Haxial Calculator 1.1 Documentation

Krizmotek Software
Haxial Software
http://www.haxialsoftware.com/

Description

Haxial Calculator is a high precision mathematical assistant that evaluates normal (infix) expressions to practically any accuracy. Results can be viewed in normal, fraction or scientific forms and the option of working in a different radix no longer restricts you to the decimal system. Worksheets enable you to solve larger problems in a more suited environment as well as allowing you to save your work. In addition Haxial Calculator incorporates unit and radix conversion utilities for your convenience as well as complete support for variables.

Introduction

Other calculator programs blindly attempt to copy physical hand-held calculators by displaying buttons on the computer screen, and an appearance and function that closely mimics a hand-held calculator. At Haxial, we believe this approach is fundamentally flawed. A computer is a far more powerful device than a hand-held calculator, and thus it is illogical and limiting to duplicate hand-held calculators on a computer. Haxial Calculator allows you to freely type expressions in a form natural to humans and much more suited when using a computer keyboard. For example, you can type a formula such as this into Haxial Calculator:

$$34 + e^{\wedge}(56 - 24.6487) * 1.24$$

When you press enter/return Haxial Calculator will interpret the expression, check for syntax errors, evaluate the result and display it to screen using the display mode and accuracy of your choice. Freely typing expressions is far superior to other methods such as clicking buttons.

Features

High Precision

Haxial Calculator does not use CPU floating-points. Many other calculators are severely limited in precision because they use CPU floating-points. Haxial Calculator is designed from scratch and it uses a powerful engine that is capable of practically unlimited precision.

Controlled Precision

When results are displayed in normal or scientific notation you can specify exactly how many digits you want the result to be accurate to. The number digits is practically unlimited, or to be precise a maximum setting of 1 million fractional digits.

Radix support other than Radix 10 (Decimal)

No longer are you limited to using the Decimal system. You may select any radix from radix 2 (binary) to radix 36.

Radix converter

If you need to convert numbers to different radixes, this is the utility to do it. Convert a number to any radix from 2 to 36.

Unit Converter

Ever needed to convert kilobits to kilobytes, miles to kilometers? This utility will convert it.

Variables and Constants

Full support for using custom variables. Constants Pi and E are generated up to the maximum accuracy of Haxial Calculator (1000000 digits).

Simple yet powerful interfaces

Simplicity is everything when it doesn't limit functionality. In addition to the standard interface you may choose to switch to "tiny interface" for a simple compact workspace. If at any time this interface is inadequate, you may switch back to the standard interface instantly with a simple key combination.

Haxial Calculator Worksheet (.hcw)
>A great alternative to the standard Haxial Calculator interface is using a Haxial Calculator Worksheet. A HCW is best used for multiple lined expressions and more complicated calculations. If you have work in progress, you can simply save the HCW to file for a later date. If you wish to demonstrate a problem to a co-worker, student or colleague this is also a great way to do so in an efficient manner.

Supports fractions
>Fractional mathematics is natively supported.

Supports exponents
>Exponents are natively supported.

Customized error messages
>Haxial calculator features custom (easy to read) error messages that let you know of any syntax or general errors that can occur during a calculation.

Functions and operations
>Unlike calculators that are based on cpu floating-point numbers, all functions in Haxial Calculator have to be custom made from scratch so they can support high precision results in different radixes. Please see "Accepted input" for a list of functions and operators currently supported.
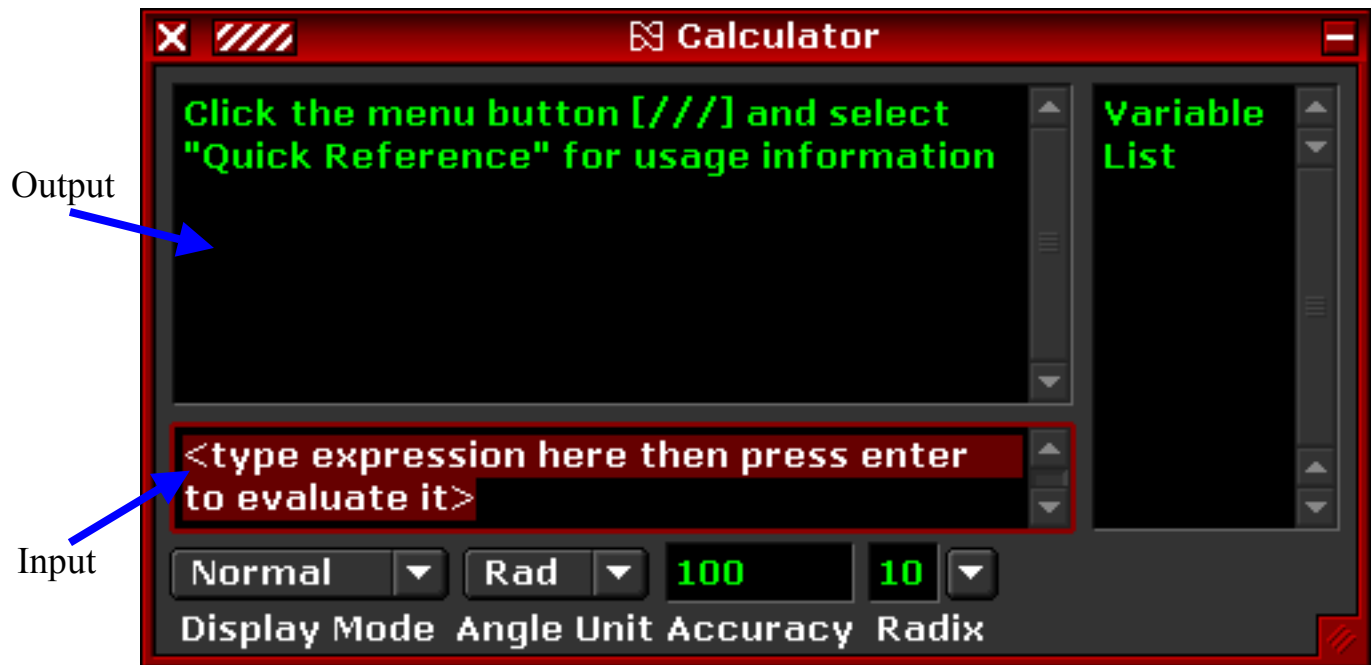
Appearance
>The appearance of the user interface is highly customizable. Supports "skins" / "schemes".

System Requirements

• MS Windows 95 or better, or
• MacOS 9 with CarbonLib 1.3.1 or better, or
• MacOS X (10) or better.

The Main Calculator Window

Output

Input

⊠ **Close Button**
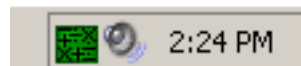   Click this to close the window.

━ **Dock/Minimize Button**
   Click this to dock or minimize the window. When a window is docked it is "hidden" and is represented by a button in the dock window. To restore the window click the button in the dock corresponding to the window that you wish to restore.

<u>Microsoft Windows Only</u>: If you are running Microsoft Windows you can right click the Dock/Minimize Button to minimize the entire program to the system tray. All windows associated with Haxial Calculator will hide and an icon will appear in the system tray. To restore Haxial Calculator simply click on the icon in the system tray.
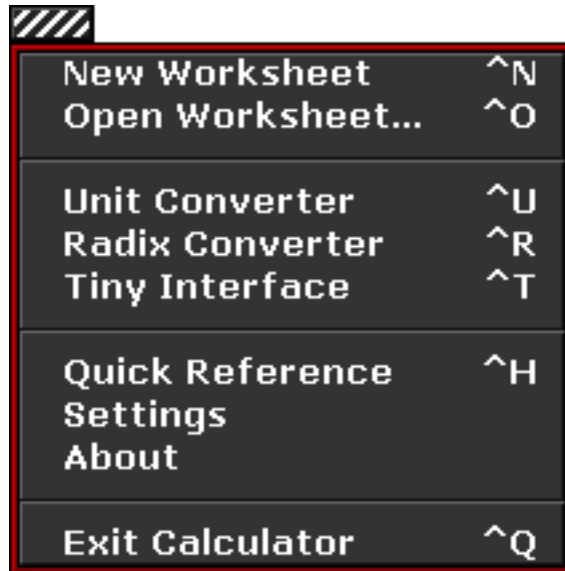
 Resize Button

> Click the mouse button on this resize button and drag the mouse to resize the window.

 Window Menu Button

> Click this to show a menu containing commands. (Shown below)

This is what each command in the menu does:

New Worksheet
> Creates a new worksheet.

Open Worksheet...
> Lets you to select and open a previously saved worksheet file.

Unit Converter
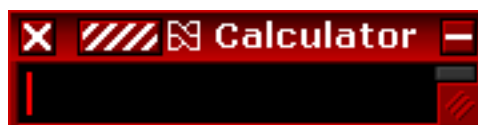> Shows a window containing a utility that can be used to convert between various units.

Radix Converter
> Shows a window containing a utility that can be used to convert numbers to different radixes (number bases).

Tiny Interface
> Switches to a very small and simple interface. This is useful for saving screen space when doing simple calculations. (See below).

Quick Reference
> Shows a window containing a list of various operators, functions, constants and other input that is accepted.

Settings
> Shows a window containing various settings that you are able to change.

About
> Shows a window containing information about Haxial Calculator such as the version number and certificate information.

Exit Calculator
> Exits/Quits/Closes Haxial Calculator.

Features of the Main Calculator Window:

Input
> This is where you type the expression to be evaluated. For example, to evaluate "3.8 * 4" you would enter "3.8 * 4" (without the quotes) in the input text box then press the enter/return key. The result will appear in the Output.

Output (History)
> Contains a history of past calculations and results.

Variable List
> Contains a list of all currently declared variables.

Display Mode Menu
> This is where you select how the output will be displayed to the screen. The different modes are as follows:

> Normal   -   Displays answers normally. e.g. 234.525
> Fraction   -   Displays answers as a fraction. e.g. 18/7
> Scientific   -   Displays answers in scientific notation. e.g. 5.466*10^3

Angle Unit Menu
> This is where you select the angle unit of your choice for use with functions that require an angle as input. For example, the "sin" function requires an angle as input. The following unit choices are available:

> Rad   -   Radians
> Deg   -   Degrees
> Grad   -   Gradients

Accuracy

> This is where you can change the current accuracy. By default this is set to 100 meaning the result will be calculated to 100 fractional digits.

Radix

> This is where you can change the current radix (number base) that you wish to work with. By default this is set to 10 (Decimal).
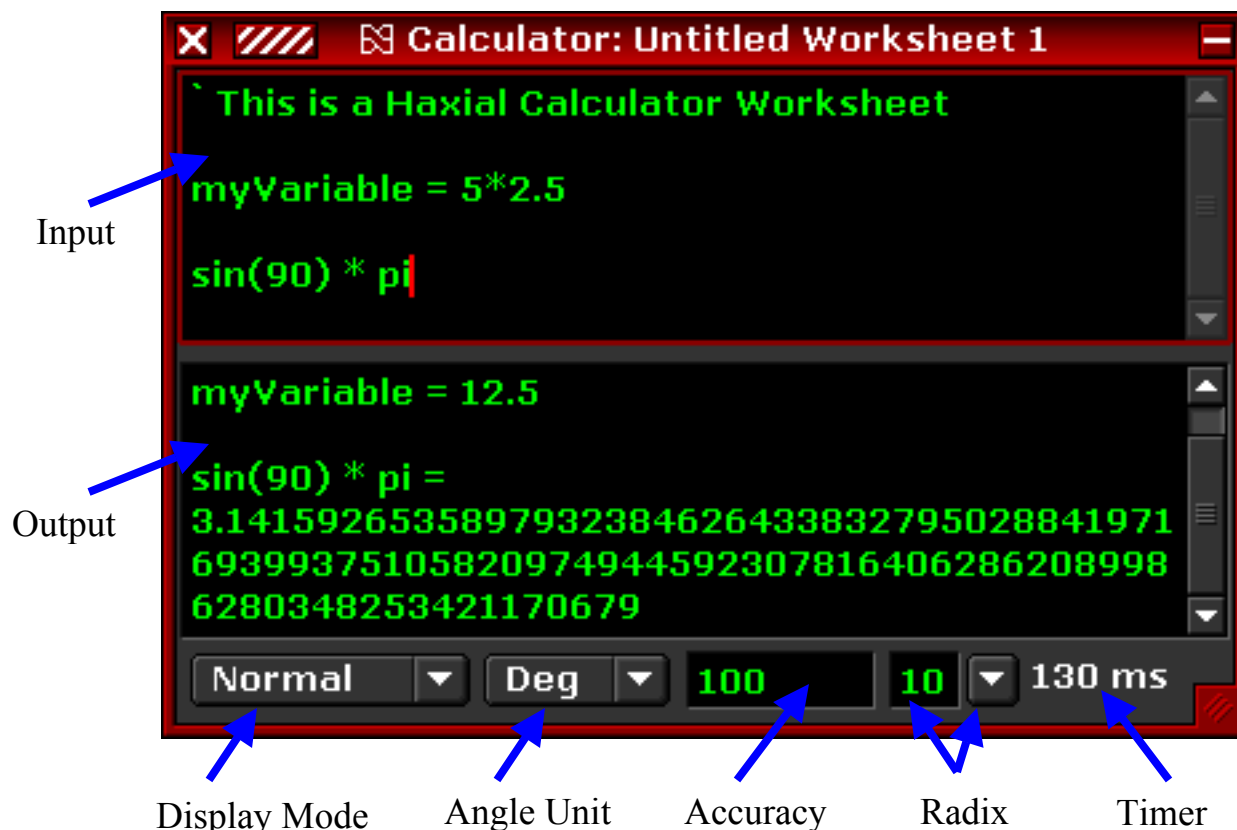
Timer

> This displays the time it took for the last expression to be evaluated (measured in milliseconds). This will appear once a calculation has completed. (Example below).


Timer

Worksheets

The following is an example of a worksheet:

Display Mode   Angle Unit   Accuracy   Radix   Timer

You will notice Worksheets have similar features to the Main Calculator Window. Worksheets can be a more suited environment when using multiple lined expressions. The variable list is no longer required as variables are stored only during each calculation. To evaluate an expression use the numeric keypad "enter".

The following is the contents of the window menu for a worksheet:
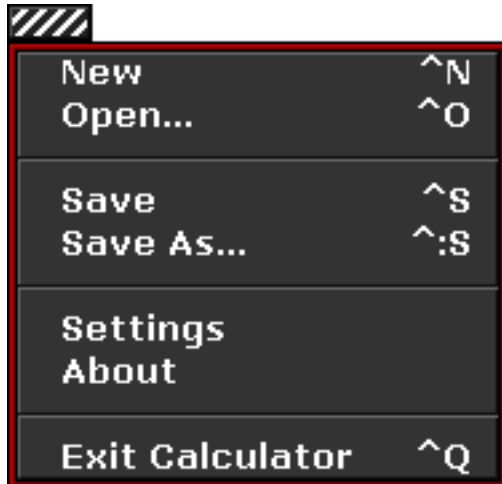

The commands that have not previously been explained are as follows:

Save   -   Saves the worksheet to a file.
Save As...   -   Opens a window that lets you to specify where you want to save
                           the worksheet.
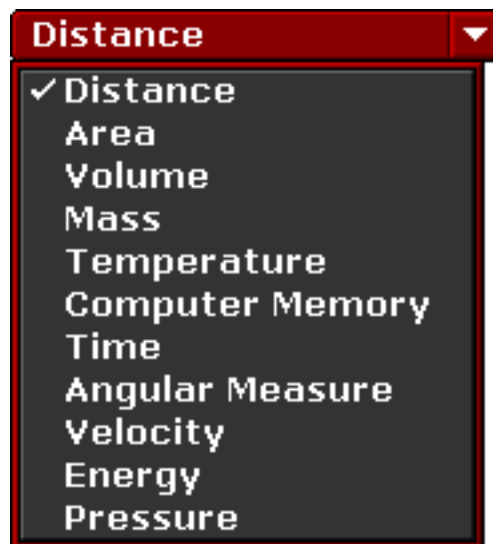
Unit Converter

The following window will be displayed when you click the command in the main window menu named "Unit Converter":

Input

"Convert from" Unit popup menu   "Convert to" Unit popup menu   Output
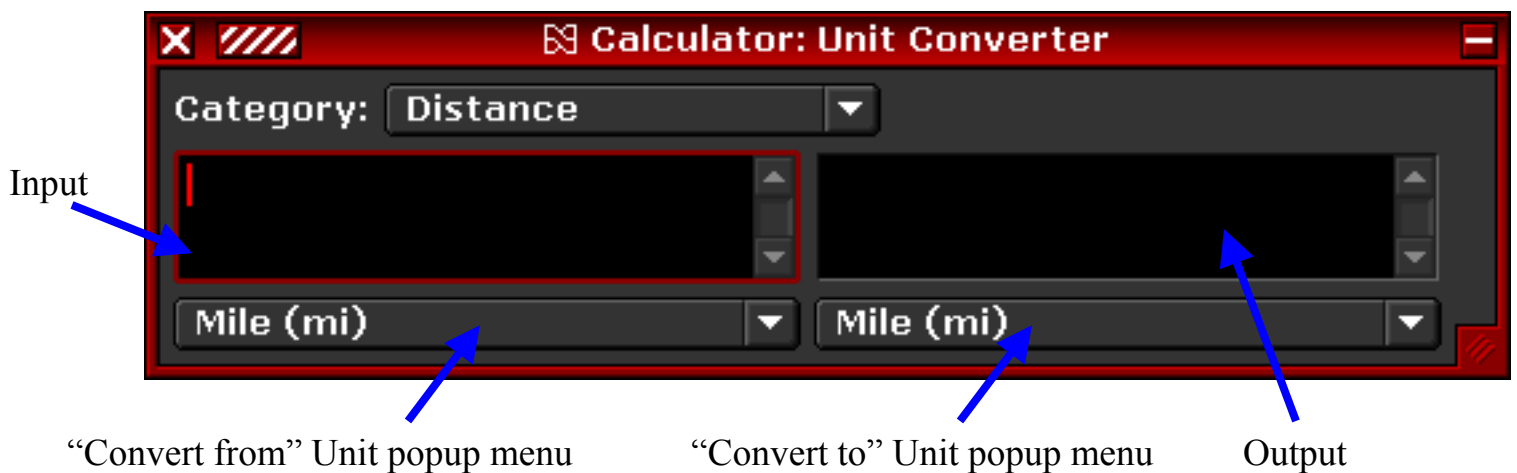
Category Popup Menu

Click this popup menu to switch between various categories of units. (Shown below).

Once you select a category you are able to convert between different units using the unit popup menus. Click a unit popup menu to see a list of all the units in the current selected category. (Example below).

Convert From Unit Popup Menu

Click this popup menu and select the unit that you wish to convert from.

Convert To Unit Popup Menu

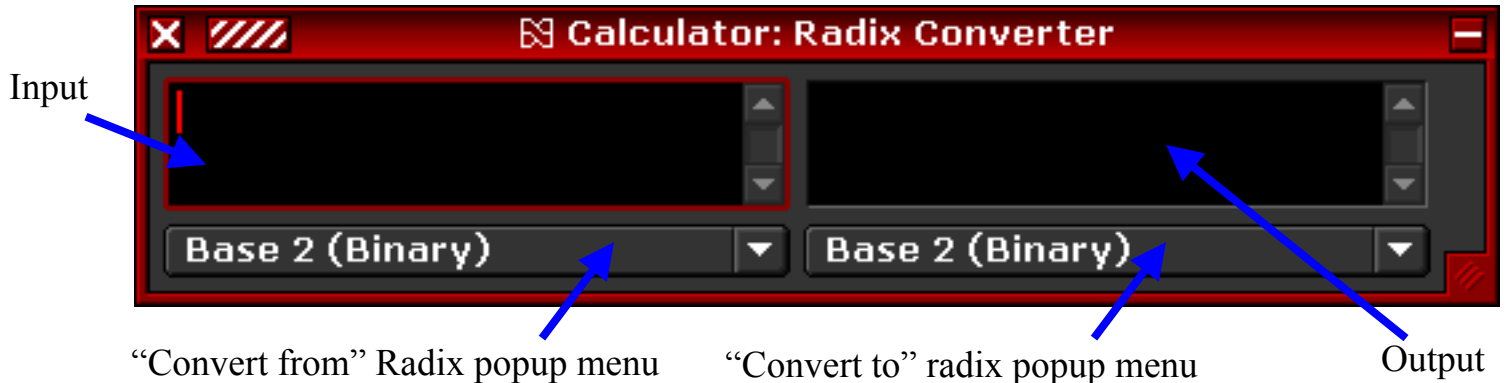Click this popup menu and select the unit that you wish to convert to.

Input

Type the value of the unit you wish to convert from in this text box. The result will be calculated as you type and displayed in the Output.
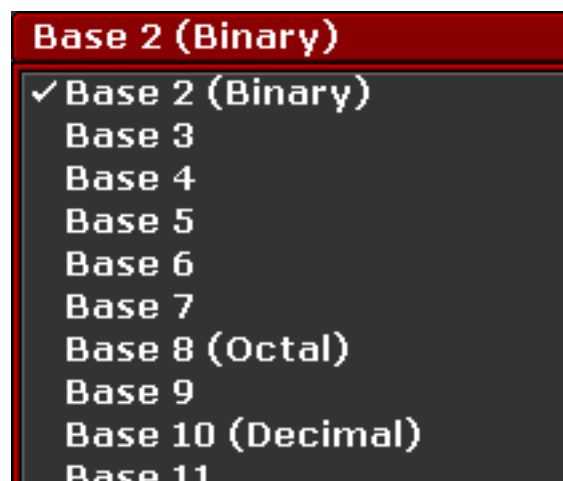
Output

This is where the result of the conversion is displayed.

Radix Converter

The following window will be displayed when you click the command in the main
window menu named "Radix Converter":

Input

"Convert from" Radix popup menu   "Convert to" radix popup menu   Output

Click a radix popup menu to see a list of the different bases you may convert
between. (Example below).

"Convert from" Radix popup Menu

Click this popup menu and select the radix (number base) that you wish to
convert from.

"Convert to" Radix popup Menu

Click this popup menu and select the radix (number base) that you wish to
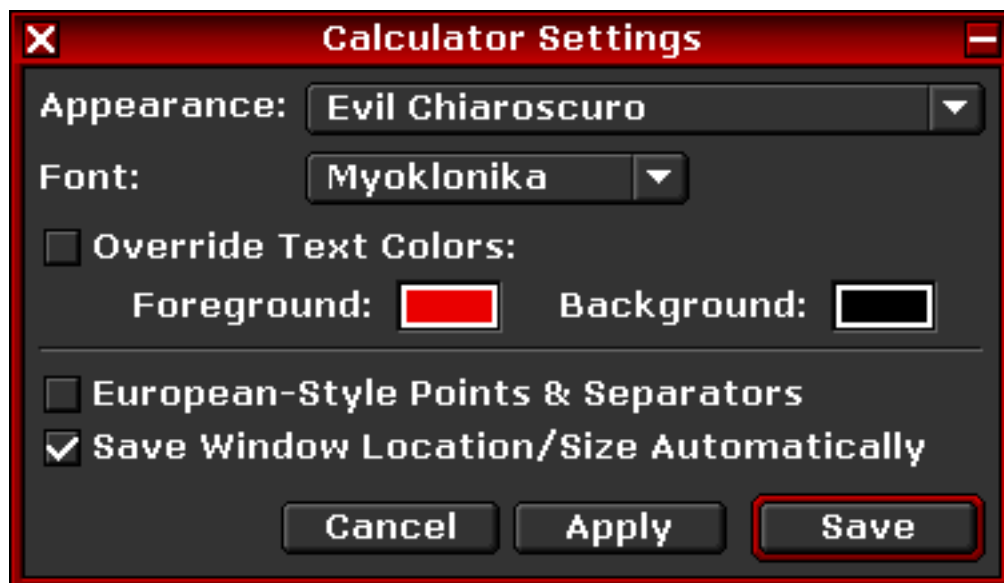convert to.

Input

       Type the number that you wish to convert from in this text box. The result will be displayed in the Output as you type.

Output

       This is where the result of the conversion is displayed.

Settings Window

The following window will be displayed when you click the command in a window menu named "Settings":

Appearance

       This lets you chance the appearance of Calculator to something that is more aesthetically pleasing to you. Please note that more appearance options are available than shown in this menu — you can download more Appearance files ("•hap" files) from the Haxial website or other sources. Place your "•hap" files into a folder named "Appearances" in the same folder as the Calculator program, and then show the Settings window in Calculator, and the contents of the Appearances menu will be replaced with the contents of the folder. For more information, please visit this website:

       http://www.haxialsoftware.com/appearance/

Font
This lets you change the type of font used for text in Calculator.

Override Text Colors
If you tick this, you can control the color of the text used throughout Calculator. The Foreground color is the color of the text itself, where as the Background color is the color of the space "behind" the text.

European-Style Points & Separators
If you tick this, the default point (.) and separator (,) are "swapped".

Using the following number as an example:
One thousand and one fifth (using an optional separator).

Without "European-Style Decimal Points & Separators" ticked and using an optional separator to represent thousands:
1,000.2

With "European-Style Decimal Points & Separators" ticked and using an optional separator to represent thousands:
1.000,2

Save Window Location/Size Automatically
If you tick this, the window location and size of selected windows will be automatically saved or "remembered". If this option is not ticked an extra command will appear in selected window menus named "Save Window Location/Size". You can use this to manually save the Location/Size of a window at the time you use the command.

Accepted input

Valid infix expressions are accepted. Spacing is ignored. For example, the following are some examples of valid expressions.

(45*6) / 34.6
bubbles = 4 *10 ^ 3
log2(45 + 2.3) * bubbles
exp(2) - pi

Valid infix expressions may be constructed from the following:

Operators:

+	Add
-	Subtract\Negate
*	Multiply
/	Divide
^	Power
!	Factorial
=	Assign

Functions:

sqrt(input)	Square Root	
cbrt(input)	Cube Root	
loge(input)	Natural Logarithm	
ln(input)	Natural Logarithm	
log(base, input)	Logarithm	example -> log(10, 25.125)
log<base>(input)	Logarithm	example -> log10(25.125)
exp(input)	Exponential	

sin(input)	Sine
cos(input)	Cosine
tan(input)	Tangent
csc(input)	Cosecant
sec(input)	Secant
cot(input)	Cotangent
sinh(input)	Hyperbolic Sine
cosh(input)	Hyperbolic Cosine
tanh(input)	Hyperbolic Tangent
csch(input)	Hyperbolic Cosecant
sech(input)	Hyperbolic Secant
coth(input)	Hyperbolic Cotangent

abs(input)	Absolute Value
floor(input)	Floor
ceil(input)	Ceiling
mod(inputA, inputB)	Modulus
quot(inputA, inputB)	Quotient

Constants (built in):

e
pi

Read-Only Variables (built in):

ans   last answer
answer   last answer

Brackets:

(Open Bracket
) Close Bracket

Numbers:

Numbers represented by the characters 0-9 A-Z a-z will be accepted according to the current number base selected.
A-Z and a-z are equivalent for representing numbers (case insensitive). Numbers starting with A-Z or a-z must have a 0 (zero) appended to the start so they can be recognized as numbers.

Variables:

Variables are case sensitive and may consist of the characters 0-9, A-Z, a-z. Variables must start with a character A-Z or a-z and must not be named the same as any built in constants, variables or functions.

For example, the following variable names are valid:
x
MyVariable
oranges10

The following variable names are NOT valid:
sqrt
10apples
ans

Variable commands (the following does not apply to worksheets):

delete <variable name>
delete all

For example if you declared the variable named "Result" as follows.

Result = 65

To delete this variable, you would type the following into the input text box and then press enter/return:

delete Result

The variable will be deleted and you will see it removed from the variable list.

Keyboard Shortcuts

You can press the following keyboard combinations instead of using the menus:

Control-Q or Command-Q: Quit/exit the program.
Control-N or Command-N: Create a new worksheet file.
Control-O or Command-O: Open a worksheet file.
Control-U or Command-U: Show the Unit converter.
Control-R or Command-R: Show the Radix converter.
Control-T or Command-T: Switch between Tiny mode and Full mode.
Control-H or Command-H: Show the quick reference window.

Control-Backspace or Command-Backspace clears the input/output (history) whilst in the main window:

Any questions/suggestions/feedback?

Your feedback and suggestions are welcomed. Feel free to send a message to Haxial using the form on this webpage:

http://www.haxialsoftware.com/contact/

Please support the development of this product

Please support the development of this program and other Haxial products by paying for it. Haxial Calculator is not free, but it only costs $15. Your money funds the development of this product and others. You can pay at the Haxial website, which is http://www.haxialsoftware.com/. Thank you.

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