Learn TradeStation's Portfolio Maestro®

See how the famous system developers of the 1980s and 1990s developed their commercial ***Algorithmic trading software***.

How to wrangle ***Portfolio Maestro*** to the ground and get it to do what you need!

Hello, George here. I receive several questions concerning **Portfolio Maestro** (**PM**) each month, so I thought I would create a tutorial on **PM.** During the 1980s, 1990s and the new millennium system vendors sold their versions of the ***Holy Grail*** for thousands of dollars**.** Most of these systems were built on the idea of using a diverse portfolio. Creating a strategy that works on multiple markets is not a small task. Also doing the research to create an enticing promo wasn't either. The development of the promo. material required hours of research and development and also the ability to present the data at the portfolio level. This tutorial is going to be a little different, because we are going to put on our system developer's hat and create the greatest algorithmic trading system of all time **(*tongue in cheek*.)** I believe a person learns best by doing, so in this vein, let's turn back the clock a few years and develop a multi-market trading system using **EasyLanguage/TradeStation/Portfolio Maestro.** In addition, we will create a killer promo that no sensible system trader could turn down. **To effectively show the power of Maestro,** this demonstration will incorporate a highly controversial approach to optimization; different parameters for different markets. This approach may not be the most robust, or maybe it is, but it is a great way to learn about **optimization** and **Portfolio Maestro.**

From 1989 through 2019, I worked with the most famous and *infamous* system developers in the Trading System industry. I have seen everything and worked with some of the best system developers our industry has ever seen. When I say best, I don't necessarily imply the best trading systems, but I do imply the character of the individuals. These developers tried their best to use their knowledge and tools at their disposal to provide what they thought would stand the test of time. In most cases, these systems could not weather the decade long depressed state of commodity prices and the absence of almost any trend and a **RAGING BULL MARKET.**

As you probably all know I worked with ***Futures Truth*** for over 30 years and published walk forward tests on well over 1000 trading systems. Over the years, this company had hundreds of supporters, skeptics and a few detractors. On a few blogs, it was stated that if a trading system made it into the **Top Ten** table, then it was time to fade or reverse the trading signals of the system. On some other blogs, it was stated that you could *pay your way* into the **Top Ten**. As the *Director of Research*, I can unequivocally say that this was absolutely a falsehood. Many of the trading systems we tracked at **FT** did well for periods time. The problem was that the popular and successful systems (at one time) entered in to a multi-sigma event. The sigma didn't all occur at one time, they were layered on. This extended lack of performance and draw down forced many system vendors to shut their door. In addition, a large portion of well-established Trend Following commodity trading advisors (CTA) did the same. However, some of the well-capitalized CTA firms diversified into other investment vehicles and/or raised their minimum investment size to institutional levels. Increasing minimum investment size screens investors to just those that can handle a larger heap of risk. Not to mention it provides more working capital for the CTA. The fee structure just a few years back for a CTA was 20% incentive and 2% management. Smaller firms that went a year or two without a new-equity peak could not pay their staff or even the light bill. See, a small CTA relies heavily on incentive income and if the equity watermark is not exceeded, then there is no income. The management fee, for small firms, probably did not cover the fees associated with compliance. The commodity trading advisors who could hang on are now reaping the benefits of the quick rise in commodity prices and interest rates. Unfortunately, smaller capitalized systematic trend followers have left the arena as well at or near the valley of a maximum annual draw down. This large loss of funds left a bad taste in the mouths of commodity investors. The words, Trend Following, became associated with large and extended losses. A question that must be asked now: Is Trend Following back to stay for a while, or are we just experiencing another anomaly (2020 thru 2022)?

The biggest question that has always been asked regarding system vendors is: Why sell your system if it is so good? Many vendors traded and sold their own systems. Some still do today. Others vendors only sold. What are, if any, the benefits of selling your own system? The most obvious answer is that it is a risk-free (from a monetary perspective) venture. The markets are now so large that selling a hundred or more editions of a trading system will not impact the execution. **I-Master** is one of the few systems whose legions of followers actually pushed the execution needle. Some other vendors actually sell their systems as **BLACK BOXES**. This level of disclosure doesn't provide any other benefit other than the profit/loss stream of the strategy. This type of system delivery via TradeStation or some other execution platform or system-assist broker is by far the most popular today. Another evolution in trading systems is you no longer must spend a lump sum up front to get access to the signals. The preferred method for vendors and users is the selling of signals via a subscription basis. The vendor gets paid monthly and the user can turn off the strategy at any time. This sounds like a win-win scenario and it is to an extent. However, some traders want to know, for various reasons, what is behind the curtain. These traders are like Dr. Frankenstein; they want to build their own strategies using parts of other's trading ideas or concepts. It might be an ego thing, or it might be they only trust what they can see.

Here are some popular vendors I have worked with over the years (*no particular order*):

Murray Ruggiero—specialized in intermarket divergence and AI. He co-wrote the ***I-Master*** trading system with **Keith Fitschen**. He was an editor at *Futures Magazine* and his greatest achievement was his **TradersStudio** software. Speaking of **I-Master,** our brokerage firm ***CRI*** traded this system for several clients and this was one of the few systems you could actually see the ripple or wake when it entered the market. It was very successful during the **dot-com** era. Its success was probably attributable to "leaping without looking" into the nitrous-driven Nasdaq of the late 90s. His most popular trading systems were **Super Turtle, Simple Harmony** and all of his intermarket applications, including his **State** systems. His partnership with **Sam Tennis** helped bring Murray's ideas to life**.** You can't go wrong partnering with the **Father of EasyLanguage**.

Keith Fitschen— developed one of the most successful and popular trading system of all time, **Aberration**. Remember he also develop **I-Master**. I can only imagine how many CTA and individual traders used his Aberration algorithm. The system only had one optimized parameter and it worked well over a wide swath of commodity markets. Alas, this brave soldier fell in battle too. This setback didn't stop Keith from doing research as he created other trading systems such as **Aberration Strategy, Short-Clips** and ultimately **Paradigm Shift**. His book, "***Building Reliable Trading Systems***" is a must-read for any serious algorithm trader.

Peter Waite— the father of **Andromeda** and **Pegasus.** Peter's systems took the mantle off of Aberration and were very popular in their hey day. Peter no longer sells his systems, his website is gone, but I do know some of his old users have reloaded Andromeda and are using it today.

Randy Stuckey— Catscan and **Golden-SX.** Randy invested in the trading systems of others early in his career and felt that he could do a better job. He fell in the camp that different markets moved in their own unique ways and it was okay to have a different set of parameters for each market.

Welles Wilder— one of the pioneers of the systematic trading system. He is famous for his ground breaking book, "***New Concepts in Technical Trading Systems***" (1978.) His fingerprints are still evident in almost every technical analysis platforms out there today. You might recognize these indicators:

- Average True Range
- Relative Strength Index
- Average Directional Index
- Parabolic SAR

John Hill—no list would be complete without John. His diligent work on technical analysis was the basis for trading systems where $millions were traded for more than two decades. John is more of a gunslinger than system designer. His partnership with **John Fisher** did produce several publicly offered trading systems that did well for a time. John Hill's work on open range break out produced big profits while the pits were alive and doing well. Once the pits disappeared, and the concept of the pit session, ORBO fell on its face, hard. Except for the stock indices where it is still alive and doing well.

Bruce Babcock— wrote a very good book ("***The Irwin Guide to Trading Systems***") in the late 1980s and developed at least 100 trading systems. His core systems were also the foundation for larger projects.

Thomas Stridsman— editor at Futures Magazine and wrote one of the most influential books on algorithmic trading, "***Trading Systems that Work.***"

John Ehlers and Mike Barna— a partnership that developed the **MESA** toolbox and the enhancement of several very good trading systems. Their accomplishments are to numerous to list.

Peter Aan— DCS-II and the **Mystery system.** Peter revitalized **the Donchian** approach that may have been traded by more people than **Aberration** and **ORBO** combined.

Dave Fox—Dollar Trader for Currencies. The benchmark that others tried to aspire to. Dave researched well up into his 80s. One of the most likable and intelligent fellows you would ever encounter.

Wayne Andrews— a name few would recognize. One of the first to use computers, tick data and algorithms to attempt to tame the commodity markets. He was the first to get **John Hill** onto a computer. He could spew off a hundred different algorithms in a 30 minute conversation.

Well, with that brief history of the trading system behind us, let's move onto the tutorial or kit. I call it a kit because you get the tutorial plus a bunch of neat code.

Pretending to be a big time system vendor that needs to develop a multi-market trading strategy using TradeStation and Portfolio Maestro is a great scenario to teach the inner workings of Maestro. This tutorial will cover several steps to get to the point where we can use Portfolio Maestro's Constraints and Portfolio Stops. The tutorial will cover a sophisticated trading system that will not only introduce and explain **Portfolio Maestro**, but may also extend your knowledge of **EasyLanguage**.

INSTALL ELD AND TSW

Before you start this Tutorial make sure you have installed the **pMaestro**.**ELD** and can open the **pMaestro.TSW**. You can use the import feature of **TradeStation** or the **EasyLanguage Editor** to import the **ELD** and afterwards open the **TSW** (**TradeStation Workspace**.)

TUTORIAL STARTS HERE!

Maestro Strategy #1—developed for small portfolio. The first step in developing a multi-market strategy where each market uses a different set of parameters is the development of a core system. I developed this core idea back in the 90s along the same lines as Randy Stuckey. We would all agree that markets are either trending or not, and I thought, wouldn't it be interesting to use a swing system during non-trending markets and a trend following approach during those times when the markets are trending. I knew several good swing systems that were chewed up in a trend following environment, and several good trend following systems that just fell on their faces during a choppy environment. The key to this dichotomous approach was the determination of the current market regime; are we trending or not. The need to determine regime change has produced many indicators over the years. However, all these indicators have one thing in common when it comes to their calculations: how far has the market travelled and the degree of oscillation. I developed the Choppy Market Index not realizing there were already several out there. My version basically measured the distance the market travelled (close of today minus close 30 days ago—a.k.a momentum) and the entire distance the market travelled (highest high past 30 days minus lowest low past 30 days) and then divided the former by the latter. The larger the numerator (larger momentum) the larger the **choppyMarketIndex**. In other words, a higher indicator reading meant the market was trending which seems the opposite of the name of the function. The problem with this indicator was that it was somewhat erratic—the readings jumped around. I found a better **ChoppyIndex** and it is described by the following formula.

ChoppyIndex = 100 * **logxy**(10,**summation**(**trueRange**,length) / (**highest**(**trueHigh**,length) - **lowest**(**trueLow**,length))) / **logxy**(10,length);

This formula uses log 10 to log transform the data. In other words, it makes the data look more normal (distribution) and stabilizes variable variation. I will leave it up to you to determine if the log transform is beneficial or not. But, I am going to use it in this algorithm.

You have two independent algorithms at play here

1. Trend following entries are based on the break out of an 80-day +/- one standard deviation Bollinger Band. Liquidations occur at the midpoint of the bands which is the same as an 80-day moving average. A global money management stop loss is used for any entry.
2. Swing entries are based on a break out of a percentage of the 10-day average range. Exits occur as a reversal within the first 5 days of the position. Once 5 days have transpired and a position is open, a liquidation occurs at 1/2 of the percent of the 10-day averag range. Again a global money management stop loss is used for any entry.

How to Program Two Algorithms in one Strategy

You can incorporate independent algorithms in one strategy by use the **From Entry** functionality. Take a look at the following code, and you will see the first part determines if the market