



How To Use Portfolio123

Part 3 Sample Screening Strategies: Technical Analysis

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The first two parts of this How-To series showed you how to construct screens. Part 1 covered the Wizard. Part 2 covered Free Form. We'll now help you put this knowledge to work by demonstrating some of the many kinds of screens you can build. This Part will focus on technical analysis and the next one will emphasize fundamental strategies.

Some technical analysis screens can be built using the Wizard, but most who emphasize this approach will choose to use Free Form, which allows for much greater flexibility and which covers ETFs in addition to stocks. The part of Free Form you'll use will be the category called FUNCTIONS. Make sure you understand generally how to work with these, especially how to specify parameters. If you need to review, see Part 2, pages 12-23.

When building any screen, it's a good idea to start with one or more liquidity filters. There's no point in creating a model that looks great when backtested if it turns out that you can't trade the stocks under real-world conditions.

Establishing Liquidity Thresholds

Here are some sample liquidity filters which you can copy to your clipboard and paste into the free form rule area.

Liquidity Based On Exchange Trading

Universe(NOOTC)

- This eliminates pink-sheet stocks, those that don't trade in the NASDAQ or on an exchange.
- In the alternative, you could simply choose No OTC Exchange in the Universe-selection dropdown menu

Liquidity Based On Price-Volume

Close(0)>=5 and AvgVol(60)>=50000

- The first part of the rule looks for shares whose most recent closing prices were 5 or higher.
- The second part of the rule seeks stocks for which daily volume over the past 60 trading days averaged at least 50,000 shares
- It's tempting to omit the price filter and use a much larger volume rule, but be careful about this. For stocks priced, say at \$0.02, even 1 million shares worth of volume may not provide nearly as much liquidity as you expect: \$0.2 per share times 1 million shares amounts to only \$20,000 worth of stock. If you want to think along these lines, consider the next strategy.

Liquidity Based On Average Daily Total

AvgDailyTot(60)>=150000

- This rule requires the average daily total traded (price per share times number of shares) to have averaged at least \$150,000 over the last 60 days

Liquidity Based On Market Capitalization

MktCap>=500

- Market capitalization must be at least \$500 million
- For many, something like this will suffice on its own, the idea being that any issue with a market capitalization above a certain level is likely to have satisfactory liquidity. But if you're worried about issues with less liquidity than meets the eye based on a large number of shares being owned by insiders and, for all practical purposes, not available for day to day trading, you could try something along the lines of our final sample strategy . . .

Liquidity Based On Float Capitalization

Float * close(0) >=400

- This requires the float adjusted market capitalization to be at least \$400 million
- Float refers the number of shares in the hands of the public and can be found under STOCK FACTOR >> SHARE RELATED ITEMS. Multiplying it by price, expressed here as the last available closing quote. This gives us a figure that is analogous to market cap, but based more specifically on the number of shares that are available for day-to-day trading.

Going on, each of the technical screens illustrated below will presume that the first rule was used to establish a liquidity threshold based on one of the above sample, or something you created along similar lines.

Technical Analysis Screening Strategies – Three flavors

When starting to screen using technical analysis, the first thing you need to do is decide what role the technicals should play. Generally speaking, there are three approaches:

1. Pure Technical-Based Stock Selection

This is probably what most technical-oriented investors have in mind when they first consider the topic. They assume they'll specify technical criteria and consider whatever stocks pass muster.

Most of the samples we present here will demonstrate this approach.

2. Combined Technical-Fundamental Analysis Screens

It may not always seem apparent but technical and fundamental analysis are inextricably linked. If a stock gapped up on strong volume, this might have been a random or irrational occurrence, but don't count on it. There was probably something particular – usually fundamental – that caused it to happen, such as a reassessment of growth prospects following a surprisingly strong earnings announcement. If a stock's 50-day moving average is above the 200-day average and continuing to trend higher, there is likely to be a fundamental reason, perhaps margin improvement, or investor reassessment of what had been a very low P/E.

Technical analysis can and often is used by itself, with traders-investors content to recognize that relevant fundamental factors exist in the background but not particularly keen to openly think about them. Others like to have the fundamentals share center s Stage and will build fundamental screens to identify opportunities that seem promising along these lines, and then use technical analysis to identify which of those issues are most buyable right now.

3. Technical-Analysis Used To Identify The “Best”

Suppose you want low-P/E stocks. You could easily build a screen using one or two rules to establish basic trading liquidity, and then use the Quick-Sort feature to rank the remaining stocks from low-to-high based on P/E. You may then select the top ten. Alternatively, you might choose one of our pre-defined ranking systems, perhaps the Basic - Value ranking system.

This sounds good on paper but may often falter in the real world, as you'll see when you backtest. However good rank or sort protocol may be at identifying a collection of stocks that, in the aggregate, are likely to be the best 10% of the universe, or even the best 5%, things may break down when you try to drill deeper, to the top ten stocks, for example. We're dealing with statistical probabilities, not a precise company-by-company hierarchy.

Technical analysis picks up on collective investment-community sentiment. It doesn't ask why the investment community feels as it does. Maybe the bullishness comes from growth trends, perhaps it has to do with balance sheet improvement, or maybe margin expansion, or more likely, different things for different companies.

By adding one or more technical rules to what is primarily a sort-based strategy, you can enhance your chances of success by, for example, finding very low-PE stocks that have attracted buying attention right now.

Pure Technical-Based Stock Selection

In all cases, it will be assumed that your first rule was used to address liquidity and that we are now working with rule two, and however many more rules, if any, will be needed. The way the functions are established in Portfolio123, it won't take much to establish a strong technical model. One or perhaps two such functions (in addition to the liquidity rule) will often suffice.

Here, now, are some sample technical strategies. We'll start with some that involve moving average. These have long been popular. They are effective in detecting trends as well as trend acceleration or deceleration. Also, they are very easy to implement.

Moving Average - Basic

$\text{sma}(50) > \text{sma}(200)$

- The stock's 50-day simple moving average is above its 200-day moving average
- This is a very basic trending strategy
- More aggressive traders will probably want to use shorter moving-average time periods, such as $\text{sma}(5) > \text{sma}(10)$

Moving Average With Offset

$\text{sma}(20) > \text{sma}(20,20)$
 $\text{sma}(20,20) > \text{sma}(20,40)$

- The first rule requires the 20-day simple moving average to be above the 20-day moving average as it was computed 20 trading days ago (i.e. using a 20-day offset)
- The second rule requires the 20-day simple moving average as it was computed 20 trading days ago to be above the average as it was computed 40 trading days ago
- We're looking, here, for acceleration in the moving average

Relative Moving Average

$\text{sma}(50)/\text{sma}(200) > \text{sma}(50,0,\#\text{Bench})/\text{sma}(200,0,\#\text{Bench})$

- Here, we're not so much interested in the 50-day average being above the 200-day average, but instead, in the relationship between the two. The greater the gap between 50 and the 200 day averages (measured in percent terms, so we won't get caught assuming \$55 versus \$50 (a 10% gap) is superior to \$12 versus \$10 (a gap that's smaller in dollar terms but amounts to a larger percentage difference).
- The rule seeks situations where the relationship between the 50- and 200-day averages is superior for the stock than to the comparable averages computed for a benchmark index (the default selection being the S&P 500).
- In a bear market, stocks could pass if the 50-day moving average was below the 200-day average, so long as the shortfall is less, in percentage terms, than is the case for the market

Now, let's step it up just a bit. MACD is a fancier technical indicator that sounds a lot more intimidating than it is. In fact, it's just a shorthand way of addressing more detailed moving-average strategies.

MACD - Moving Average Convergence-Divergence

MACD(0) > 0

- MACD is based on the relationship between the 12 and 26 day exponentially weighted moving averages. Unlike the simple moving average, which counts all prices in the averaging period equally, the exponentially weighted moving average gives more emphasis to recent prices.
- This rule requires the 12-day exponentially weighted moving average to be above the 26-week moving average. It could just as easily have been written as $\text{ema}(12) > \text{ema}(26)$.
- To look for stocks whose MACD is accelerating, build a rule around the offset parameter, such as $\text{MACD}(0) > \text{MACD}(5)$, which means the current MACD is greater than the MACD as of five days ago.
- The more interesting application of MACD may be in the indicator built around it, which we'll examine next.

The MACD Indicator – MACDD

MACDD(12,26,9)>0

- The first two parameters tell us we're looking at the basic MACD, the 12-week exponentially weighted moving average and the 26-week exponentially weighted moving average. Note, though, that in this version of the function, you can make changes. Perhaps you want to compare 5- and 15-week average. In that case, the first two parameters would be 5 and 15, instead of 12 and 26.
- Getting the third parameter starts with the differences between the 12- and 26-day moving averages. Assume the daily differences were plotted on a separate trend line. The 9-day moving average of that trend line, the difference line, is the third parameter. (You could, of course, change the 9 if you'd like to evaluate the difference over a longer or shorter period).
- When the MACDD is positive, it means the stock is in an uptrend and would be considered bullish by those who use such strategies.

Indicators like moving average and MACD are great because they can be expressed numerically, meaning they lend themselves well to applications like Portfolio123. Interestingly, though, it can be argued that indicators like these are contrary to tradition.

At its heart, technical analysis is a visual discipline, where one looks at a chart and evaluates patterns; resistance, support, cup-and-handle, head-and-shoulders, pennant, and so forth. The problem is that such things can't be expressed numerically, since often the presence or absence of a particular pattern tends to be in the eye of the beholder.

But there are some chart patterns that can be translated to numbers.

Gap Up

GapUp(10,500,20,0) = true

- This rule looks for stocks that experience a gap up (a daily low that was higher than the previous day's high price) of at least 10%. This even must have happened some time within the past twenty trading days and must have been accompanied by a volume spike of at least 500% above the average volume that prevailed during the 20-day period.

Gap Down

GapDown(10,500,20,0) = true

- This is the mirror image of the GapUp. Here, we're looking for cases when the day's high was at least 10% lower than the prior day's low.
- Don't fall into the temptation to assume that such a rule is only for short sellers. Here's an example of a screen that looks for stocks whose trends were OK, at least up till 60 days ago, but experienced a gap down between 20 and 40 days ago, but has recently started to show signs of resuming its old uptrend.

```
sma(50,60)>sma(200,60)
GapDown(10,500,20,20) = true
sma(5)>sma(20)
```

- The first two rules make use of the functions' offset parameters. If you are at all unclear about this, review the discussion of Functions in Part 2.
- Copy this screen and backtest it. You'll see that this is not the sort of model you can use if you just want to buy all the stocks that pass. But if you look closely at the individual holding periods, you'll see that there are usually few enough passing stocks that you do have time to review them all case by case, and that plenty of good opportunities can be uncovered this way.

Highest

Highest(#Close,20,0) > Highest(#Close,20,20)

- This rule evaluates closing prices (you could also use open, intra-day high, intra-day close, or volume) and looks for situations where the highest close within the past 20 trading days was above the highest close achieved during the prior 20-day period.
- You can really push this function, and use it alongside the mirror-image Lowest function, to screen for a pattern of higher highs and higher lows.

```
Highest(#Close,20,0) > Highest(#Close,20,20) * 1.05
Highest(#Close,20,20) > Highest(#Close,20,40) * 1.05
Lowest(#Close,20,0) > Lowest (#Close,20,20) * 1.10
Lowest(#Close,20,20) > Lowest (#Close,20,40) * 1.10
```

- If you like visual chart analysis, look at this and see if it rings a bell.

```
Highest(#Close,20,0) < Highest(#Close,20,20)
Highest(#Close,20,20) < Highest(#Close,20,40)
Lowest (#Close,20,0) > Lowest(#Close,20,20)
Lowest (#Close,20,20) > Lowest(#Close,20,40)
```

- I wouldn't go so far as to say the latter is the pennant formation, but it has key elements in common; descending highs and ascending lows heading toward a point at which, presumably, something noteworthy is bound to happen. But be careful about using this for a buy-all-the-names screen. The "something" at the end of a pennant might be negative. Use this screen to hunt for ideas you'll evaluate case by case, or combine it with other factors that give you reason to think the next move is more likely to be positive.

- NOTE: Copy the pseudo-pennant screen. Backtest it using one-week holding periods. Backtest again using four-week holding periods. Assume zero slippage. Notice the superiority of the four-week test. This is an example of how ideas often need time to materialize, even when selected on the basis of technical analysis. Now try testing with a one-day holding period. Here, a zero-slippage assumption would be way too tenuous. Assume 0.25%. This test is terrible. Now, just for laughs, assume zero slippage. This time, the result looks a lot better. Moral of the story: day trading can be great on paper, but unless you're a superstar at navigating your way around bid and ask spreads, you may be better off giving your ideas time to develop, and to overcome the initial spreads you faced when you bought.

When we think of visual chart analysis, it's usually assumed that that we're looking at stock prices. But that doesn't always have to be the case. The Portfolio123 CrossOver function, for example, looks to moving average plots for an important visual cue, and one that can be expressed numerically.

CrossOver

CrossOver(#sma,10,50,200)

- Technicians often talk about the desirability of the 50-day moving average being above the 200-day moving average. If we're going to assume that trends persist, as we would if we use trend-oriented strategies such as moving average, it seems reasonable to also assume it would be better to get in during the early stages of a trend. CrossOver helps us do that.
- The above rule looks for stocks whose 50-day simple moving average (the first parameter, #sma) crossed above the 200-day average at some point within the last ten trading days.
- For contrarians, or those who believe in mean reversion (oscillation), there is a mirror-image CrossUnder function.

On several occasions, it was noted that mirror image functions exist to identify what, at first glance, would seem to be bearish technicals: GapDown, Lowest, CrossUnder. The extent to which these are necessarily bearish, however, is a matter for debate.

Just as fundamental investing has different stylistic camps (e.g., growth versus value), so, too, does technical analysis: trending versus oscillating. Except for the side notes on mirror-image functions, we've focused thus far on trends. We looked for stocks whose trends seemed favorable and attempted to write rules that would help us identify them in the screener.

Oscillation reflects a different perspective, sometimes referred to as mean reversion. It assumes there is some sort of central tendency and that stocks often bounce around on either side of their theoretically proper levels. When they get high, it is assumed they will correct back down toward the proper level. When they get too low, it is assumed they will bounce back. This doesn't mean the true and correct trend is always sideways and that every instance to the contrary is an aberration that needs to be corrected. Actually, history gives considerable ammunition to those who argue that the central trend tilts upward, with much of the debate on being on how steep or gradual the slope is. But even in the context of a long- or intermediate-term uptrend, stocks do bounce around above and below the central tendency necessitating frequent reversions to the mean.

Technical analysis offers some indicators, known as oscillators, that help investors judge whether and the extent to which a stock may be overbought or oversold and, presumably, poised for

decline or rally. These indicators differ from others in that lower numbers usually signify bullishness (low number are associated with oversold conditions).

Oscillators can involve complex calculations (actually, for mathematicians, they are extremely simple, but for investors, they are considerably more involved than P/E, growth rates, or even MACDD). Here's how the Ultimate Oscillator, one of those offered in Portfolio123, is calculated. This is presented just for the information of those who'd like to know. If you like, you certainly can skip the computations.

Buying Pressure: $bp = \text{close} - (\text{lesser of intraday low or prior day close})$
True Range: $tr = (\text{greater of intraday high or prior day close}) - (\text{lesser of intraday low or prior day close})$

7-day Average = $(bp-1/tr-1 + bp-2/tr-2 \dots bp-7/tr-7) / 7$
14-day Average = $(bp-1/tr-1 + bp-2/tr-2 \dots bp-14/tr-14) / 14$
28-day Average = $(bp-1/tr-1 + bp-2/tr-2 \dots bp-28/tr-28) / 28$

Ultimate Oscillator = $((4 * 7\text{-day Average}) + (2 * 14\text{-day Average}) + (28\text{-day Average})) / 7 * 100$

Again, if you can't follow it, or prefer not to bother, don't worry. Suffice it to say that high levels of the oscillator, signifying greater buying pressure relative to the stock's "true" range," suggest it's overbought and vice versa.

Interestingly, although this is complex to calculate, it's easy to implement in Portfolio123.

Ultimate Oscillator

ULTISC(0)<=30

- This rule seeks stocks for which the current level of the ultimate oscillator is 30 or below.
- If you want to look for stocks for which the ultimate oscillator has been becoming increasingly oversold, try this:

Ultosc(0)<=30
Ultosc(0)< Ultosc(20)

- Here's another approach:

Ultosc(0)<=30
Ultosc(20)>=40

This is a representative sample of the kinds of things you can do with the technical indicators on Portfolio123. For those who are more advanced in this area, we offer a set of Wilder-based indicators. The calculations are too complex to be covered here, but for those who know what they are and want to use them, the functions as presented on Portfolio123 are just as easy to work with as the ones discussed above. Check the Descriptions that accompany the functions. If you'd like to learn more about the J. Welles Wilder indicators, you can check his book [New Concepts in Technical Trading Systems](#).

Combined Technical-Fundamental Analysis Screens

Many who use technical analysis stick to just that and do quite well.

Many others use technical analysis hand-in-hand with fundamental analysis. The most typical approach is to identify a list of suitable investment candidates using fundamental criteria. These tell us which stocks deserve to move. But such factors don't necessarily tell us when the stocks will actually receive the favorable treatment they ought to have. Remember the old adage:

Q: How long can the market continue to be wrong?

A: A heck of a lot longer than you can continue to stay solvent!

Based on this, many investors filter fundamentally sound stock lists through technical filters to help them determine, not if the stock is worth buying, but whether it would be reasonable to act on bullish sentiment right now.

Doing this is easy. Just create a fundamental screen and then, add one or two technical rules such as those discussed above to the screen.

The challenge lies in strategy. What sort of technical rules might enhance the performance of a fundamental screen?

Consider, for example, use of the pre-defined Quality – Basic screen as a starting point:

```
universe(nootc) and close(0)>=5 and mktcap>=250 and Industry!=fsmisc
OpMgn%TTM>12
OpMgn%5YAvg>12
ROI%TTM>=12
ROI%5YAvg>=12
IntCovTTM >=3
```

This simple set of rules will usually uncover about 150 stocks that most would regard as fundamentally sound, the sort of stocks the average investor should feel comfortable owning. Assume, too, we boost the comfort factor by honing in on the top 15 stocks as per the Portfolio123 QVG (Quality-Value-Growth) ranking system.

To many, it will seem eminently sensible that a technical rule, if added, should be geared toward identifying which of these sound stocks are actually trending favorably. Try it. Add the following rule: `sma(50)>sma(200)`. Now, backtest the top 15 as per the QVG ranking system.

As of this writing, that test produced very disappointing results. The model outperformed the market when no technical filter was used, but substantially underperformed when the sma rule was added.

Now change the technical rule to this: `sma(5)>sma(20)`. This is a much shorter-term version of the same thing, Backtest again.

As of this writing, the model is now outpacing the market, but by a lesser amount than was the case before the rule was added. From the vantage point of trying to support a buy-now decision, the second rule, with its short term orientation, added new information to our model, which tended to focus on less immediate factors. That was a plus. But it's still not doing for us all we need, since we'd still be better off with no technical filter at all.

Now, flip the technical rule around. Make it look like this: $sma(5) < sma(20)$.

This definitely is new information, very new information. We'll now get a list of consistently fundamentally solid companies whose stocks lost steam.

Interestingly, in this test, the model outperformed not just the market, but also the results achieved by using fundamentals alone.

The moral of the story: Learn to love, or at least respect, the notion of mean reversion (or oscillation) if you haven't yet done so. The market never goes up or down in an infinite straight line. If you pile up too many bullish rules in your model, you may simply be increasing your exposure to the prospect of a downward correction.

This isn't to say you should never add a bull-oriented trending technical rule to a fundamental screen. There are times when that will help. But such occasions should be identified via testing, not seat-of-the-pants hunches, and not even based on your experience with purely technical screens.

When you're doing technical analysis alone, your bullish technical rules will often help steer you toward stocks that have been deemed fundamentally sound in the eyes of market participants whose collective trading decisions resulted in the bullish patterns you detect. When you add technical rules to a fundamental screen, you don't need to think this way. Your fundamental rules will have done all the necessary legwork in pointing you toward good companies. The addition of a bullish technical rule may amount to overkill.

Technical-Analysis Used To Identify The “Best”

This is similar to the technical-fundamental combination screen except here, the screen contains technical rules only. All fundamental concepts are incorporated into one of the pre-defined Portfolio123 ranking systems, or a quick-sort that you create.

This approach is useful when you want to create a broad technical screen, one that is likely to show more passing situations than you are able to buy or analyze. Use the quick rank or ranking system to narrow the list to a manageable number.

Consider, for example, the Gap Up pattern. What’s not to love – a stock that jumps briskly on big volume. This doesn’t happen often, but it can be frequent enough to produce more stocks than anyone can buy or analyze.

Create the following simple two-rule screen:

```
universe(nootc)
GapUp(10,500,20,0) = true
```

Backtest results are good (assume weekly rebalancing), but often, the screen contains more than 50 stocks, sometimes, more than 100. There’s not much we can do in the real world with something like this.

Now, change the settings so that we consider only the top five stocks and that these be selected using the Basic: Sentiment ranking system, Backtest again.

The picture changes quite a bit. Performance is again strong. This time, though, you can do something about it; you can follow an automatic trade-everything-weekly strategy, or you can look at each chart individually and decide case by case.

Mix and match technical screens and ranking systems and test the combinations. Not everything will work. But you’ll see many that will be backtest quite nicely with 15, 10 or even 5 stocks.

Now, try a variation using Quick Rank.

Setting up a Quick Rank is similar to creating a free-form fundamental screening rule. Clicking on the note-pad icon next to the Quick-Rank box will open the free form rules interface; you can use this and or type manually. The one difference is that the Quick Rank item needs to always be in true-false form. Don’t actually say =true; just input the factor. For example, if you want to sort based on the trailing 12 month rate of EPS growth, all you need do is input: EPS%ChgTTM.

Try combining the EPS%ChgTTM Quick Rank with the Gap Up screen and backtest. The result is OK. But here, too, you can mix and match. Try combining the Gap Up screen with analyst upgrade, improvement in the average analyst recommendation score. This is: AvgRec-AvgRec4WkAgo. Make sure you set the drop-down menu to say Lower is Better (these scores sun from 1.00, best, to 5.00, worst). Assuming you’re looking for the five best stocks and are rebalancing weekly, this should be considerably stronger.

The screen-quick rank paring can also go the other way. You can have a fundamental screen and narrow down with a technical Quick Rank. Here, though, you’d need to use a formulation that lends itself to a numeric answer, something that can be sorted. So it would not be helpful to specify GapUp(10,500,20,0) as a Quick Rank formula. Formulas you could use include sma(50)/sma(200) (higher is better), sma(5)/sma(20) (lower is better), MACDD(12,26,9) (higher is better and so forth).

Summary

When creating a technical screen, organize your efforts in terms of two important strategic decisions.

1. Decide what role technical analysis will play
 - a. a screen based entirely on technical tests
 - b. a screen that reflects a combination of fundamentals and technicals
 - c. a combination screen wherein one approach is used for screening and the other for a pre-defined ranking or a Quick Rank formula
2. With regard to the technical-analysis portion of your model, decide which technical style you will pursue
 - a. trending
 - b. oscillating

With those decisions in hand, you will have come quite far. You'll know what kinds of functions you'll be looking for and you'll know where to place them. And as you've seen from the Functions discussion in pages 12-23 of Part 2 and in the examples presented here, using functions to create rules is actually quite easy once you've gotten into the habit of checking the Descriptions to see which parameters are needed and the sequence in which they need to be specified.

The next Part of this series will cover Fundamental screening strategies.