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CUSTOM STUDY LITE FOR MULTI-SECURITY G/BLP CHARTS

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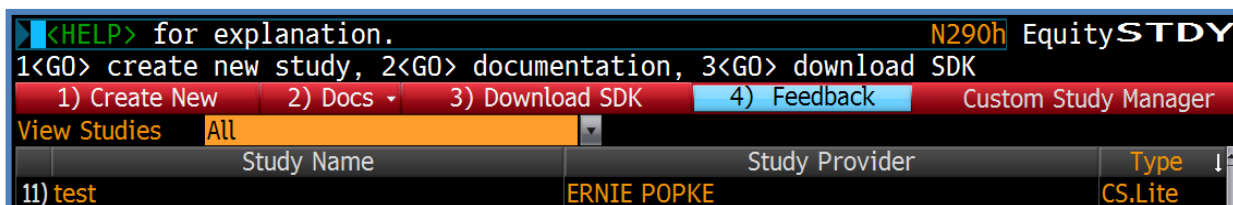
STDY<GO>

STDY<GO> is the Bloomberg function for creating and managing custom studies that you can use with your multi-security G charts. STDY<GO> is the interface for both CS.Lite where you can develop your own studies using the Bloomberg proprietary scripting language and CS.NET where C# or VB.Net are used. Please note that Microsoft Visual Studio is required for CS.NET development. For more information of CS.NET, go to STDY<GO> 2) Docs.

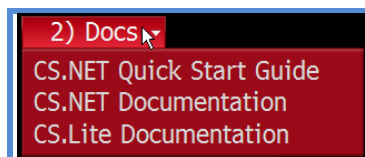
How to add a study using STDY<GO>

Run STDY<GO> to bring up the **Custom Study Manager**. If you are not enabled for this option, please use the Feedback to request enablement. Once enabled, you may use the Feedback button to send us your comments about this new function.

Below is the top of the STDY<GO> display.



Under 2) Docs you will find links to all custom study documentation.



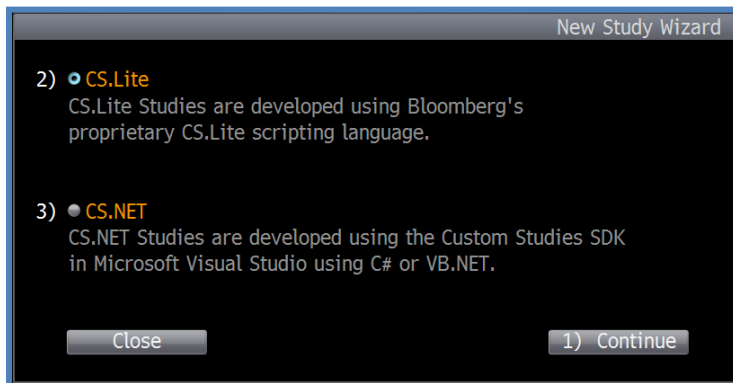
On the Custom Study Manager screen, you may choose to view All studies that have developed using the developed using either CS.Lite or the CS.NET framework and have been published to you. You may choose to limit the view to only those studies Owned by you or to only those Shared with you.



Creating a new Custom Study - CS.Lite vs CS.NET

To create a new custom study, you will have chosen the item 1) Create New from the STDY<GO> display. The next choice you need to make is to decide which custom study environment you want to use. To continue with CS.Lite simply choose 1) Continue.

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If you are also interested in the CS.NET product and have not yet downloaded the Custom Studies SDK, you will need to do so. If you are not yet enabled for the CS.NET product, you may request enablement with the Feedback button.

Creating a New CS.Lite Study

Below is the New CS.Lite Study definition screen.

Parameter Name	Type	Default	Min Value	Max Value	Description
1) <add new parameter>	Integer	0	<input type="checkbox"/> 0	<input type="checkbox"/> 0	<parameter description>

Line Name	Expr. Variable	Visible	Panel	Color	Width	Style
1) <add new line>	<variable from expression>	<input checked="" type="checkbox"/>	Parent Panel		1	Solid Line

The following fields and options are used to define a new CS.Lite study:

- Input Parameters:** Up to 5 parameters can be specified for a study. To add a parameter, enter a **Parameter Name** field and then press <GO>. Parameter Names should be kept fairly short. A parameter can be more exhaustively described in the **Description** field. You can also specify the **Type** of the parameter, either Integer (whole number) or Real (a number that permits decimal points). To set a **Min Value** or **Max Value** for a parameter, first active the value entry field by checking the appropriate checkbox.

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- b) **Expression Variables and Formulas:** Multi-line text entry to enter calculation formula. The user defined study is currently limited to 2000 characters including semicolons and spaces. An expression variable is followed by an “=” and then by the formula that defines a calculation.

More than one formula can be on a single line. A formula can span several lines.

Each formula, including the last one, must end with a semicolon.

- c) **Output Lines:** Option to show a maximum 5 lines in the study. A **Line Name** can have a maximum of 30 characters. In the **Expr. Variable** field, enter the appropriate expression variable from the **Expression**. The study provides an option to display the study as an overlay in the chart's parent panel or in a separate study panel. The destination panel can be chosen for each output line. **Color, Width and Style**, can be changed for each line.

The study can be used on historical and intraday multi-security charts and also monitors.

The study works only on OHLC data. No other data sources are currently supported.

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CS.Lite Study Example

Defining the Study

Here is an example of a custom study.

The screenshot shows the configuration for a custom study in EquitySTDY. The interface includes a title bar with '<HELP> for explanation.' and 'EquitySTDY'. Below the title bar are three tabs: '1) Preview', '2) Publish', and '3) Actions'. The main area is divided into three sections: 'Input Parameters', 'Expression', and 'Output Lines'.

Parameter Name	Type	Default	Min Value	Max Value	Description
1) <add new parameter>	Integer	0	0	0	<parameter description>
2) Period1	Integer	10	<input checked="" type="checkbox"/> 2	<input type="checkbox"/> 0	Period for 1st SMAvg
3) Period2	Integer	21	<input checked="" type="checkbox"/> 2	<input type="checkbox"/> 0	Period for 2nd SMAvg
4) Period3	Integer	5	<input checked="" type="checkbox"/> 2	<input type="checkbox"/> 0	Period for EMAvg

The Expression section contains the following code:

```
Osc=SMAvg(C,Period1)-SMAvg(C,Period2);
EMAO=EMAvG(Osc,Period3);
```

Line Name	Expr. Variable	Visible	Panel	Color	Width	Style
1) <add new line>	<variable from expression>	<input checked="" type="checkbox"/>	Parent Panel	Yellow	1	Solid Line
2) Osc	Osc	<input checked="" type="checkbox"/>	Study Panel	Orange	1	Solid Line
3) Signal	EMAO	<input checked="" type="checkbox"/>	Study Panel	Blue	2	Solid Line

Osc=SMAvg(C, Period1) – SMAvg(C,Period2); indicates that “Osc” is an oscillator line differencing two simple moving averages of Close price, the first with a parameterized period named Period1, the other with a parameterized period named Period2.

EMAO=EMAvG(Osc, Period3); indicates that EMAO is an exponential moving average with a parameterized period named Period3 of the oscillator line “Osc.”

The study will be plotted in a separate pane from the price series. The “Osc” will be plotted as solid orange line with width 1 while the “EMAO” line will be plotted as solid blue line with width 2.

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Previewing the Study

To make sure that the study is working properly, you can preview it on a chart by choosing the 1) Preview option.



Click on the pencil (Edit) icon to preview the Study Properties dialog, both for Parameter Settings and Display Properties.

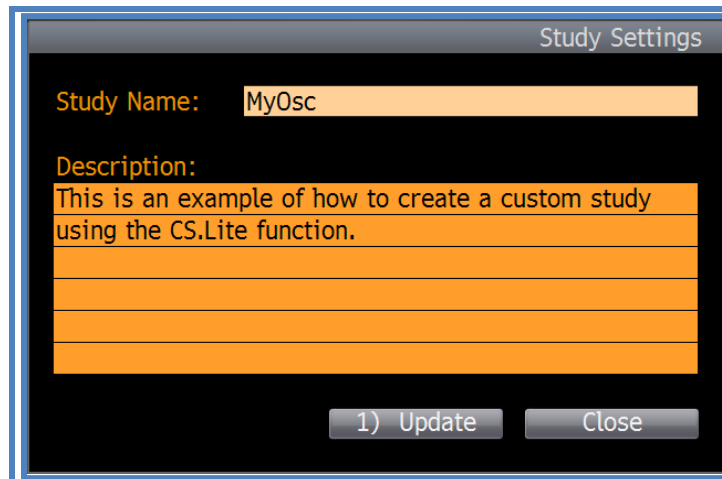


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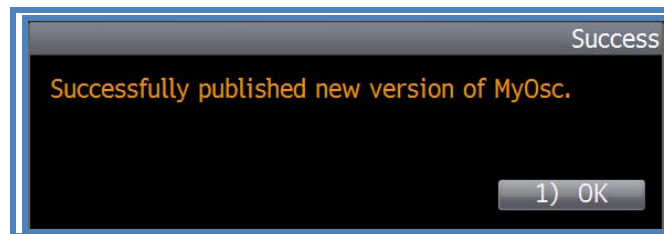


Publishing the Study

To make the study available for use on any multi-security G chart, you must publish the study with the 2) Publish option. Here is where you give the study a name and a more exhaustive description.



After you choose 1) Update, the following message appears

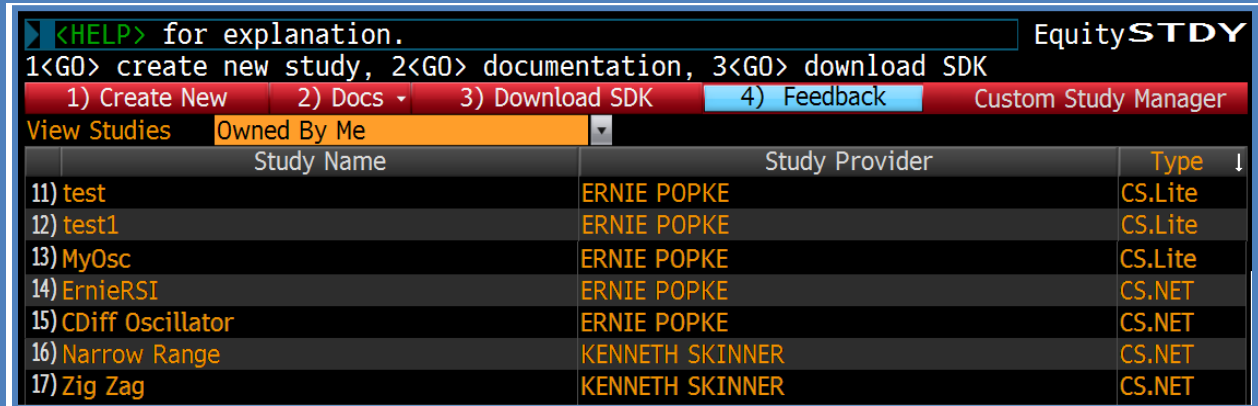


and the study name appears in your STDY<GO> study list.



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To limit the elements in the study list you can switch from viewing all studies to **View Studies Owned by Me**.



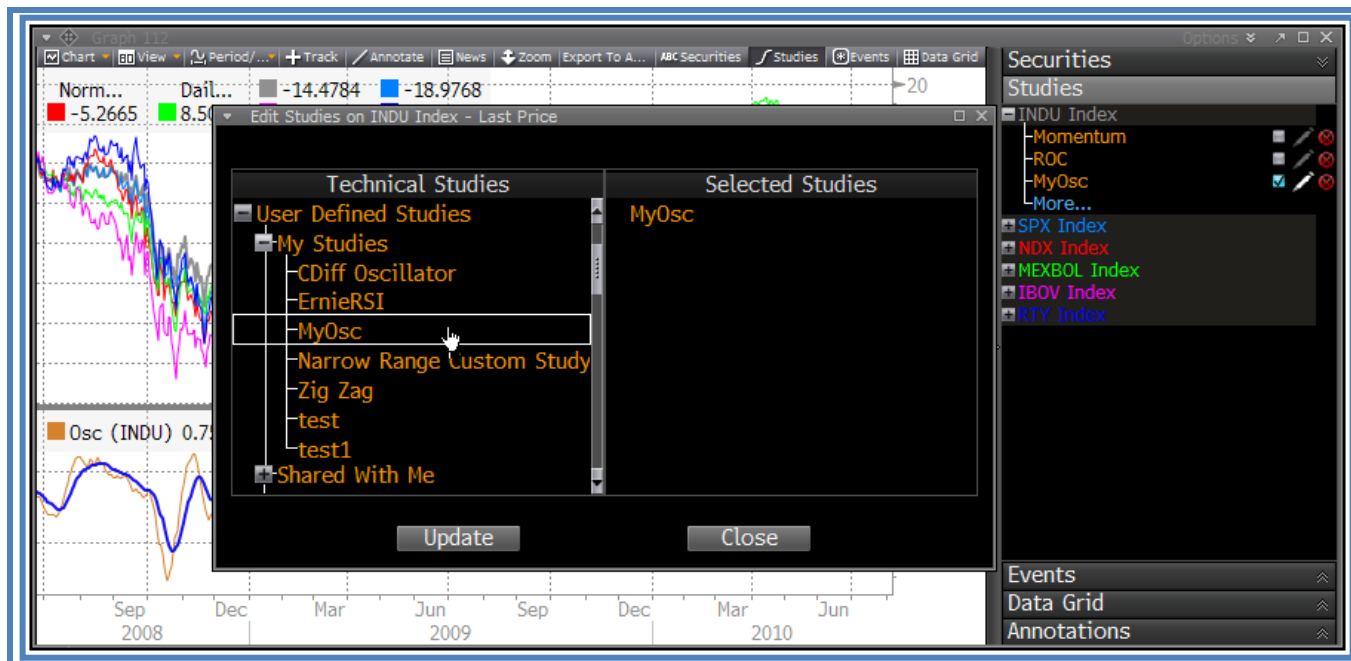
The screenshot shows the EquitySTDY interface. At the top, there is a header with the text "EquitySTDY" and a navigation bar with buttons: "1) Create New", "2) Docs", "3) Download SDK", "4) Feedback", and "Custom Study Manager". Below the navigation bar, there is a section titled "View Studies" with a dropdown menu currently set to "Owned By Me". The main area displays a table of studies.

	Study Name	Study Provider	Type
11)	test	ERNIE POPKE	CS.Lite
12)	test1	ERNIE POPKE	CS.Lite
13)	MyOsc	ERNIE POPKE	CS.Lite
14)	ErnieRSI	ERNIE POPKE	CS.NET
15)	CDiff Oscillator	ERNIE POPKE	CS.NET
16)	Narrow Range	KENNETH SKINNER	CS.NET
17)	Zig Zag	KENNETH SKINNER	CS.NET

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Adding the study to a chart

To add the study to a chart, either create or open a multiple security chart (only multiple security) and click the “Studies” button. Then click “More” and open the “User Defined Studies” tree. Select the study. Once the “Update” button has been pressed, the study title will appear in the pane showing the studies selected.



The study works just like any other G/BLP study and has Y axis labels, track mouse, data available to copy to clipboard, study side panel functionality, context menus and tooltips.

Sending a Study to Another User

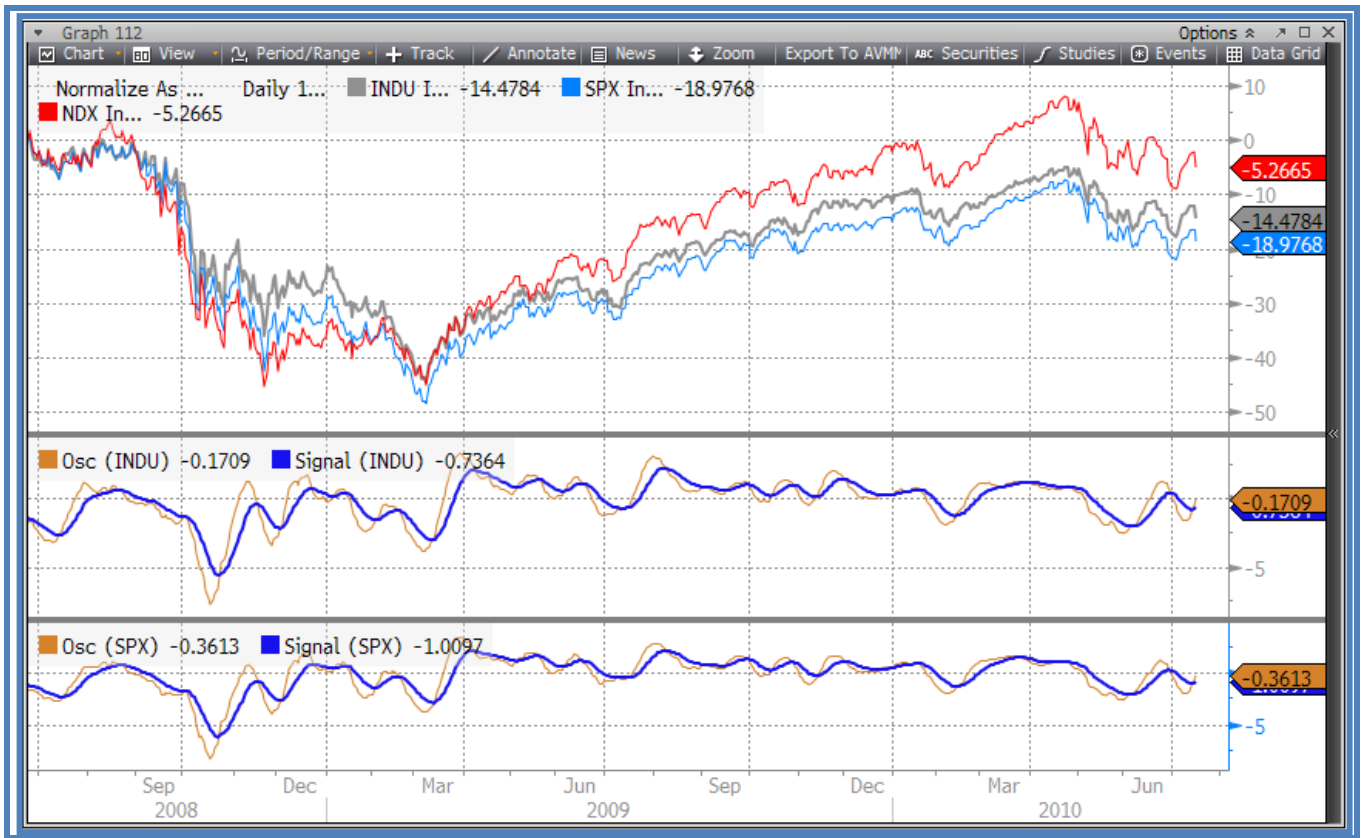
After you have created a custom study and given it a name, you will find it in the STDY<GO> study list. Right-click on the line with the study name and select Edit Study Settings to display the Study definition screen. A selected study can be sent to another user from **3) Actions Send Study**. The study will appear in the receiving user’s **MyStudies** section of the Study Manager of a multi-security G chart.

Sharing a CS.Lite study is currently not supported. When sharing/sending a chart which has a CS.Lite study displayed, the study will not appear on the receiving user’s screen. It must be manually added.

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MyOsc Chart Display

Below is the display of the custom study name “MyOsc” defined above. Just like any other study, the visibility of the study can be controlled using the study side panel.



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CS.Lite Formulas

Custom formulas can combine studies with mathematical and logical operators to produce values which can be displayed as lines in custom studies. A simple example is the standard oscillator formula:

$$\text{Oscillator} = \text{SMavg}(C,10) - \text{SMAvg}(C,20);$$

In the example above the Input parameter to the simple moving average study has been set to C which is the syntax for the close price. There are five data types available for use within the formula:

O = open, H = high, L = low, C = close, and V = volume.

Here is another example:

$$\text{TrailingStop} = (L - 0.25 * \text{ATR}(H,L,C,14,\text{Simple})) << 1;$$

In this example the trailing stop is just the prior low less 0.25 times the 14 period average true range.

Data Types supported:

Data Type	Syntax
Open Price	O
High Price	H
Low Price	L
Close Price	C

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Operators supported:

In the definition of the various studies which follows, the word “Input” refers to the data used to a calculation , either with an operator

Description	Operator	Example
Accessing future data (visually shifts study line left)	<<	C<<<1 gives tomorrow's Close price
Accessing previous data (visually shifts study line right)	>>	C>>>1 gives yesterday's Close price
Study line selection	[]	TAS(H,L,C,15,4,5,3)[DSS] selects DSS line of the TAS study (more on that below)
End of statement	;	;
Assignment of an expression in a variable	=	a1=C>>>10;
Addition	+	Input1 + Input2
Subtraction	-	Input1 – Input2
Multiplication	*	Input1 * Input2
Division	/	Input1 / Input2
Remainder	%	Input1 % Input2
Negation	-	- Input
Greater than	>	Input1 > Input2
Less than	<	Input1 < Input2
Greater than or equal	>=	Input1 >= Input2
Less than or equal	<=	Input1 <= Input2
Equal	==	Input1 == Input2
Not equal	!=	Input1 != Input2
Or		Input1 Input2
And	&&	Input1 && Input2
Not	!	! Input
Crosses	X	Input1 X Input2
Crosses above	XU	Input1 XU Input2
Crosses below	XD	Input1 XD Input2

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Moving Averages Supported:

Exponential Moving Average

- Syntax: EMAvg(Input, Period)
 - Input Formula
 - Period Integer

Simple Moving Average

- Syntax: SMAvg(Input, Period)
 - Input Formula
 - Period Integer

Triangular Moving Average

- Syntax: - TMAvg(Input,Period)
 - Input Formula
 - Period Integer

Variable Moving Average

- Syntax: - VMAvg(Input,Period)
 - Input Formula
 - Period Integer

Weighted Moving Average

- Syntax: - WMAvg(Input, Period)
 - Input Formula
 - Period Integer

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Other Studies Supported:

AverageLine

- Syntax: - AvgLine(Input, Period) [Output]
 - Input Formula
 - Period Integer
 - Output (AverageLine, Deviation3Up, Deviation2Up, Deviation1Up, Deviation3Dn, Deviation2Dn, Deviation1Dn)

Average True Range

- Syntax: - ATR(InputHi, InputLo, InputCl, Period, MAType)
 - InputHi Formula
 - InputLo Formula
 - InputCl Formula
 - Period Integer
 - MAType (Exponential or Simple)

Acc/Dist Oscillator

- Syntax: - ADO(InputOpen, InputHi, InputLo, InputClo, MAType, Period)[Output]
 - InputOpen Formula
 - InputHi Formula
 - InputLo Formula
 - InputCl Formula
 - Period Integer
 - MAType (Exponential, Simple, Weighted)
 - Output (ADO, Signal)

Bollinger Bands

- Syntax: - Boll(Input, Period, UpperFactor, LowerFactor)[Output]
 - Input Formula
 - Period Integer
 - UpperFactor FloatingPoint
 - LowerFactor FloatingPoint
 - Output (BollMavg, UpperBand, LowerBand, Bandwidth, PercentB)

Chaikin Oscillator

- Syntax: - CHKO(InputOpen, InputHi, InputLo, InputClo, InputVolume)
 - InputOpen Formula
 - InputHi Formula
 - InputLo Formula
 - InputCl Formula

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- InputVolume Formula

Commodity Channel Index

- Syntax: - CMCI(InputHi, InputLo, InputCl, Period)
 - InputHi Formula
 - InputLo Formula
 - InputCl Formula
 - Period Integer

Directional Move Index

- Syntax: - DMI(InputHi, InputLo, InputCl, Period)[Output]
 - InputHi Formula
 - InputLo Formula
 - InputCl Formula
 - Period Integer
 - Output (PlusDMI, MinusDMI, ADX, ADXR)

Fear/Greed

- Syntax: - Radar1FG(InputHi, InputLo, InputCl, Sensitivity, FirstLookback, LookBack, AlertLevel)[Output]
 - InputHi Formula
 - InputLo Formula
 - InputCl Formula
 - Sensitivity Integer
 - FirstLookBack Integer
 - LookBack FloatingPoint
 - AlertLevel FloatingPoint
 - Output ((Radar, BullAlert, BearAlert)

Hurst

- Syntax: - Hurst (Input, Period)
 - Input Formula
 - Period Integer

Ichimoku - GOC

- Syntax: - GOC(InputHi, InputLo, InputClo, Conversion, Base, Lead, Lag) [Output]
 - InputHi Formula
 - InputLo Formula
 - InputCl Formula
 - Conversion Integer
 - Lead Integer

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- Lead Integer
- Lag Integer
- Output (BaseLine, ConversionLine, Lagging, Leading1, Leading2)

Keltner Bands

- Syntax: - KLTN(InputHi, InputLo, InputClo, BandPeriod, MiddlePeriod, UpperBand%, LowerBand%) [Output]
 - InputHi Formula
 - InputLo Formula
 - InputCl Formula
 - BandPeriod Integer
 - MiddlePeriod Integer
 - UpperBand% Float
 - LowerBand% Float
 - Output (MiddleBand, UpperBand, LowerBand)

Moving Average Convergence / Divergence

- Syntax: MACD(Input, Period1, Period2 ,Period3)[Output]
 - Input Formula
 - Period1 Integer
 - Period2 Integer
 - Period3 Integer
 - Output (MACD1, MACD2, Signal)

MaxMin

- Syntax: - MaxMin(InputMax, InputMin, Period, CalcRetrace, Retracement)[Output]
 - InputMax Formula
 - InputMin Formula
 - Period Integer
 - CalcRetrace (true, false)
 - Retracement FloatingPoint
 - Output (Min, Max, Retracement)

Moving Average Envelope

- Syntax: - MAE(Input, Period, UpperBand, LowerBand)[Output]
 - Input Formula
 - Period Integer
 - UpperBand% Float
 - LowerBand% Float
 - Output (MiddleBand, UpperBand, LowerBand)

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Moving Average Oscillator

- Syntax: MAO(Input, OscType, MAType1, MAType2, MAType3, Period1, Period2, Period3)[Output]
 - Input Formula
 - OscType (Difference, Ratio, Percentage)
 - MAType1 (Simple, Exponential, Weighted, Variable, Triangular)
 - MAType2 (Simple, Exponential, Weighted, Variable, Triangular)
 - MAType3 (Simple, Exponential, Weighted, Variable, Triangular)
 - Period1 Integer
 - Period2 Integer
 - Period3 Integer
 - Output (Osc, Signal, Diff)

Parabolic

- Syntax: - PTPS(InputHi, InputLo, AccelFactor, StartFactor, MaxFactor)
 - InputHi Formula
 - InputLo Formula
 - AccelFactor FloatingPoint
 - StartFactor FloatingPoint
 - MaxFactor FloatingPoint

Rate Of Change

- Syntax: - ROC(Input, Period)
 - Input Formula
 - Period Integer

Relative Strength Index

- Syntax: - RSI(Input, Period)
 - Input Formula
 - Period Integer

REX Oscillator

- Syntax: - Rex(InputOpen, InputHi, InputLo, InputClo,rexPeriod,signalPeriod)[Output]
 - InputOpen Formula
 - InputHi Formula
 - InputLo Formula
 - InputCl Formula
 - rexPeriod Integer
 - signalPeriod Integer
 - Output (REX,Signal)

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Stochastics

- Syntax: - TAS(InputHi, InputLo, InputCl, PeriodK, PeriodD, PeriodDS, PeriodDSS)[Output]
 - InputHi Formula
 - InputLo Formula
 - InputCl Formula
 - PeriodK Integer
 - PeriodD Integer
 - PeriodDS Integer
 - PeriodDSS Integer
 - Output (K, D, DS, DSS)

Trading Envelope

- Syntax: - TE(Input,upperBandFactor,lowerBandFactor)[Output]
 - Input Formula
 - upperBandFactor Float
 - lowerBandFactor Float
 - Output (UpperBand,LowerBand)

Trender

- Syntax: - Trender(InputHi, InputLo, InputCl, Sensitivity, useClose) [Output]
 - InputHi Formula
 - InputLo Formula
 - InputCl Formula
 - Sensitivity Integer
 - useClose true or false
 - Output (TrendUp, TrendDown)

William's Percent R

- Syntax: - WLPR(InputHi, InputLo, InputCl, Period)
 - InputHi Formula
 - InputLo Formula
 - InputCl Formula
 - Period Integer

Erlanger Trend Direction

- Syntax: - ETD(InputOpen, InputHi, InputLo, InputClo)[Output]
 - InputOpen Formula
 - InputHi Formula
 - InputLo Formula
 - InputCl Formula
 - Output (UpTrend, Rally, PullBack, DownTrend)

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Some useful Examples of custom studies:

Description	Calculations
10 period Simple Moving Average + 10	A1=SMAvg(C,10) + 10;
5 period Simple Moving Average of a 10 period exponentially smoothed True Range	A1= SMAvg(ATR(H,L,C,10,Exponential),5);
Standard Oscillator: Differences of 2 Moving Averages with periods of 10 and 20	avg1=SMAvg(C,10); avg2=SMAvg(C,20); S=avg1 - vg2;
Simple Moving Average shifted to the right by 5 points	A1=SMAvg(C,10) >> 5;
Exponential Moving Average shifted to the left by 10 points	A1=EMAvg(H,20) << 10;
TRIX Study	a1=EMAvg(C,10); a2=EMAvg(a1,10); a3=EMAvg(a2,10); TRIX=(a3 - (a3>>1)) / (a3>>1);
Accumulation/Distribution Line	A1=((C - L) - (H - C))/(H - L); A2=A1 * V;
Kairi Indicator	A1= SMAvg(C,20); A2=((C - A1) / A1) * 100;
Exponential Moving Average of the DSS output of the TAS Study	A1=TAS(H,L,C,15,4,5,3)[DSS]; A2=EMAvg(A1,20);
TAS * DMI * MACD / RSI	A1=TAS(H,L,C,15,4,5,3)[DSS]; A2=DMI(H,L,C,9)[MinusDMI]; A3=MACD(C,12,26,9)[Signal]; A4= (A1*A2*A3) / RSI(C,14);
Study Event: SMAvg crosses above Open	A1=SMAvg(C,10) XU O
Study Event: RSI crosses above 60 and the High crossed above the upper Bollinger band	A1=RSI(C,14) >60 && H XU Boll(C,20,2.0,2.0)[UpperBand];