Introduction to EasyLanguage

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EasyLanguage Defined

EasyLanguage is a combination of words and punctuation used to create rules or instructions, based on market data, which TradeStation follows to perform one or more analytical tasks.

EasyLanguage is designed to use simple English-like terms that one trader would use to describe a trading idea to another trader. There are certain rules and guidelines we must follow to ensure that the EasyLanguage studies we create can be understood by and applied within TradeStation. Using the correct grammar, statement structure and punctuation is a must when creating custom EasyLanguage documents.   We encourage you to follow these rules from the start to facilitate your learning curve.

Benefits of Learning EasyLanguage

- With EasyLanguage, you can translate your trading ideas into studies and strategies that TradeStation can understand and apply
- You will also have the ability to modify the EasyLanguage in studies and strategies that come "pre-built" in the TradeStation platform
- In addition, learning EasyLanguage allows you to read, understand and learn from what others have already written in EasyLanguage
- Learning EasyLanguage will provide you with a better understanding of the calculation intricacies of technical analysis and strategy trading

Available Market Data

Each bar on a chart contains a certain amount of raw data for analysis. The following is a list of the data contained in each bar of a chart, depending on the type of symbol and interval selected:

- Date
- Time
- Open
- High
- Low
- Close
- Volume
- Ticks
- Futures Open Interest
- Implied Volatility
- Option Volume
- Option Open Interest
- Fundamental Data

As you work with EasyLanguage, one of the basic principles to remember is that TradeStation calculates studies and strategies on each bar. TradeStation processes all EasyLanguage instructions from top to bottom (as written in the TradeStation Development Environment), starting from the first bar on the left side of a chart and repeating the instructions for each bar as it moves to the right.

TradeStation Development Environment

Whenever you create or modify EasyLanguage studies in TradeStation, you'll be working in the TradeStation Development Environment. Think of it as your canvas and analogous to the way you would use Microsoft Word to create and edit Word documents. The TradeStation Development Environment is a full-featured "word-processing" editor for creating and modifying EasyLanguage instructions, which allows you to communicate your trading ideas to TradeStation. New analysis techniques may be created or existing ones may be modified, including indicators and ShowMe™ and PaintBar™ studies, as well as rule-based strategies.
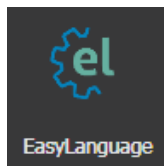
The TradeStation Development Environment is also conveniently designed as a stand-alone application to run independently from the TradeStation platform. A new icon, such as the one on the left, is now available when clicking **Start – All Programs** from the Windows task bar. You may also click the **EasyLanguage** icon from the Apps panel within TradeStation to launch the Development Environment.

Creating New EasyLanguage Documents

To create a new study or strategy in the TradeStation Development Environment, click on the **File – New** menu sequence and choose the type of EasyLanguage document you would like to create from the drop-down menu.

You may also click the **New** button, which is the first button displayed on the toolbar. This button has two clickable areas: clicking the white page will open the same type of EasyLanguage document used previously, while clicking the arrow will drop a menu allowing you to choose the type of EasyLanguage document you want to create.
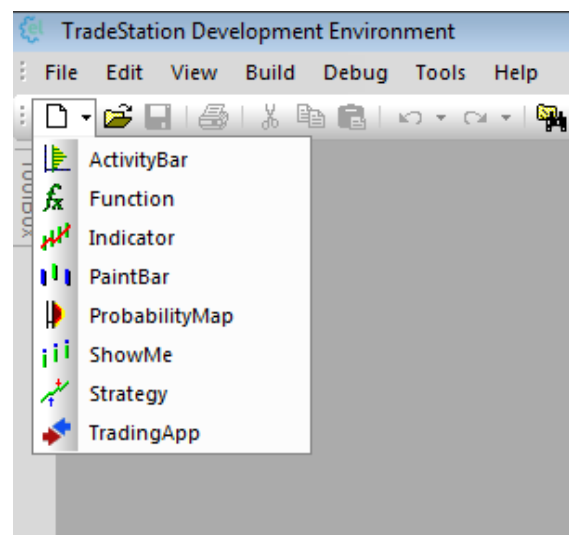
An indicator in TradeStation may be defined as a mathematical calculation using the data from each bar, and then plotting the calculated value for each bar on the chart. Indicators are generally plotted on charts as either a line or histogram.

The three main areas of the TradeStation Development Environment are the Editor, Output Bar and Dictionary.

- **EasyLanguage Editor** – Is launched when a new EasyLanguage document is created or an existing one is opened.

- **EasyLanguage Output Bar** – A desktop bar that returns information about the EasyLanguage document. By default, the Output Bar is displayed at the bottom of the Development Environment.

- **EasyLanguage Dictionary** – A reference dictionary of EasyLanguage words, functions, etc. The Dictionary is displayed as a button on the right that rolls out when active.
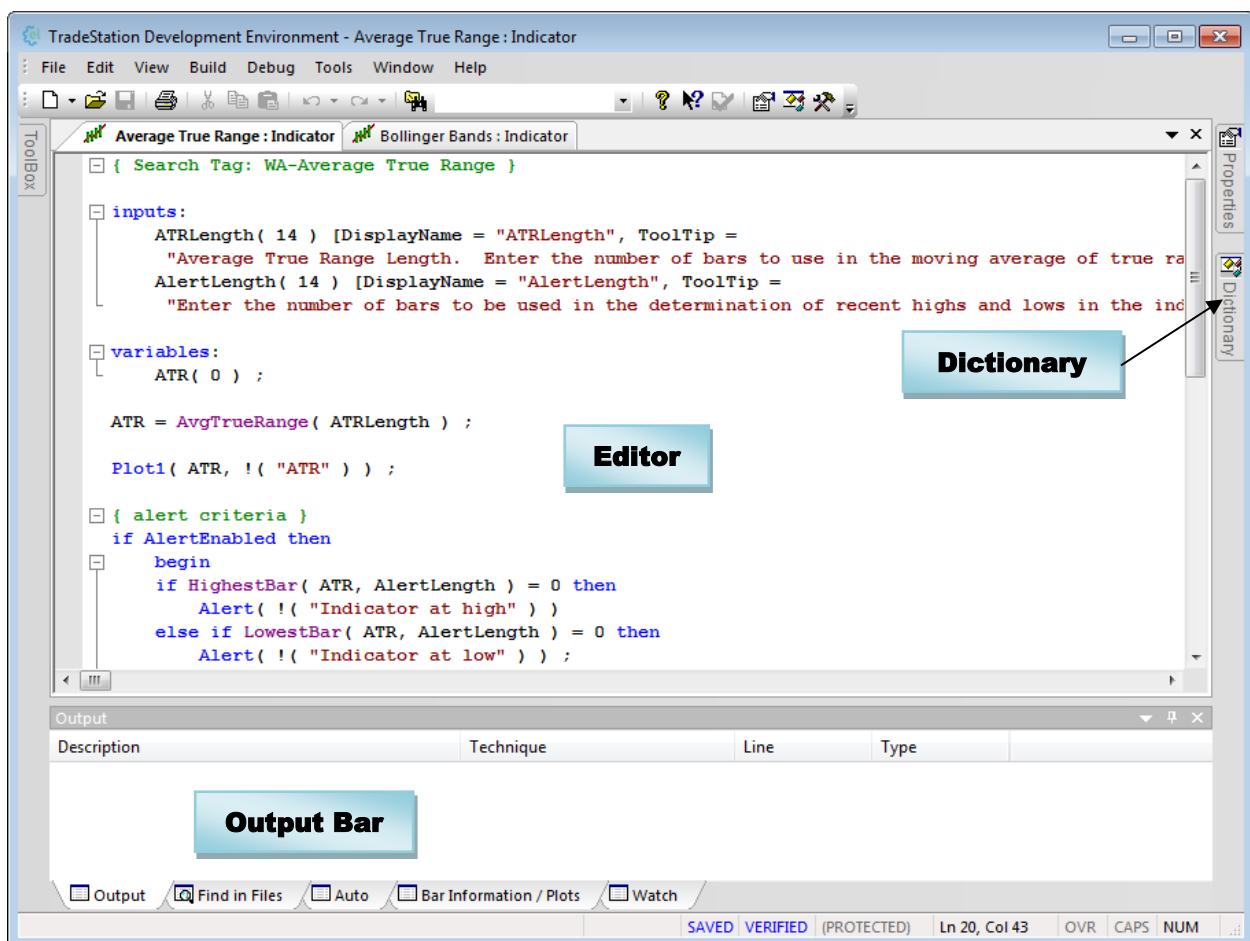

In addition to providing common word-processing features and color-coding for various elements of EasyLanguage, the Development Environment also checks for proper syntax and grammar.

Dictionary Slide Bar

On the right side of the Development Environment, a button labeled **Dictionary** will give you access to the EasyLanguage Dictionary slide bar. The Dictionary can be a tremendous help while editing or creating strategies and analysis techniques.

Clicking any of the categories listed in the left pane will list elements from that category on the top right pane. You may also search for reserved words or functions by typing them in the **Search** field and clicking the green arrow button or pressing Enter on the keyboard. A list of all matching or related EasyLanguage reserved words or functions will appear. Highlighting one of the words will display a short summary and example in the bottom right pane.

Words and functions can be dragged and dropped directly into the EasyLanguage code. The picture on the left displays the results after searching for the word "time." The EasyLanguage Dictionary slide bar simplifies the process of searching and finding the reserved words or functions needed for your code.
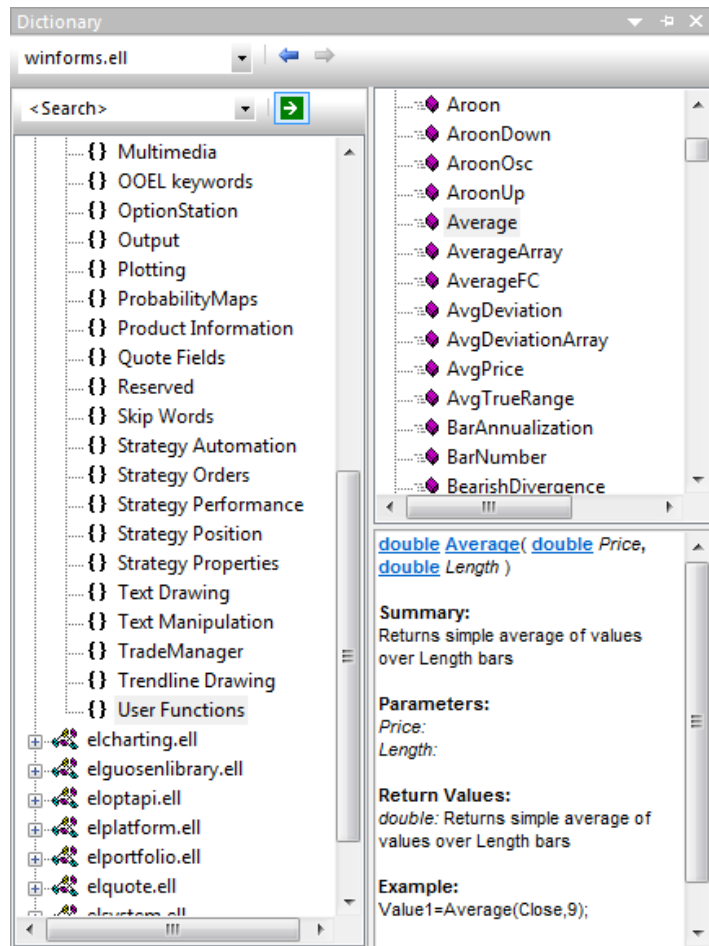
EasyLanguage Output Bar

The EasyLanguage Output Bar enables you to find errors easily and quickly so you can resolve them. Verification ensures the EasyLanguage commands used to create a study or strategy follow the EasyLanguage rules. If a study or strategy contains syntax errors, these errors are recorded in the EasyLanguage Output Bar for further evaluation.

Tip: The EasyLanguage Output Bar appears docked at the bottom of the TradeStation Development Environment; however, you can also float the bar and move it to any location inside or outside the Development Environment.

EasyLanguage Expressions and Statements

Words are the basic building blocks of any language. However, becoming fluent in a language requires the proper use of groups of words to form expressions and, ultimately, statements. Statements are comprised of expressions, like the phrases in a sentence. All EasyLanguage instructions or rules consist of statements, which are like sentences in spoken language. Sentences can express one simple thought or a series of thoughts.

EasyLanguage Punctuation

A critical step in becoming fluent in EasyLanguage is to gain a thorough understanding of its punctuation. Below is a reference to the most common uses of EasyLanguage punctuation.

( )   Parentheses – Used in statement structures for syntax and also algebraically for grouping mathematical operations.

" "   Quotes – Denote a text item (e.g., "plot name") in EasyLanguage.

;   Semicolon – Indicates the end of a statement.

:   Colon – Denotes the declaration of a list.

,   Comma – Separates items in a list.

[ ]   Square brackets – Used to reference data from a previous bar and to displace a plot. Also used in arrays.

{ }   Curly brackets – Any text between curly brackets is notation (remarks) that is not part of the EasyLanguage instructions.

//   Double forward slash – Any text following a double forward slash, for the remainder of that line only, is notation (remarks) and not part of the EasyLanguage instruction.

Line returns, line spacing and paragraph indents are ignored by EasyLanguage and are generally used for improved readability of the code only; they do not affect the EasyLanguage instructions.

Plot Statements

Plot statements instruct TradeStation where to draw plots in a Chart Analysis window or what to place in a cell in a RadarScreen window. They are used for TradeStation indicators and ShowMe and PaintBar studies. A study may contain a maximum of 99 simultaneous plot statements.

Example:
Plot1 (Open, "The Open");

The word Plot1 in the sample plot statement above states that this is the first plot for this study. In this example, TradeStation is being instructed to place a plot at the Open for each bar. "The Open" is the *plot name* and is optional when writing a plot statement; however, assigning a name to a plot will help you identify a specific plot when formatting.

Inputs

An input is a user-editable value used in a study or strategy. It is a placeholder that allows the user to change a value from the **Inputs** tab of the **Format** dialog. This provides flexibility and efficiency when modifying studies and strategies.

The figure below shows the **Inputs** tab in the **Customize Indicator** dialog for TradeStation's **RSI** indicator. As you can see, six inputs are specified and can be changed directly from this dialog.
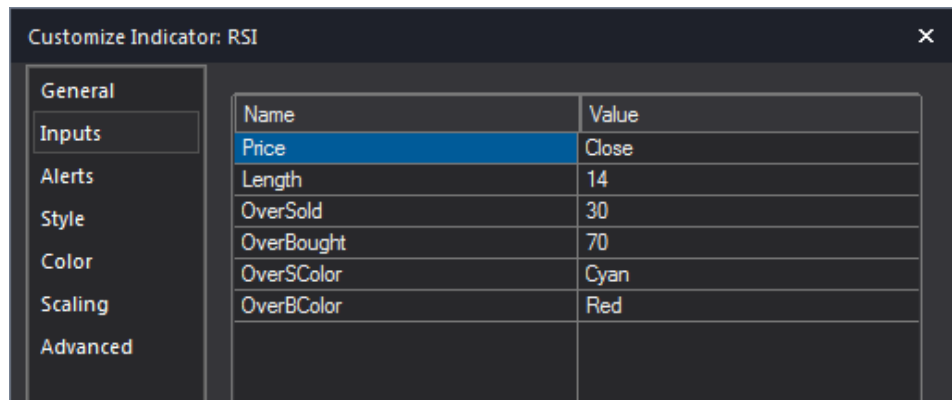
So if you decided to change the **Length** used in the **RSI** calculation, or the numeric levels indicating **OverBought** and **OverSold** conditions, you could easily modify the indicator without having to return to the EasyLanguage Development Environment to do so.

Referencing Data from Previous Bars

Previously occurring prices and other values may be referenced using square brackets, [ ], immediately following the name of the value to be referenced.

Example:
The close of the bar 5 bars ago would be written:
Close[5]

Using Functions

Functions are frequently used formulas or comparisons written in EasyLanguage. They may be called for use in any study or strategy with just a few words, eliminating the need to re-create or repeatedly re-type complex formulas.

The EasyLanguage Dictionary includes hundreds of functions that you may use as you write your own EasyLanguage. Here you will find prewritten functions for RSI, ADX, DMI, Stochastic and many more. This will save you time and make your instructions more efficient.

Writing Alerts in EasyLanguage

Alerts are audiovisual or electronic notifications of specific market events as defined by the user.

- Alerts are triggered only when criteria are true on the last bar of a chart.

- The EasyLanguage instructions for the study must contain the alert criteria.

- Alerts must be "enabled" for the analysis technique, either by the default setting in the EasyLanguage Development Environment or in the **Customize** dialog.

The last two bullet points above are extremely important when working with alerts, especially when writing your own into EasyLanguage documents. Because an alert is usually contingent on an event, EasyLanguage alert instructions are written using "If…then" statements.

ShowMe Studies

A ShowMe study marks each bar on a chart that meets specific criteria. These studies are used for identifying historical occurrences, as well as monitoring for current occurrences, on a chart. Generally, ShowMe studies are not used to mark all the bars on a chart but rather only those on which some condition is true.

Strategies

A trading strategy monitors the market for past and current occurrences of criteria that are position entry and exit points. These occurrences are indicated on a chart and logged for performance reporting purposes. Current occurrences of trading criteria may also be sent to the marketplace for actual execution.

EasyLanguage Order Syntax for Strategies

EasyLanguage uses four trading verbs to identify the market action to be taken in a strategy:

- Buy: establish, or add to, a long position (any existing short position will be covered before a long position is established)

- SellShort: establish, or add to, a short position (any existing long position will be liquidated before a short position is established)

- Sell: sell to liquidate a long position only

- BuyToCover: buy to cover a short position only.

EasyLanguage Seminars

EasyLanguage Boot Camp

EasyLanguage Boot Camp can open up a host of possibilities in your strategy testing and trading. Whether you want to create your own strategies and techniques from scratch, modify existing ones or simply desire a fluency in EasyLanguage to better understand the work of authors and developers, this is the course for you.
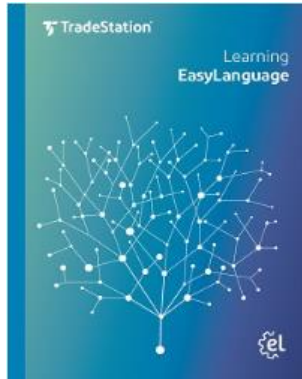
EasyLanguage Boot Camp is a two-day class designed to provide a solid working knowledge of EasyLanguage, with strong emphasis on practical information you can use right away. Our instructors will guide you step by step through exercises that cover creating strategies, indicators, and ShowMe and PaintBar studies, including studies designed specifically for use with RadarScreen.

Implementing Objects in EasyLanguage

Implementing Objects in EasyLanguage is a two-day intensive online course specifically designed for experienced EasyLanguage users who want to learn how to incorporate the new EasyLanguage object features that were released with TradeStation 9.0. Learn how to access any symbol and data programmatically, place orders from an indicator, integrate Excel and build your own windows inside TradeStation.
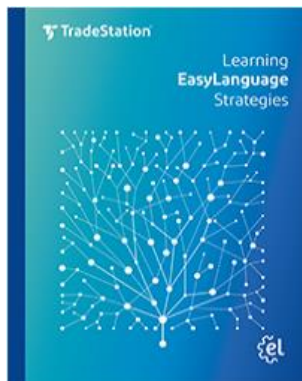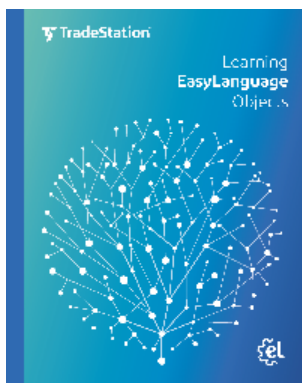
EasyLanguage Books

EasyLanguage Home Study Course

This self-paced home-study course is based on our popular two-day EasyLanguage® Boot Camp online training class. It is designed to teach you EasyLanguage® programming, starting with the fundamentals and continuing through advanced topics that allow you to create your own trading indicators and strategies. The EasyLanguage® Home Study Course includes online resources with answers to all of the course exercises and video answers for all the challenge exercises.

Learning EasyLanguage Strategies

This self-paced course is based on the two-day, live webcast Learning EasyLanguage® Strategies. The goal of this course is to help you become more adept at writing trading strategies in EasyLanguage®. You will accomplish this by creating and examining 19 unique EasyLanguage® strategies and indicators. It is strongly recommended that you attend the EasyLanguage® Boot Camp webcast or purchase the EasyLanguage® Home Study Course before attempting to go through the exercises in this course.

EasyLanguage Objects Home Study Course

This book serves as an introduction to the EasyLanguage® object enhancements that are designed to access market data and place orders within the existing EasyLanguage® framework. The goal of this course is to help you become more familiar with EasyLanguage® objects and how they can be used to extend the existing EasyLanguage® code you with which are already familiar. You will accomplish this by creating and examining a number of unique EasyLanguage® indicators using objects. It is recommended that you have an understanding of and familiarity with the TradeStation platform before beginning this course. This includes items such as creating and managing Chart Analysis windows as well as general file, window, workspace, and desktop management skills.

Exercise 1
Using Formulas and Functions as Inputs

You may use any formula or function when formatting the inputs of any analysis technique or strategy.

Examples:
(High + Low) / 2
(Open + High + Low + Close) / 4
Open – Close
Average (Open – Close, 10)
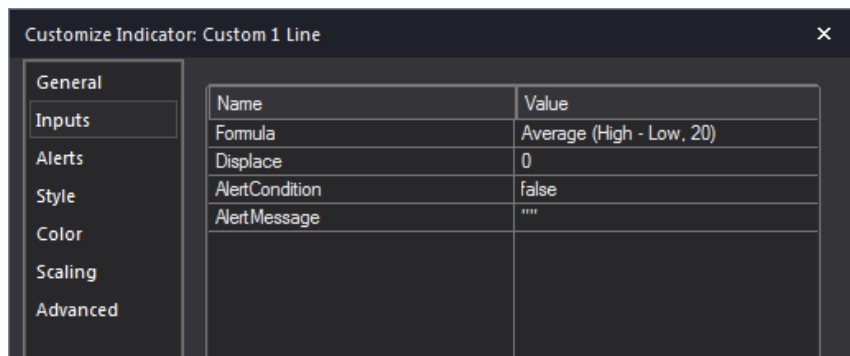
Exercise 2
Creating an Indicator

This indicator plots a line representing the real body of each candle. The value will oscillate between positive and negative values.

Real Body = Difference between Open and Close.

Indicator: **Real Body

```
Value1 = Close – Open;

Plot1 (Value1);
Plot2 (0);
```

Exercise 3
Using EasyLanguage Functions

Modify the Real Body indicator to plot a line representing the average of real body over a user-specified number of bars.

Indicator: **Real Body Avg

```
Value1 = Close – Open;
Value2 = Average (Close – Open, 10);

Plot1 (Value1);
Plot2 (Value2);
Plot3 (0);
```
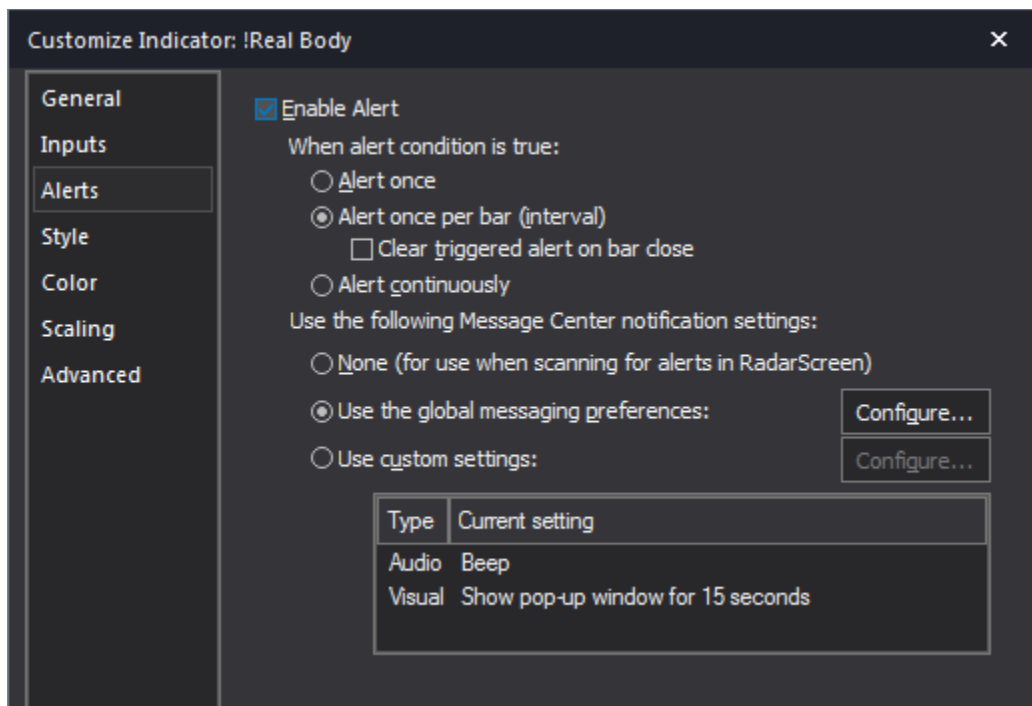
Exercise 4
Creating Alerts

Modify the Average Real Body indicator to generate an alert every time the average crosses the zero line.

Indicator: **Real Body Avg

```
Value1 = Close – Open;
Value2 = Average (Close – Open, 10);

Plot1 (Value1);
Plot2 (Value2);
Plot3 (0);

If Value2 crosses over 0 then
    Alert;
If Value2 crosses under 0 then
    Alert;
```

Customize Indicator: !Real Body   ✕

General
Inputs
Alerts
Style
Color
Scaling
Advanced

☑ Enable Alert
   When alert condition is true:
   ○ Alert once
   ◉ Alert once per bar (interval)
      ☐ Clear triggered alert on bar close
   ○ Alert continuously
   Use the following Message Center notification settings:
   ○ None (for use when scanning for alerts in RadarScreen)
   ◉ Use the global messaging preferences: Configure...
   ○ Use custom settings: Configure...

Type	Current setting
Audio	Beep
Visual	Show pop-up window for 15 seconds

Exercise 5
Creating a ShowMe

This ShowMe will display a dot on the bar that meets specific criteria. In this case, it will identify the bar where the Average Real Body oscillator crosses from positive to negative and vice versa.

ShowMe: **Real Body Cross

Value1 = Average (Close - Open, 10);

If Value1 crosses under 0 then
    Plot1 (Low);

If Value1 crosses over 0 then
    Plot2 (High);

Exercise 6
Creating a Strategy

This strategy will generate a long entry when the Real Body oscillator crosses over the zero line. It will generate a short entry when the Real Body oscillator crosses under the zero line. This strategy is always in the market. Long entries will exit short positions, and short entries will exit long positions.

Strategy: **Real Body Cross

```
Value1 = Average (Close – Open, 10);

If Value1 crosses over 0 then
     Buy next bar at market;

If Value1 crosses under 0 then
     Sell Short next bar at market;
```

Exercise 7
Adding Plots to Indicators

You may create and plot other lines to already existing analysis techniques. This is done by adding plot statements to the EasyLanguage document.

Indicator: RSI

```
Inputs:  Price( Close ), Length( 14 ), OverSold( 30 ),
OverBought( 70 ), OverSColor( Cyan ), OverBColor( Red ) ;

Variables:  MyRSI( 0 ) ;

MyRSI = RSI ( Price, Length ) ;

Plot1( MyRSI, "RSI" ) ;
Plot2( OverBought, "OverBot" ) ;
Plot3( OverSold, "OverSld" ) ;
Plot4( Average (MyRSI, 30) );
```

Exercise 8
Using RadarScreen

Insert custom analysis techniques into a RadarScreen window and monitor hundreds of symbols simultaneously for real-time alerts.

Indicator: **Real Body Avg

Symbol	Interval	Last	Net Chg	Net %Chg	!Real Body PLOT2
Dow Jones Industrial Average					
AAPL	Daily	165.31	0.97	0.59%	0.02
AXP	Daily	94.45	-0.11	-0.12%	-0.11
BA	Daily	344.86	1.70	0.49%	0.80
CAT	Daily	155.44	1.47	0.96%	0.00
CSCO	Daily	41.74	0.51	1.24%	0.03
CVX	Daily	112.14	-1.15	-1.01%	-0.98
DIS	Daily	103.70	-0.42	-0.40%	-0.40
DWDP	Daily	70.29	-0.46	-0.65%	-0.13
GE	Daily	14.77	0.10	0.65%	-0.12
GS	Daily	258.40	2.87	1.13%	0.05
HD	Daily	181.98	-1.74	-0.95%	-0.96
IBM	Daily	152.43	1.68	1.11%	-0.55
INTC	Daily	44.49	0.03	0.07%	-0.27
JNJ	Daily	128.59	-1.37	-1.05%	-0.61
JPM	Daily	113.88	1.45	1.29%	-0.01
KO	Daily	44.01	-0.18	-0.41%	-0.26
MCD	Daily	160.36	-2.04	-1.26%	-0.29
MMM	Daily	229.96	-1.40	-0.61%	-1.25
MRK	Daily	54.76	-0.14	-0.26%	-0.24
MSFT	Daily	89.70	-0.13	-0.14%	-0.12
NKE	Daily	66.97	1.10	1.67%	0.10
PFE	Daily	35.02	0.08	0.23%	-0.13
PG	Daily	80.49	-1.01	-1.24%	-0.55

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