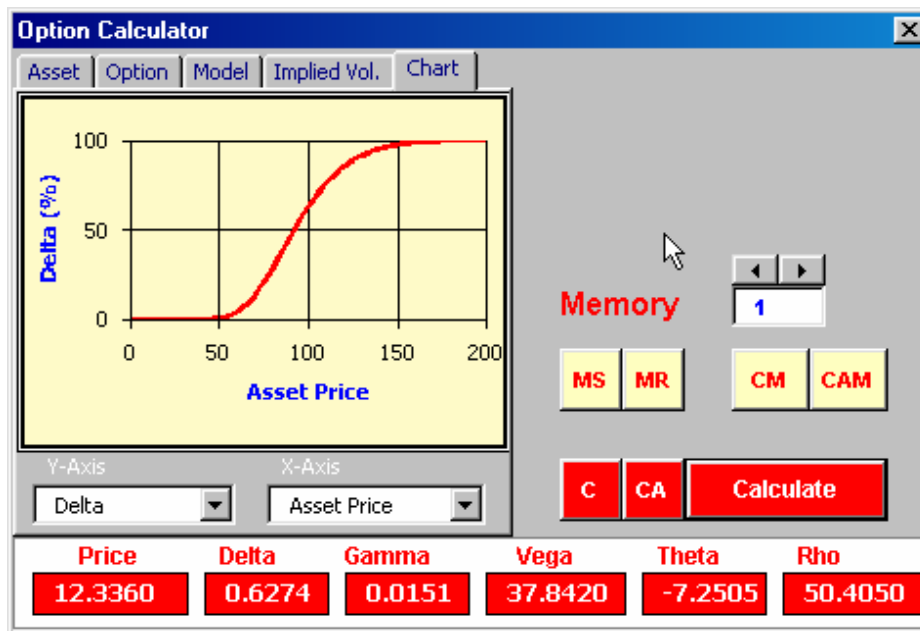


Clip-On Tools

Version 2.4

User Guide



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Installation

1. Hardware Requirements

- Pentium PIII or higher (PIV recommended)
- Windows XP
- 64MB RAM or greater (128Mb recommended)

2. Software Requirements

- Microsoft Excel 2000-2003

3. Installation

The following files are contained in the installation zip file:

- Clip-On Tools Version 20.xls
- Msdatagr.d.ocx
- Mscomct2.ocx
- Mschrt20.ocx

Copy the workbook file to a folder of your choice (e.g. My Documents)

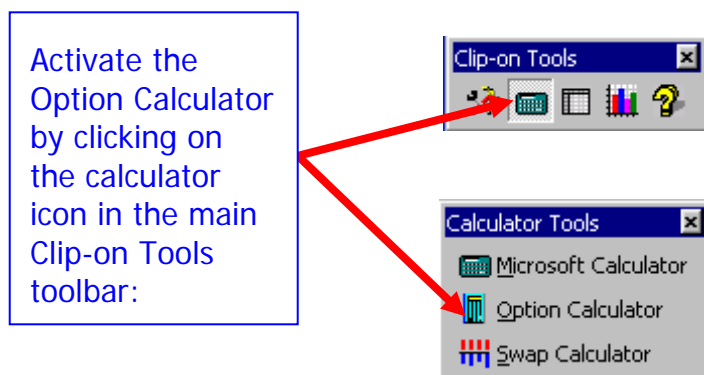
Copy the OCX files to the windows\system or windows\system32 subdirectory (do not overwrite later versions if they already exist in that directory).

4. Starting Clip-On Tools

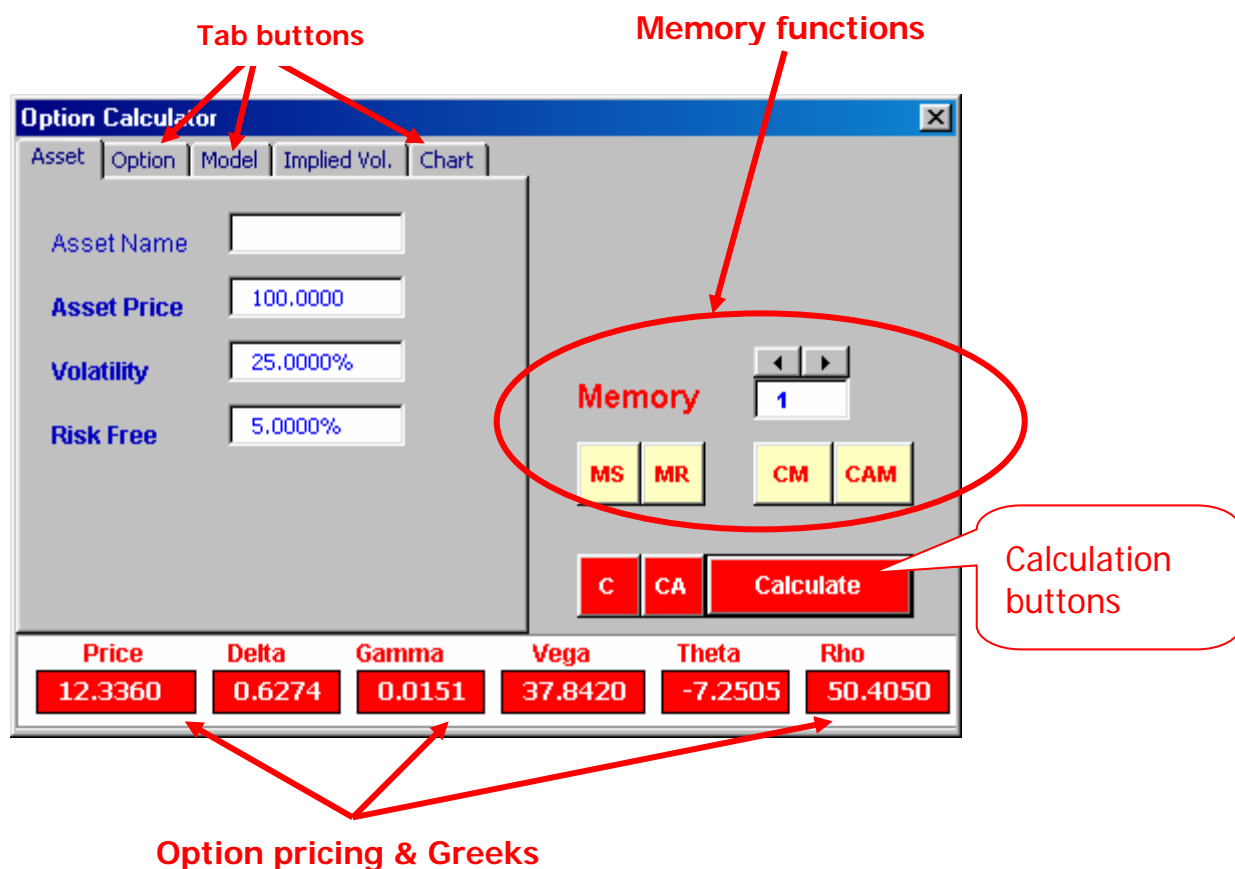
Start Microsoft Excel and load the Clip-On Tools workbook or double click on the workbook file. The program will automatically load and install the software components it requires.

Option Calculator

5. Starting the Option Calculator



The Option Calculator starts up with a default 1-year call option struck at \$100 on a stock priced at \$100, with a 25% annual volatility.



6. Calculating Option Prices and Greeks

Click the Option tab at the top of the calculator to check the option characteristics. Change the strike price from \$100 to \$110 and press the <Calculate> button. The Option Calculator computes the option price (\$8.0624) and all the Greeks.

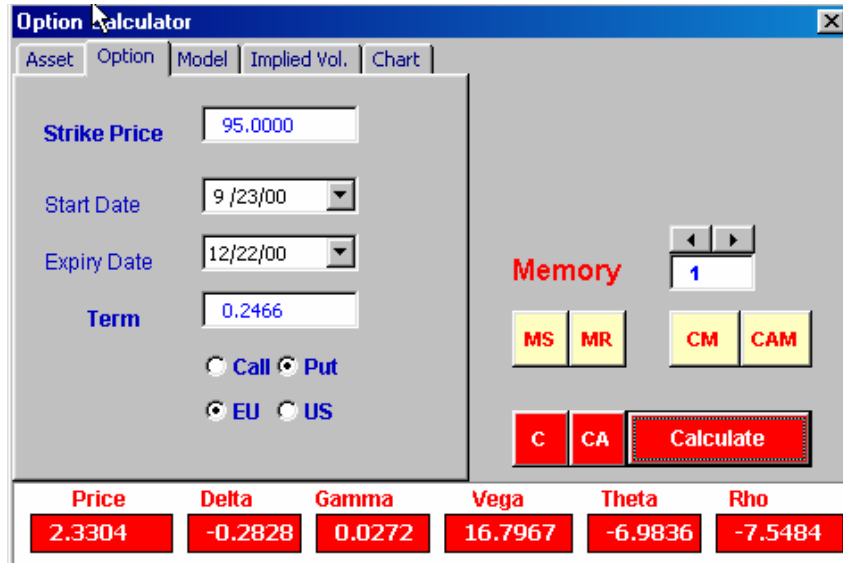
Price	Delta	Gamma	Vega	Theta	Rho
8.0264	0.4776	0.0159	39.8312	-6.9655	39.7311

Try calculating the price of a \$95 strike put option expiring on Dec 22 2000.

Change the strike price to 95, select the <Put> button, and then click on the expiry date. A pop-up calendar will appear.

Price	Delta	Gamma	Vega	Theta	Rho
8.0264	0.4776	0.0159	39.8312	-6.9655	39.7311

Press the scroll-back button to page back through the months until you find the right month, and then select the date you want by clicking on it. Option Calculator fills in the date and computes the term of the option. Now you can calculate the option price (and Greeks) by pressing the <Calculate> key.



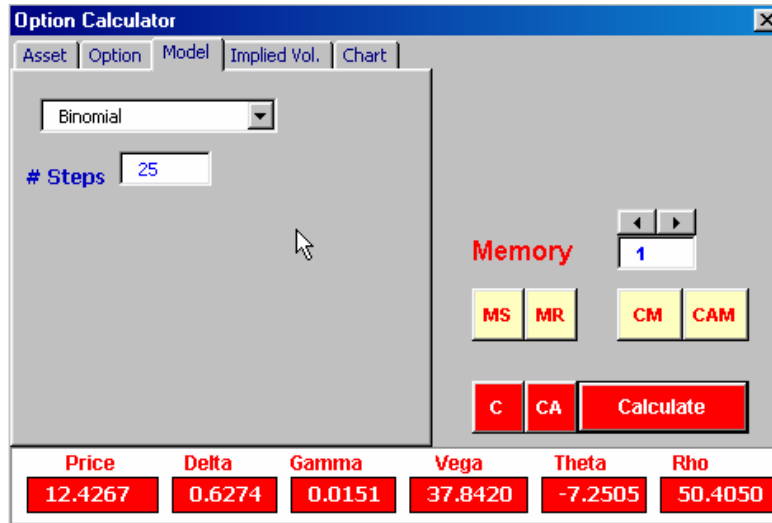
Press the <CA> button to clear the Option Calculator contents and restore the default values.

7. Selecting the Option Model

By default the Option Calculator uses the vanilla Black-Scholes model, but you may wish to use other models which are included in the Calculator:

- Binomial
- Trinomial
- Black 76
- Merton
- Garman-Kohlhagen
- Roll-Geske-Whaley
- Barone-Adesi-Whaley
- Bjerksund-Stensland
- Jump Diffusion

For example, let's use the binomial model to calculate the value of the default call option. Select the <Model> tab at the top of the option calculator and you will see a drop-down box containing a list of available models (which by default is set to Black-Scholes). Select the Binomial model, set the number of steps to 25 and click the <Calculate> button.

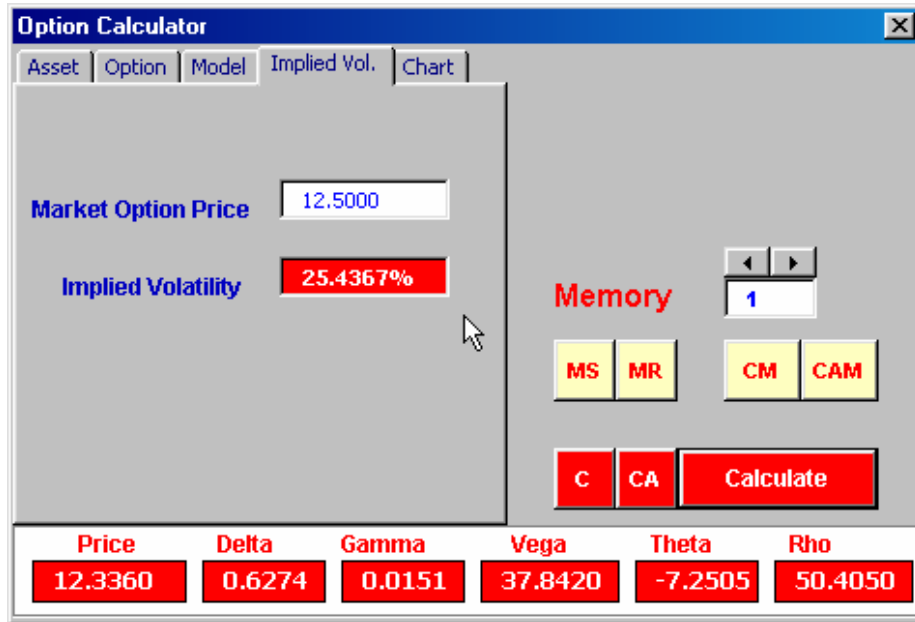


The model estimate the call option value to be 12.4267. Repeat the exercise for a larger number of steps and you will find that, as the accuracy improves, the estimated option value converges to 12.3360, the value calculated using the Black-Scholes model.

Now let's calculate the value of a call option struck at \$100, on a stock paying a (continuous) dividend yield of 2% per annum. Select the Merton model from the list of available models, enter 2% for the dividend yield, and recalculate. The call option is worth \$11.1238.

8. Implied Volatility

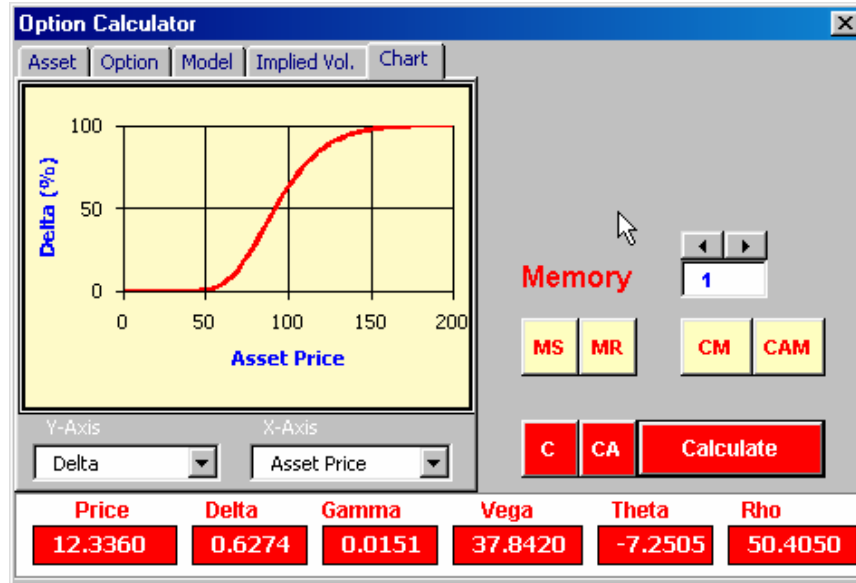
To estimate the implied volatility of an option, go to the <Implied Vol.> tab and enter the market price of the option. Let's say we have a mid-market price of \$12.5 for our default call option. Enter this market price and recalculate. The Option Calculator computes the implied volatility to be 25.4367%, compared to the stock volatility of 25%.



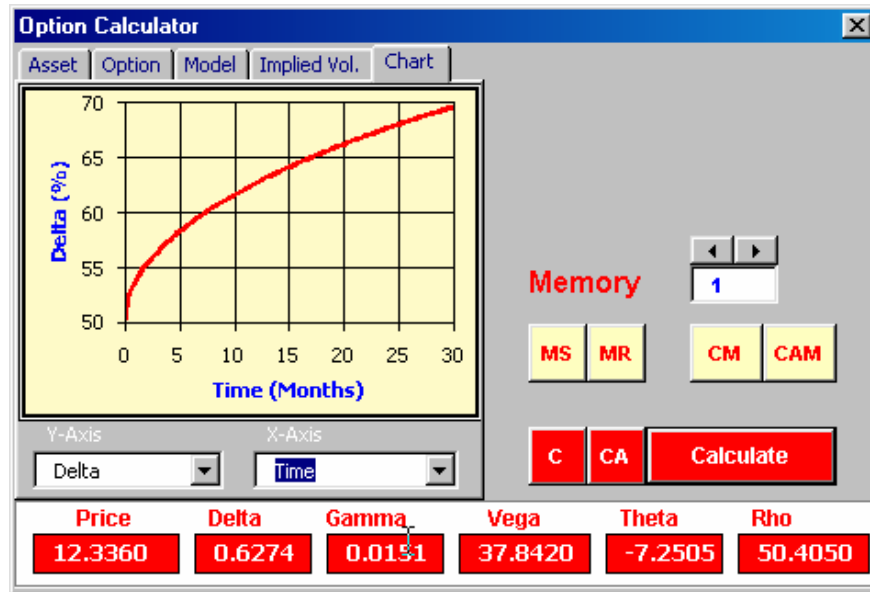
Price	Delta	Gamma	Vega	Theta	Rho
12.3360	0.6274	0.0151	37.8420	-7.2505	50.4050

9. Charts

Option Calculator comes with an extensive set of charting functions that allow you to cross-plot any two option characteristics. To go to the charting functions select the <Chart> tab. By default, the chart is set to plot option price against asset price. Let's change this to plot option delta against asset price. Simply select <delta> for the chart y-axis and the Option Calculator immediately plots the familiar delta-characteristic function.



You might want to see how delta varies with time to maturity. Simply select time for the X-axis and the following chart is generated:



10. Memory Functions

Clip-On Tools Option Calculator comes with a set of 20 memories that can be used to store options data, including calculated prices and Greeks.

6.1 Storing in Memory

Let's begin by storing the default call option in the 1st memory location.

Click on the <CA> button and recalculate. Then press the <MS> (memory store button). The Calculator stores the option data in the memory location specified (set to 1 by default).

You will see that the Option Calculator opens up a Worksheet named <Memory>, which contains a table containing 20 memory locations. The default option is stored in the first memory location.

Memory	Asset Name	Asset Price	Volatility	Strike Price	Term	Put/Call	Estimated Price	Market Price	Implied Volatility	Quantity
>> 1		100.0000	0.2500	100.0000	1.0000	0	12.3360	0.0000	0.0000%	
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										

Option Calculator

Asset Option Model Implied Vol. Chart

Strike Price: 100.0000

Start Date: 9 /23/00

Expiry Date: 9 /23/01

Term: 1.0000

Call Put

EU US

Memory: 1

MS MR CM CAM

C CA Calculate

Price	Delta	Gamma	Vega	Theta	Rho
12.3360	0.6274	0.0151	37.8420	-7.2505	50.4050

Notice how the current memory location is highlighted with the >> symbol, and the data is highlighted in bold type.

Now let's store a different option in memory 2. Return to the Option Calculator, click on the <Option> tab, enter a strike price of 110 and recalculate. Then increment the memory location to 2 and click the <MS> button. The second option is stored in memory 2.

6.2 Recalling Data from Memory

To recall option data from memory, simply select the memory location where the data is stored and press the <MR> (memory recall) button. The option data is transferred to the Option Calculator.

6.3 Clearing Data from Memory

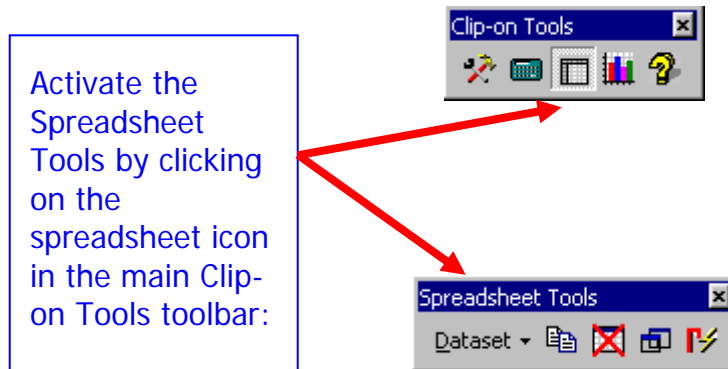
The <CM> button will delete the data stored in the current memory location.

The <CAM> button will delete data from all memory locations.

In both cases the user is prompted to confirm the deletion.

Spreadsheet Tools

1. Starting Spreadsheet Tools

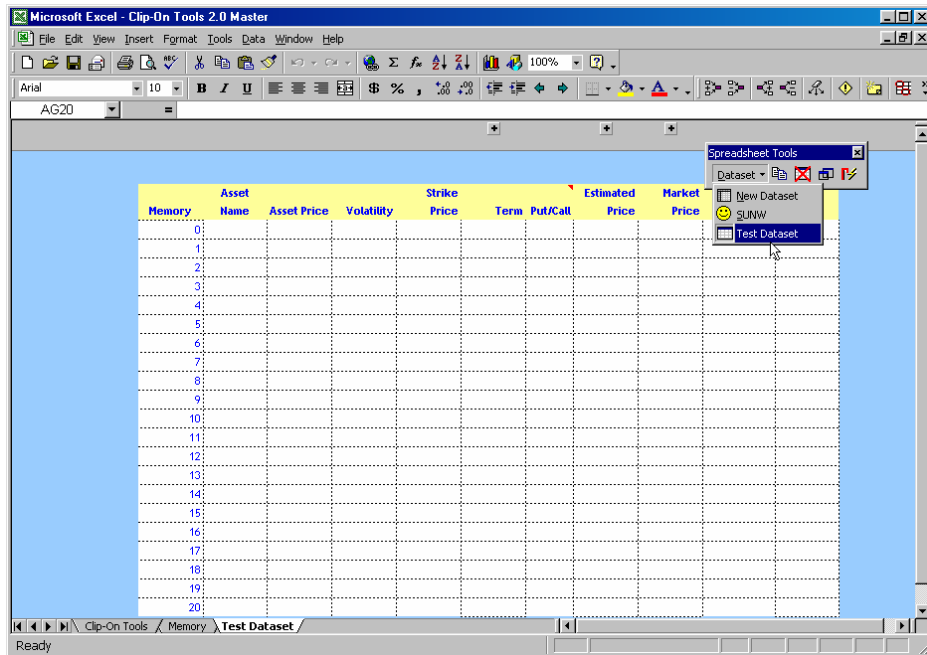


2. Datasets

Clip-On Tools contains a number of data sets that are used for illustrative purposes. The user can access, copy and amend these datasets, or create new datasets of his own.

2.1 Creating Data Sets

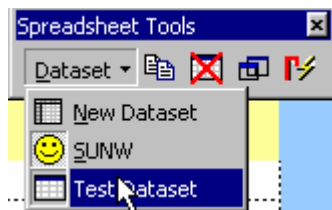
To create a new dataset click on the <Dataset> menu and select <New Dataset>. You will be prompted for a name for the new dataset. Chose a name (e.g. Test Dataset) and press OK.



A new worksheet is entered in the Workbook, containing a blank 20 row table (in the same format as the table in the Memory worksheet). You can edit this worksheet as you wish and save it with the workbook.

2.3 Opening and Closing Data Sets

Notice that the new Worksheet has been added to the list of available datasets.



You can open and close the dataset by toggling the button on the dataset menu. Click on the <Test Dataset> button and the worksheet will close; click on it again and it will reopen. This will enable you to keep the workbook tidy.

3. Copying Datasets

Click on the <Dataset> menu and select the SUNW dataset. Now click on the <Copy Dataset> button.

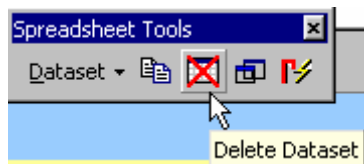


You will be prompted for a dataset name. Click on OK to accept the default. A copy of the SUNW dataset is created and stored in a new worksheet named SUNW (2). Notice that SUNW (2) has been added to the list of available datasets. It can be opened and closes just like any other dataset.

Memory	Asset Name	Asset Price	Volatility	Strike Price	Term	Put/Call	Estimated Price	Market Price
0	SUNW	120.7500	0.5500					
1	SUNW	120.7500	0.5500	110.0000	0.0184	0	11.2005	11.6875
2	SUNW	120.7500	0.5500	115.0000	0.0184	0	7.0379	7.1875
3	SUNW	120.7500	0.5500	120.0000	0.0184	0	3.8359	3.7500
4	SUNW	120.7500	0.5500	125.0000	0.0184	0	1.7757	1.5625
5	SUNW	120.7500	0.5500	130.0000	0.0184	0	0.6907	0.5000
6	SUNW	120.7500	0.5500	110.0000	0.1123	0	15.3979	16.1250
7	SUNW	120.7500	0.5500	115.0000	0.1123	0	12.2763	12.8125
8	SUNW	120.7500	0.5500	120.0000	0.1123	0	9.6099	9.9375
9	SUNW	120.7500	0.5500	125.0000	0.1123	0	7.3695	7.4375
10	SUNW	120.7500	0.5500	130.0000	0.1123	0	5.5852	5.3750
11	SUNW	120.7500	0.5500	110.0000	0.3616	0	22.4426	22.7500
12	SUNW	120.7500	0.5500	115.0000	0.3616	0	19.7735	19.8750
13	SUNW	120.7500	0.5500	120.0000	0.3616	0	17.3605	17.2500
14	SUNW	120.7500	0.5500	125.0000	0.3616	0	15.1823	14.8750
15	SUNW	120.7500	0.5500	130.0000	0.3616	0	13.2551	12.7500
16	SUNW	120.7500	0.5500	110.0000	0.6110	0	27.5134	27.1250
17	SUNW	120.7500	0.5500	115.0000	0.6110	0	25.0599	24.6250
18	SUNW	120.7500	0.5500	120.0000	0.6110	0	22.7527	22.0000
19	SUNW	120.7500	0.5500	125.0000	0.6110	0	20.6546	19.9375
20	SUNW	120.7500	0.5500	130.0000	0.6110	0	18.7315	17.6875

4. Deleting Datasets

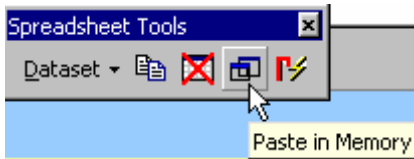
To delete a dataset simply click on the <Delete Dataset> button and confirm your choice when prompted. The Active dataset (i.e. the one that is currently visible) will be deleted. It cannot be recovered.



Note that the datasets supplied with the Clip-On Tools workbook are protected and cannot be deleted. If you try to delete them you will receive a message to this effect.

5. Pasting Datasets in Memory

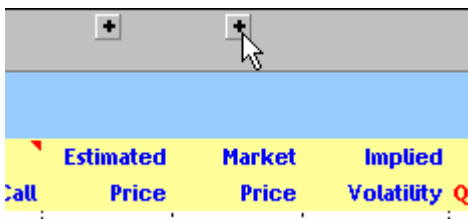
You can copy an entire dataset into memory by clicking on the <Paste in Memory> button.



You will be prompted to confirm that you wish to overwrite the memory locations.

6. Grouped Columns in Datasets

Just as in the Memory worksheet, a number of dataset columns are grouped together and hidden, in order to simplify the display. You can recognize these columns by the “+” buttons at the top of the worksheet.



For example, in the SUNW dataset click the third “+” button at the top of the worksheet and the columns containing the options Greeks will be revealed. Notice how the “+” button has become a “-“ button.

 A screenshot of a worksheet showing a table of data. The table has a yellow header row and two data rows. The columns are labeled 'Delta', 'Gamma', 'Vega', 'Theta', 'Rho', and 'Pr'. The data values are as follows:

	Delta	Gamma	Vega	Theta	Rho	Pr
05	0.9150	0.0180	2.4110	-46.2960	1.6320	11.6
79	0.7710	0.0360	4.6930	-83.6710	1.4140	7.1

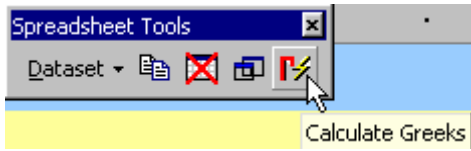
To regroup and hide the columns simply click on the “-“ button.

7. Calculating Greeks

You can calculate all the Greeks for an entire option series using the <Calculate Greeks> button.

For example, go to the copy of the SUNW dataset called SUNW (2). Click on the third “+” button to reveal the group of columns containing the option Greeks (see section 2.7

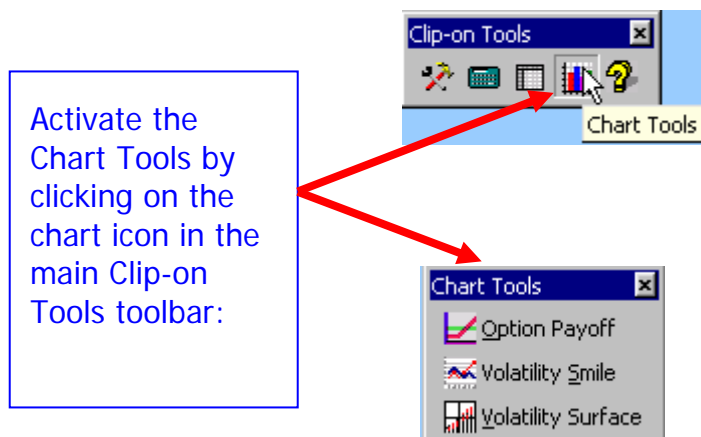
above). Now selection all of the entries in these cells and delete them. Next, go to the Implied Volatility column and delete all of the entries in that column.



Finally, recomputed the Greeks using the <Calculate Greeks> function. All of the Greeks are recalculated.

Chart Tools

1. Starting Chart Tools



2. Option Payoffs

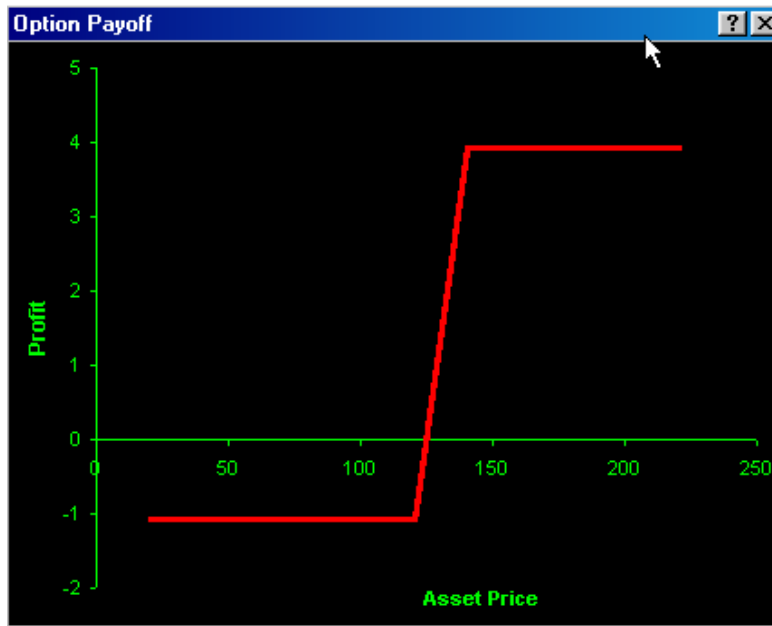
You can use the Chart Tools to chart payoff diagrams for a variety of option strategies.

Using the Spreadsheet Tools toolbar, select the SUNW dataset and paste it into memory (see section 5 in Spreadsheet Tools).

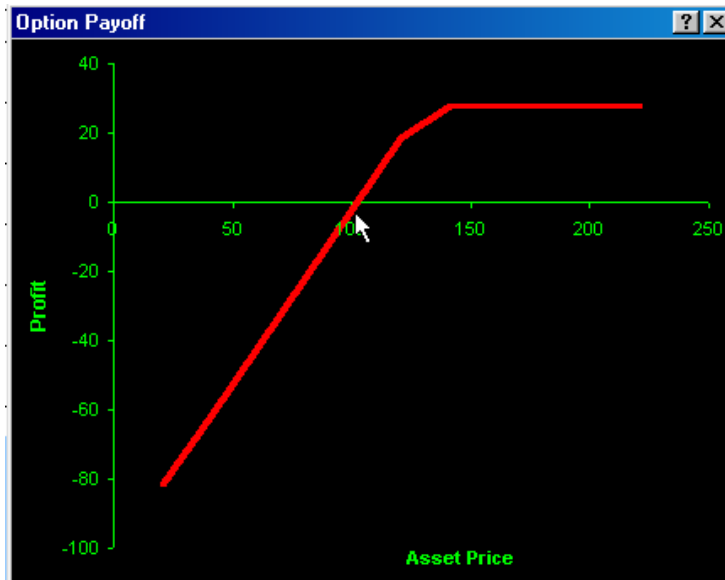
To create an option strategy, enter the quantity of each option bought or sold in the Quantity column of the Memory table. For example, suppose we create a call spread by purchasing 1 x 125 strike Sept Call (Memory location 4) and selling 1 x 130 strike Sept call (Memory location 5). Enter 1 in the Quantity column for row 4 of the memory table, and -1 in the quantity column of row 5.

Memory	Asset Name	Asset		Strike Price	Term	Put/Call	Estimated Price	Market Price	Implied Volatility	Quantity
		Price	Volatility							
0	SUNW	120.7500	0.5500							
1	SUNW	120.7500	0.5500	110.0000	0.0164	0	11.2005	11.6875	72.7976%	
2	SUNW	120.7500	0.5500	115.0000	0.0164	0	7.0379	7.1815	64.0909%	
3	SUNW	120.7500	0.5500	120.0000	0.0164	0	3.8359	3.7500	53.6229%	
4	SUNW	120.7500	0.5500	125.0000	0.0164	0	1.7757	1.5625	54.1147%	1
5	SUNW	120.7500	0.5500	130.0000	0.0164	0	0.6907	0.5000	51.6305%	-1

Now chart the payoff diagram by clicking on the Option Payoff button. The following chart appears.

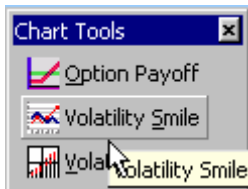


Notice that row 0 of the memory table is used to designate holdings of the underlying stock. We can use this to create strategies which involve stock + option combinations. For example, enter 1 in the Quantity column for row 0 of the Memory table (signifying that we are long 1 unit of stock) and then let us sell the Jan 130 calls by typing -1 in the Quantity column in row 20 of the memory table. This is a classic buy-write strategy, with payoff as shown in the following diagram:

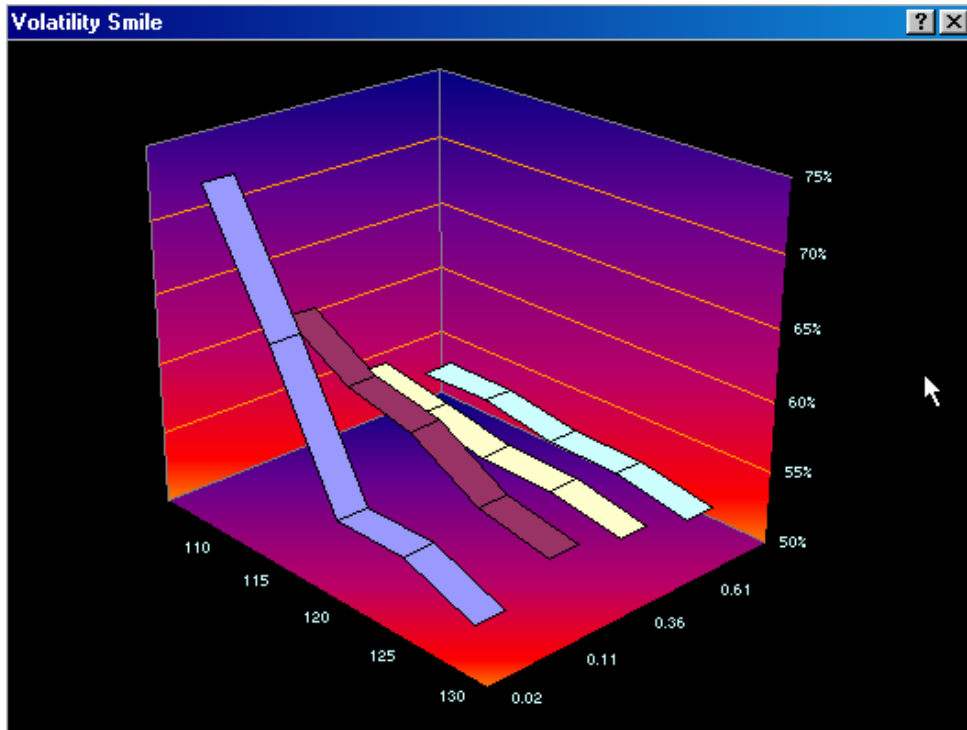


3. Volatility Smile

Options with different strike prices often trade at varying implied volatilities. Typically the implied volatility of OTM options is (significantly) higher than that for ATM options. If we chart implied volatility vs. strike price we can see the characteristic volatility “smile”. To do this with Option Calculator, click the <Volatility Smile> button on the Chart Tools toolbar.

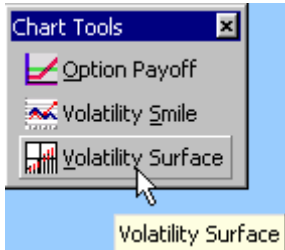


A typical volatility smile chart is shown below.



4. Volatility Surface

To see the entire volatility surface, click the <Volatility Surface> button on the Chart Tools toolbar



A typical volatility surface chart is shown below.

