

Using MT4 EAs, Strategy Tester, and Optimizer

by David J. Lin

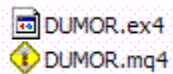
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General Guidelines for EA Usage

To Compile the Source Code:

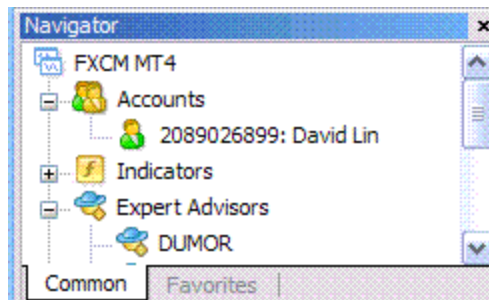
- Save the source code file (.mq4) to the /experts/ sub-directory in your MT4 platform's directory.
- Double-click on the source code file's yellow diamond shaped icon to open it in the MetaEditor. (Alternatively, open the MetaEditor first and open the desired .mq4 file by using File>Open.)



- Press F5 (or click Files>Compile) to compile it.
- This creates an MT4 executable file (.ex4) which is needed for the MT4 platform to run the EA.
- Note: You may save different versions of your EA with different default Input parameters by simply saving and compiling different files which have different values for the input parameters. For example, name one file EA1 with setting default of 1 and another file EA2 with setting default of 2. This will allow you to quickly apply EAs with different default settings to charts.

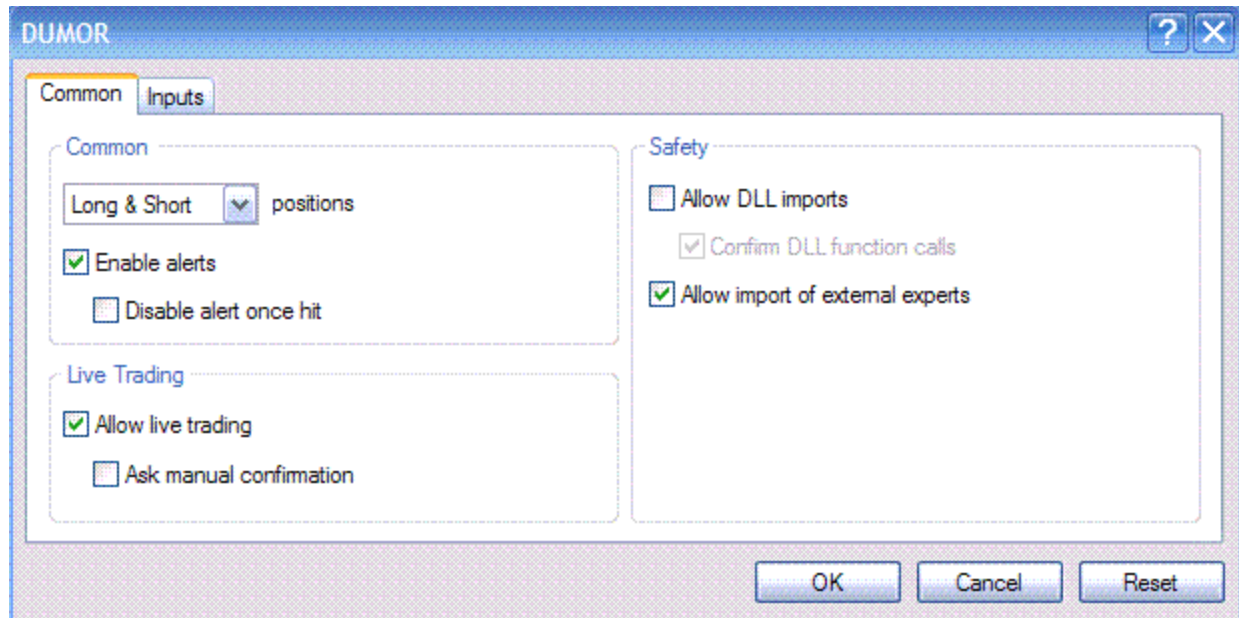
To Apply an EA for Active Trading:

- In the Navigator window, find the “Expert Advisors” category and click on the plus sign or double-click on the word to open up the Experts category:

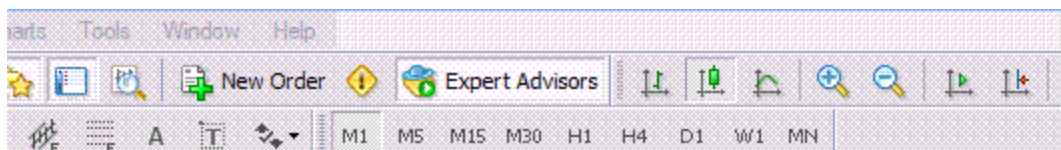


- Open a chart of the desired currency pair by right-clicking on its name in the Market Watch window and selecting “Chart Window.”
- Activate the EA by either click-and-dragging the desired EA onto the chart, double clicking the EA's name, or right-clicking on the EA's name and select “Apply to a chart.”

- The Properties box of the EA will appear first. In the Common tab, make sure “Allow live trading,” is selected, and “Long and Short” positions is selected. In the Inputs tab, choose the desired values for the input parameters. Press OK to activate the EA.



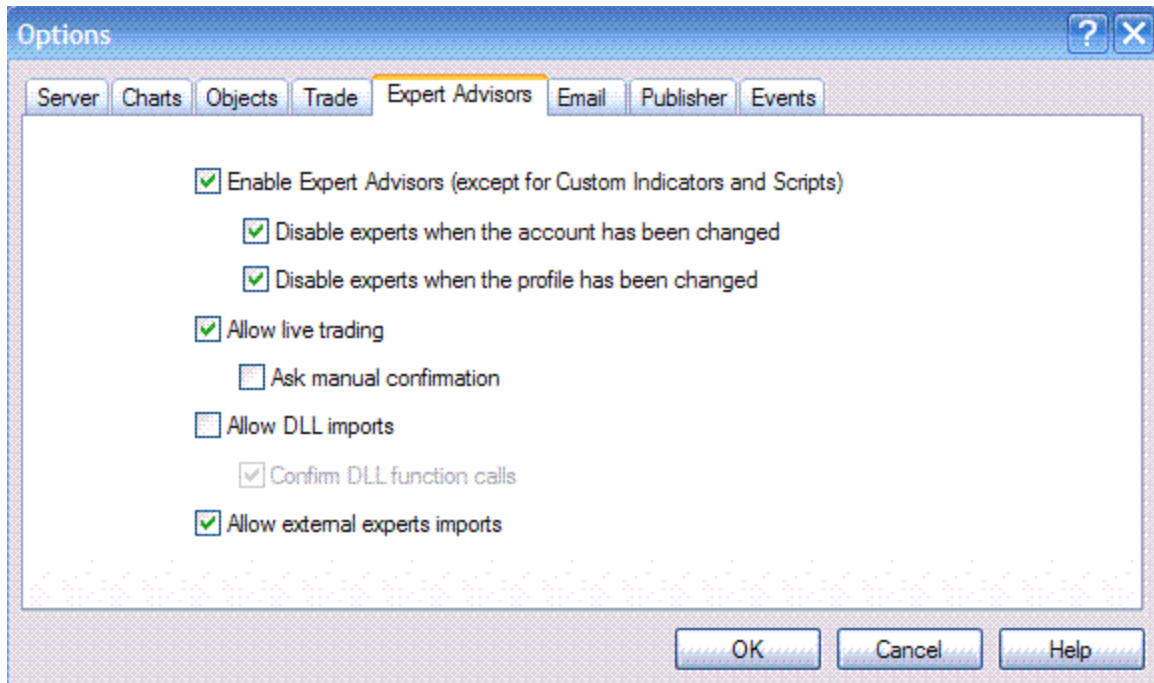
- Make sure the “Experts Advisor” toggle button is activated in the tool bar.



- A smiley-face should appear in the upper-right-hand corner of the chart if the EA is properly activated and ready to trade.



- Note: If a frown-face appears, the “Allow live trading” in the Properties box is not selected. If an “x” appears, the “Experts Advisor” toggle button is not activated in the tool bar.
- If desired, you can default both of these setting to active-trading status so that it will always be ready for live trading, go to Tools>Options>Expert Advisors, and check-mark “Enable Expert Advisors” and “Allow live trading.”



- For even faster application of EAs, you may designate “hotkeys” for each. Right-click on the EA's name, choose “Set hotkey,” and designate a unique keyboard key for it. After the hotkey is set, pressing Alt- along with the chosen hotkey will apply the EA to the active chart.

To Deactivate an EA:

- To turn an EA “off,” simply remove it from the chart by right-clicking anywhere on the chart and selecting Expert Advisors>Remove.
- Or, simply close the chart completely (click on the “x” in the upper-right-hand corner).
- Or, to temporarily disable the EA, toggle the “Experts Advisor” button in the tool bar to the off position (not depressed). Re-toggle (depress) the button to re-activate it. (Using the toggle in this fashion will not re-initialize the EA, only disable its functionality.)

To Re-Start an EA:

Expert Advisors (EAs) will be automatically re-started if any of the following occurs:

- an EA is removed from and re-applied to a chart
 - the timeframe of a chart with an EA attached to it is changed;
 - the input parameters in the properties box of an active EA is changed;
 - the MT4 platform is re-started (turned off and on again) with active EAs running on charts;
 - the source code (.mq4) is re-compiled in the MetaEditor.
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- Note: Re-starting an EA causes it to go through all of its initialization procedures, and if an EA is not properly designed to re-start properly, vital information necessary for continuous function may be lost during the re-initialization process. While re-starts should not affect the operation of EAs which I design, since they are properly coded to handle them, it is generally good operating procedure to keep the frequency of re-starts to a minimum, since re-starting requires the EA to unnecessarily perform initialization routines.

Note: if the connection to the broker's server drops while the platform remains running with active EAs on charts, the EA will continue functioning after re-connection, assuming it was not deactivated during the disconnection.

MT4 EAs are tick-driven, which means that it responds to incoming ticks. If no new ticks arrive, it essentially hibernates, waiting for the next tick to arrive. Thus, during slow markets, it may seem that an EA is not functioning when in fact it is simply waiting for the next tick.

Running the Strategy Tester and Optimizer:

MT4's Strategy Tester offers many powerful analysis and optimization tools, and playing with it is the best way to become familiar with using it. Generally, it is best to run the Strategy Tester and Optimizer when you are not using the EA to actively trade, because substantial computational resources are required in the testing process, which may significantly slow down your computer.

The Strategy Tester methodically runs an EA over historical data, to show you how your strategy would have performed in the past. The following are some general instructions for using it.

Downloading / in-putting the raw data for the test period:

- How much data shows up in your charts is how much data the Strategy Tester has available to use. So, if your charts displays data over the period which you are interested, you can use the Strategy Tester to test over that period. If you want to load more data, you can use the Tools>History Center function to download more, but that data is not your broker's data; it is generic data from MetaQuotes, which may significantly differ from your broker's data. Using generic MetaQuotes data for the testing may yield substantially different results compared to using your broker's data.

Using the Strategy Tester:

- To use the Strategy Tester, simply open the Strategy Tester and go to the "Settings" tab.
- Select the EA, currency pair, desired timeframe (M15), and select "Use Date" to choose the time period over which to perform the testing (From – To). If "Use Date" is not selected, the entire period in the existing data set will be used.
- If you want to watch the EA perform the backtest step-by-step, choose the Visual Mode, but if you just want to get the final results over the period (which is faster), don't use Visual Mode.
- Use the "Every Tick" model for the best results. Be aware, though, that MT4's Strategy Tester does not use real tick data, nor real Ask data for its simulations. Both ticks and Ask are simulated, since the data is entirely Bid-based bars with the smallest time increment of M1 (1 minute). This is an inherent limitation of MT4's Strategy Tester.
- You can also modify the EA parameters in the Experts Properties box, for example, to choose between the position management Options. Specify the desired parameter value in the Inputs tab under the column "Value."
- After the Tester finishes a run, you can open up a chart of the results by clicking "Open chart," where you can visually examine all the trade entries and exits.
- You can examine the results and statistics in the tabs "Results," "Graph," and "Report."
- To make an HTML summary of the results, go to the "Report" tab, right click, and choose "Save As Report."

Optimizing Parameters:

The Optimizer efficiently tests over a range of values for the selected input parameters. This helps you pick out which values performed the best (optimally) over the testing period. Be careful, though, not to fall into the trap of curve fitting the past, that is, over-optimizing the parameters. While optimizing can produce very impressive results, what I like to call “pretty pictures,” it is based on the past, and as it is said, “Hindsight is 20/20.” As it is also said, “Past performance does not guarantee future results.” Nevertheless, optimizing can help you gain an appreciation for how changes in the values of a parameter can affect your strategy's performance over time.

- Click the Optimization box to activate the Optimizer.
- Click on Expert properties in the Strategy Tester (top button on the right-hand side of the Strategy Tester box.)
- Choose the Inputs tab.
- On the left hand side, select (check-mark) the parameters you want to optimize over. You can select as many parameters to optimize over as you want, but realize that the more you choose, the longer the optimization run will take, since it has to run through all of them.
- For each parameter, the three right-most columns are Start, Step, and Stop values, which are the values over which to optimize.
- For example, if you want to optimize a parameter named TakeProfit over the range 10 to 50 pips using 10 pip steps, specify Start=10, Step=10, and Stop=50 for the optimization values in TakeProfit. This will tell the optimizer to test for different values of TakeProfit starting from 10 pips to 50 pips in 10 pip increments, so it will test 10, 20, 30, 40, and 50 pips for this parameter.
- Note: the Value parameter is what the Strategy Tester will use when it runs a normal backtest, when it is not in optimization mode.
- When running the optimization, you can also right-click on your mouse and choose a lot of different options and ways to display the results. It would take too much space to describe every feature of the optimizer, so I encourage you to simply explore and try different things with it. If you have any questions, feel free to ask.

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For more information about trading, MT4 programming, custom indicators, expert advisors (EAs), please feel free to contact me at dave.j.lin@gmail.com, or visit my web page <http://activeone.com/davidjlin/>.

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