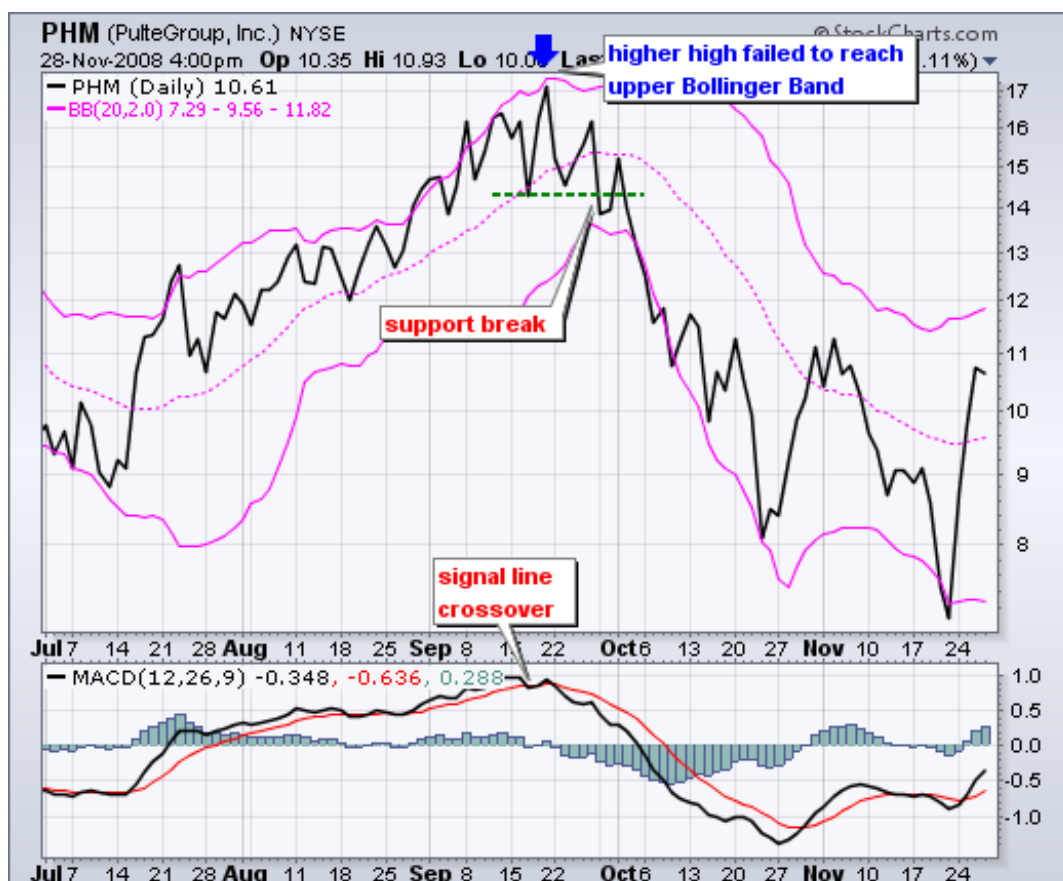
Chart 5 shows Pulte Homes (PHM) within an uptrend in July-August 2008. Price exceeded the upper band in early September to affirm the uptrend. After a pullback below the 20-day SMA (middle Bollinger Band), the stock moved to a higher high above 17. Despite this new high for the move, price did not exceed the upper band. This flashed a warning sign. The stock broke support a week later and MACD moved below its signal line. Notice that this M-top is more complex because there are lower reaction highs on either side of the peak (blue arrow). This evolving top formed a small head-and-shoulders pattern.

Signal: Walking the Bands

Moves above or below the bands are not signals per se. As Bollinger puts it, moves that touch or exceed the bands are not signals, but rather "tags". On the face of it, a move to the upper band shows strength, while a sharp move to the lower band shows weakness. Momentum oscillators work much the same way. Overbought is not necessarily bullish. It takes strength to reach overbought levels and overbought conditions can extend in a strong uptrend. Similarly, prices can "walk the band" with numerous touches during a strong uptrend. Think about it for a moment. The upper band is 2 standard deviations above the 20-period simple moving average. It takes a pretty strong price move to exceed this upper band. An upper band touch that occurs after a Bollinger Band confirmed W-Bottom would signal the start of an uptrend. Just as a strong uptrend produces numerous upper band tags, it is also common for prices to never reach the lower band during an uptrend. The 20-day SMA sometimes acts as support. In fact, dips below the 20-day SMA sometimes provide buying opportunities before the next tag of the upper band.
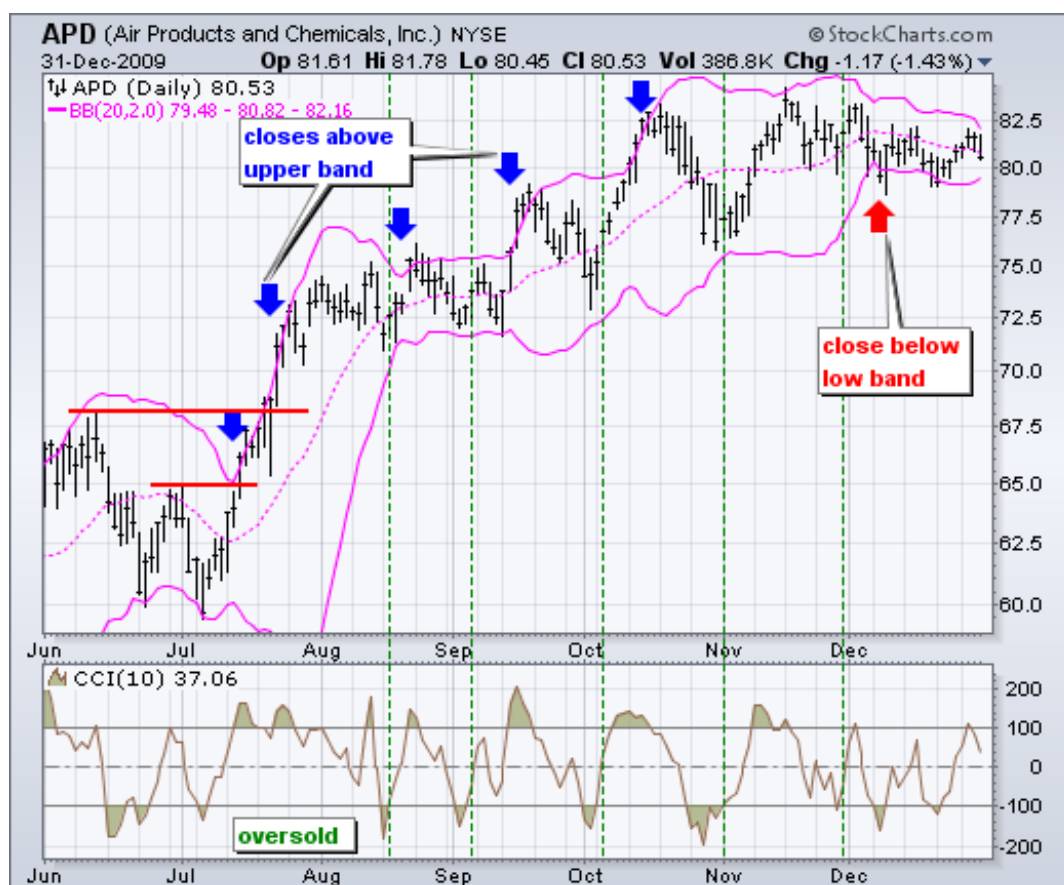
Chart 6 shows Air Products (APD) with a surge and close above the upper band in mid-July. First, notice that this is a strong surge that broke above two resistance levels. A strong upward thrust is a sign of strength, not weakness. Trading turned flat in August and the 20-day SMA moved sideways. The Bollinger Bands narrowed, but APD did not close below the lower band. Prices and the 20-day SMA turned up in September. Overall, APD closed above the upper band at least five times over a four month period. The indicator window shows the 10-period Commodity Channel Index (CCI). Dips below -100 are deemed oversold and moves back above -100 signal the start of an oversold bounce (green dotted line). The upper band tag and breakout started the uptrend. CCI then identified tradable pullbacks with dips below -100. This is an example of combining Bollinger Bands with a momentum oscillator for trading signals.

Chart 7 shows Monsanto (MON) with a walk down the lower band. The stock broke down in January with a support break and closed below the lower band. From mid-January until early May, Monsanto closed below the lower band at least five times. Notice that the stock did not close above the upper band once during this period. The support break and initial close below the lower band signaled a downtrend. As such, the 10-period Commodity Channel Index (CCI) was used to identify short-term overbought situations. A move above +100 is overbought. A move back below +100 signals a resumption of the downtrend (red arrows). This system triggered two good signals in early 2010.

Conclusions

Bollinger Bands reflect direction with the 20-period SMA and volatility with the upper/lower bands. As such, they can be used to determine if prices are relatively high or low. **According to Bollinger, the bands should contain 88-89% of price action, which**

makes a move outside the bands significant. Technically, prices are relatively high when above the upper band and relatively low when below the lower band. However, relatively high should not be regarded as bearish or as a sell signal. Likewise, relatively low should not be considered bullish or as a buy signal. Prices are high or low for a reason. As with other indicators, Bollinger Bands are not meant to be used as a stand-alone tool. Chartists should combine Bollinger Bands with basic trend analysis and other indicators for confirmation.

Using with SharpCharts

Bollinger Bands can be found in SharpCharts as a price overlay. As with a simple moving average, Bollinger Bands should be shown on top of a price plot. Upon selecting Bollinger Bands, the default setting will appear in the parameters window (20,2). The first number (20) sets the periods for the simple moving average and the standard deviation. The second number (2) sets the standard deviation multiplier for the upper and lower bands. These default parameters set the bands 2 standard deviations above/below the simple moving average. Users can change the parameters to suit their charting needs. Bollinger Bands (50,2.1) can be used for a longer timeframe or Bollinger Bands (10,1.9) can be used for a shorter timeframe. Click here for a live example.
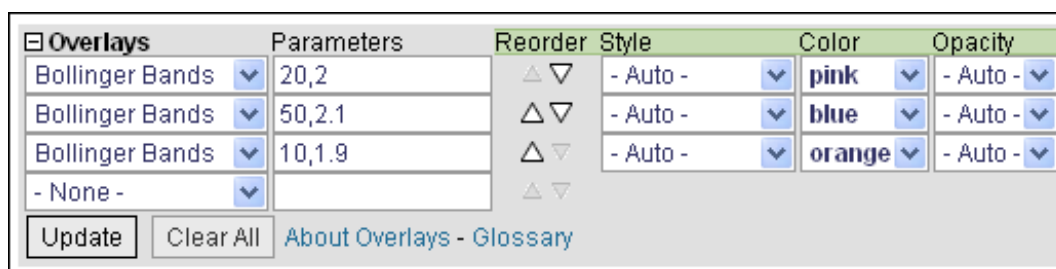
Suggested Scans

Bullish Bollinger Band Crossover

This scan finds stocks that have just moved above their upper Bollinger Band line. This scan is just a starting point. Further refinement and analysis are required.

```
[type = stock] AND [country = US]
AND [Daily SMA(20,Daily Volume) > 40000]
AND [Daily SMA(60,Daily Close) > 5]

AND [Daily Close x Daily Upper BB(20,2.0)]
```

Bearish Bollinger Band Crossover

This scan finds stocks that have just moved below their lower Bollinger Band line. This scan is just a starting point. Further refinement and analysis are required.

```
[type = stock] AND [country = US]
AND [Daily SMA(20,Daily Volume) > 40000]
AND [Daily SMA(60,Daily Close) > 5]

AND [Daily Lower BB(20,2.0) x Daily Close]
```

For more details on the syntax to use for Bollinger Band scans, please see our Scanning Indicator Reference in the Support Center.

Additional Resources

Stocks & Commodities Magazine Articles

Bollinger Bands by Amy Wu
Dec 2001 - Stocks & Commodities V. 20:1 (78-79)

Using Bollinger Bands by John Bollinger
Jan 1992 - Stocks & Commodities V. 10:2 (47-51)