## NAME

calctool – a desktop calculator

## SYNOPSIS

**calctool** [ **–2** ] [ **–3** ] [ **-a** *accuracy* ] [ **-c** ] [ **-l** ] [ **-m** ] [ **–name** *app-name* ] [ **-r** ] [ **-v** ] [ **–?** ] [ **–Wn** ] [ **+Wn** ]

## DESCRIPTION

**calctool** is a desktop calculator. It has been designed to be used with either the mouse or the keyboard. It is visually similar to a lot of hand-held calculators. There are financial, logical and scientific modes. Similar operations are color coded on color workstations. Some of the calculator keys have menu marks. This indicates that there is a menu associated with that key. Each key is discussed in more detail below.

One of the most important things to remember about **calctool** is that calculations are performed from left to right, with no arithmetic precedence. If you need arithmetic precedence, then you should use parentheses (see below).

Internal arithmetic is now done with multi-precision floating point numbers. Accuracy can be adjusted from zero to nine numeric places in fixed notation, but numbers can be displayed in engineering and scientific notation as well. The calculator reverts to scientific notation when the number is larger than the display would allow in fixed notation. The base of operation can be changed between binary, octal, decimal and hexadecimal. Numbers are initially displayed in fixed notation to two numeric places, in the decimal base.

You can use the *Copy* and *Paste* functions in conjunction with the numeric display to store or retrieve characters from the text shelf. You can also remove the last digit entered, and the whole display can be cleared.

There are ten memory registers. Numbers can be stored or retrieved in these locations, and arithmetic can be performed upon register contents.

The display windows contains the current numerical value plus the current base and trigonometric type. There are also indicators which show if the hyperbolic and inverse function switches are set, and which numerical mode is currently in operation. If an operation needing more than one numerical input is partially complete, the operation is also displayed in this window as a reminder.

On startup, **calctool** will use several X resources. These are listed in detail in the resources section of these manual pages.

If you press MENU in the **calctool** window, and you aren't over a calculator key which has a menu associated with it, then a floating menu will appear, from which you can bring up a property sheet. Hitting the *Props* function key has the same effect.

From this property sheet, you can modify several properties of the calculator. Each calculator button can have either a 2D or a 3D look, the keys can be in either monochrome or color (assuming you are using a color screen), and the buttons can be set to give either a "left-handed" or a "right-handed" appearance.

Context sensitive help is also available. Position the mouse cursor over the item you need help with, and press the *Help* key. A popup will be displayed giving detailed information on this facility.

On startup, **calctool** will look for a **.calctoolrc** file in the users' home directory. This file allows the user to define personal constant and function definitions, plus setup the initial values for the ten memory registers. It then looks for a **.calctoolrc** file in the current directory, and if present, uses the contents of this file in place of any previously defined values.

With the **.calctoolrc** file, there are currently four valid record types. These are comments, constant and function definitions and initial memory register values.

Lines starting with a '#' are treated as comments and ignored.

Lines starting with 'c' or 'C' in the first column are definitions for constants. The cC is followed by a digit in the range 0-9, then a space. This is followed by a number in fixed or scientific notation. Following this is an optional comment, which if found, will be used in the popup menu for the constants. If the comment is present, then there must be at least one space between this and the preceding number.

Lines starting with 'f' or 'F' in the first column are definitions for functions. The fF is followed by a digit in the range 0-9, then a space. This is followed by a function definition. Following this is an optional comment, which if found, will be used in the popup menu for the functions. If the comment is present, then there must be at least one space between this and the preceding function definition.

Lines starting with 'r' or 'R' in the first column are definitions for the initial contents of the memory registers. The rR is followed by a digit in the range 0-9, then a space. This is followed by a number in fixed or scientific notation. The rest of the line is ignored.

All other lines are ignored. There should be no embedded spaces in the function definitions. Whenever a backslash is found, this and the following character signify a control character, for example \g would be ASCII 7.

## OPTIONS

**–2** On a color screen, start **calctool** with a 2D look. This is the default.

**–3** On a color screen, start **calctool** with a 3D look.

**–a** *accuracy*
Initial number of digits displayed after the numeric point. This value must be in the range 0 to 9. The default is two numeric places.

**–c** Display in color, assuming this is a color screen.

**–l** Start up a "left-handed" version of the **calctool** program.

**–m** Always display in monochrome, even on a color screen.

**–name** *app-name*
This option specifies the application name under which resources are to be obtained, rather than the default executable file name. *app-name* should not contain ''.'' or ''*'' characters.

**–r** Start up a "right-handed" version of the **calctool** program. This is the default.

**–v** Show the version number and the usage message of this release of the **calctool** program.

**–?** Show the version number and the usage message of this release of the **calctool**

program. Note that the **?** character must be escaped if using **csh**(1).

**–Wn** Start **calctool** with no title line.

**+Wn** Start **calctool** with a title line present.

**RESOURCES**

On startup, **calctool** uses the following resources:

**Resource:** deskset.calctool.accuracy
**Values:** Accuracy value (numeric)
**Description** The number of of digits displayed after the numeric point. This value must be in the range 0 to 9.

**Resource:** deskset.calctool.base
**Values:** Numeric Base (string)
**Description** The initial numeric base. Valid values are binary, octal, decimal and hexadecimal.

**Resource:** deskset.calctool.display
**Values:** Display mode (string)
**Description** The initial display mode. Valid values are engineering, fixed-point and scientific.

**Resource:** deskset.calctool.mode
**Values:** Mode (string)
**Description** The initial calculator mode. Valid values are basic, financial, logical and scientific.

**Resource:** deskset.calctool.mono
**Values:** True, False (False)
**Description** Whether the calculator should start in monochrome. Color is obviously only allowed on screens that support it.

**Resource:** deskset.calctool.beep
**Values:** True, False (True)
**Description** Indicates whether a beep should sound in the event of an error (such as invalid input, or if the display needs to be cleared).

**Resource:** deskset.calctool.showRegisters
**Values:** True, False (True)
**Description** Whether the memory register window is initially displayed.

**Resource:** deskset.calctool.trigType
**Values:** Trig. type (string)
**Description** The initial trigonometric type. Valid values are degrees, grads and radians.

**Resource:** deskset.calctool.rightHanded
**Values:** True, False (True)
**Description** Whether the calculator is started with a "right-handed" display style.

**Resource:** deskset.calctool.3dLook
**Values:** True, False (True)
**Description** If the display is color, whether each calculator button has a pseudo 3D appearance.

**Resource:** deskset.calctool.hasTitle
**Values:** True, False (True)
**Description** Indicates whether the **calctool** window has a title line.

**Resource:** deskset.calctool.buttonFont
**Values:** Font name string
**Description** The name of the font used to display all button labels, irrespective of the current size and scale of **calctool.**

**Resource:** deskset.calctool.modeFont
**Values:** Font name string
**Description** The name of the font used to display the various mode labels, irrespective of the current size and scale of **calctool.**

**Resource:** deskset.calctool.memoryFont
**Values:** Font name string
**Description** The name of the font used to display the memory register values, irrespective of the current size and scale of **calctool.**

**Resource:** deskset.calctool.displayFont
**Values:** Font name string
**Description** The name of the font used to show the current display value, irrespective of the current size and scale of **calctool.**

**Resource:** deskset.calctool.decDigitColor
**Values:** Color name string or hexadecimal color specification string
**Description** The color of the buttons containing the decimal digits 0 - 9 and the numeric point on the main panel.

**Resource:** deskset.calctool.hexDigitColor
**Values:** Color name string or hexadecimal color specification string
**Description** The color of the buttons containing the hexadecimal digits A - F on the main panel.

**Resource:** deskset.calctool.arithOpColor
**Values:** Color name string or hexadecimal color specification string

**Description** The color of the arithmetic operator buttons on the main panel.

**Resource:** deskset.calctool.adjustColor
**Values:** Color name string or hexadecimal color specification string
**Description** The color of the Bsp and Clr buttons on the main panel.

**Resource:** deskset.calctool.portionColor
**Values:** Color name string or hexadecimal color specification string
**Description** The color of the Abs, Chs, Frac and Int buttons on the main panel.

**Resource:** deskset.calctool.functionColor
**Values:** Color name string or hexadecimal color specification string
**Description** The color of various function buttons on the main panel. These are Acc, Con, Exch, Fun, Keys, Mem, Quit, Rcl and Sto.

**Resource:** deskset.calctool.mainModeColor
**Values:** Color name string or hexadecimal color specification string
**Description** The color of the three mode buttons on the main panel. These are Base, Disp and Mode.

**Resource:** deskset.calctool.portionLogicalColor
**Values:** Color name string or hexadecimal color specification string
**Description** The color of the logical buttons in the mode panel that do shift operations or take a portion of the result. These are **<**, **>**, &16 and &32.

**Resource:** deskset.calctool.bitLogicalColor
**Values:** Color name string or hexadecimal color specification string
**Description** The color of the bitwise logical operator buttons in the mode panel. These are And, Not, Or, Xnor and Xor.

**Resource:** deskset.calctool.finColor
**Values:** Color name string or hexadecimal color specification string
**Description** The color of the financial buttons in the mode panel.

**Resource:** deskset.calctool.trigModeColor
**Values:** Color name string or hexadecimal color specification string
**Description** The color of the trigonometrical mode buttons in the mode panel. These are Hyp, Inv and Trig.

**Resource:** deskset.calctool.trigColor
**Values:** Color name string or hexadecimal color specification string
**Description** The color of the trigonometrical buttons in the mode panel. These are Cos, Sin and Tan.

**Resource:** deskset.calctool.sciColor

**Values:** Color name string or hexadecimal color specification string
**Description** The color of the scientific buttons in the mode panel. These are e^x, 10^x, y^x, x!, Ln, Log and Rand.

**Resource:** deskset.calctool.backgroundColor
**Values:** Color name string or hexadecimal color specification string
**Description** The color of the background area for the calculator buttons in the main and mode panels.

**Resource:** deskset.calctool.displayColor
**Values:** Color name string or hexadecimal color specification string
**Description** The color of the numerical display area in the main panel.

**Resource:** deskset.calctool.memRegisterColor
**Values:** Color name string or hexadecimal color specification string
**Description** The background color in the memory register window.

**Resource:** deskset.calctool.textColor
**Values:** Color name string or hexadecimal color specification string
**Description** The color of all text. This includes the numerical display, the button labels and the contents of the memory register window.

## CALCULATOR BUTTONS

This section describes the calculator keys present in the main **calctool** window. Apart from this basic mode, **calctool** has three other modes, and the keys associated each each of these modes are described in separate sections below.

Keyboard equivalents appear in the square brackets. Note that '^' followed by a letter indicates that the Control key and this key should be pressed together.

### Numerical Keys [ 0-9 a-f . = <Return> ].

Enter a digit (decimal digits 0-9 or hexadecimal digits A-F) into the display. The '.' character acts as the numeric point, and '=' (or Return) is used to complete numerical entry.

Upto forty digits may be entered.

### Arithmetical Operations [ + - x * / ].

Perform an arithmetical operation using the previous entry and the next entry as operands. Addition, subtraction, multiplication and division are denoted by the characters '+', '-', 'x' and '/' respectively ('*' is also synonymous with multiplication).

### Number Manipulation Operators.

| | | |
|---|---|---|
| **Int** | **[ ^i ]** | Return the integer portion of the current entry. |
| **Frac** | **[ ^f ]** | Return the fractional portion of the current entry. |
| **Abs** | **[ ^u ]** | Return the absolute value of the current entry. |
| **+/-** | **[ C ]** | Change the arithmetic sign of the current entry. |
| **1/x** | **[ r ]** | Return the value of 1 divided by the current entry. |
| **x^2** | **[ @ ]** | Return the square of the current entry. |
| **%** | **[ % ]** | Perform a percentage calculation using the last entry and the next entry. |
| **Sqrt** | **[ s ]** | Perform a square root operation on the current entry. |

**Asc** **[ ^a ]** If Asc is selected with the mouse, then a separate window is displayed which allows you to enter any character. The ASCII value of this character is then displayed in the current base. If this option is selected via the keyboard, then you don’t get a special window displayed.

**Menu Operations.**

Each of these operations has a popup menu associated with it. This menu can be displayed using the MENU mouse button, and a selection made. You can select the default item from the menu using the SELECT mouse button.

It is also possible to use just the keyboard to achieve the same results. The first keyboard value selects the menu operation; the second keyboard character selects the new value for this operation. Unlike the menu facility available with the mouse, there is no visual feedback on what choices are available to you, so the user has to know what item they wish to select.

**Base** **[ B ]** Change the base that calculations are displayed in. The available choices are binary [ b ], octal [ o ], decimal [ d ] and hexadecimal [ h ]. Digits that are inappropriate for a particular base selection are greyed out in the main **calctool** window.

**Disp** **[ D ]** Change the numerical display mode. The choices are engineering [ e ], fixed point [ f ], and scientific [ s ] notation.

**Mode** **[ M ]** Change the calculator mode. By default, **calctool** is in basic mode, and just the keys on the main **calctool** window are visible. There are also three other modes; financial [ f ], logical [ l ] and scientific [ s ]. Selection of one of these modes will display an extra window with more keys. These special operations are described in more detail in the sections below.

**Acc** **[ A ]** Set the display accuracy. Between 0 and 9 [ 0-9 ] significant digits can be displayed.

**Con** **[ # ]** Retrieve and display a constant value. There are ten constant values [ 0-9 ], and each one has a default value which can be overridden by entries in the users **.calctoolrc** file. The ten default values are:

| | | |
|---|---|---|
| 0 | 0.621 | kms per hour / miles per hour. |
| 1 | 1.41421 | square root of 2. |
| 2 | 2.71828 | e. |
| 3 | 3.14159 | pi. |
| 4 | 2.54 | cms / inch. |
| 5 | 57.29578 | degrees in a radian. |
| 6 | 1048576.0 | 2 to the power of 20. |
| 7 | 0.0353 | gms / oz. |
| 8 | 0.948 | kilojoules / British thermals. |
| 9 | 0.0610 | cubic cms / cubic inches. |

**Fun** **[ F ]** Retrieve and execute a function expression. There are ten function definitions [ 0-9 ]. These are setup with entries in the users **.calctoolrc** file.

| | | |
|---|---|---|
| **Rcl** | **[ R ]** | Retrieve memory register value. There are ten memory registers [ 0-9 ]. |
| **Sto** | **[ S ]** | Store value in memory register. There are ten memory registers [ 0-9 ]. The register number may be preceded by an arithmetic operation (addition, subtraction, multiplication or division), in which case the specified operation is carried out between the displayed entry and the value currently in the selected memory register, and the result is placed in the memory register. |
| **Exch** | **[ X ]** | Exchange the current display with the contents of a memory register. There are ten memory registers [ 0-9 ]. |

**Other Operations.**

| | | |
|---|---|---|
| **Clr** | **[ Delete ]** | Clear the calculator display. |
| **Bsp** | **[ Back Space ]** | Remove the rightmost character of the current entry, and recalculate the displayed value. |
| **( and )** | **[ ( and ) ]** | Parentheses. Allow precedence with arithmetic calculations. Note that parentheses can be nested to any level, and **calctool** provides a visual feedback of what is being typed in, in the calculator display. The calculation doesn't take place until the last parenthesis is matched, then the display is updated with the new result. |
| **Exp** | **[ E ]** | This is used to allow numbers to be entered in scientific notation. The mantissa should be initially entered, then the Exp key selected. The exponent is then entered. If no numerical input had occurred when the Exp key was selected, then a mantissa of 1.0 is assumed. |
| **Keys** | **[ k ]** | Toggle the labels on the **calctool** buttons between the mouse and keyboard equivalents. |
| **Mem** | **[ m ]** | Display the window with the ten memory register values. These values are displayed in the current base to the current degree of accuracy using the current numerical display notation. |
| **Quit** | **[ q or Q ]** | Exit without user verification. |

## FINANCIAL MODE

An example of how to use each of these financial calculations, is available via the context sensitive help facility.

**Ctrm** **[ ˆt ]** Compounding term. Computes the number of compounding periods it will take an investment of present value pv to grow to a future value of fv, earning a fixed interest rate int per compunding period.
Memory register usage:

| | | |
|---|---|---|
| Register 0 | int | (periodic interest rate). |
| Register 1 | fv | (future value). |
| Register 2 | pv | (present value). |

**Ddb** **[ ˆd ]** Double-declining depreciation. Computes the depreciation allowance on an asset for a specified period of time, using the double-declining balance method.
Memory register usage:

| | | |
|---|---|---|
| Register 0 | cost | (amount paid for asset). |
| Register 1 | salvage | (value of asset at end of life). |

| | | |
|---|---|---|
| Register 2 | life | (useful life of the asset). |
| Register 3 | period | (time period for depreciation allowance). |

**Fv** **[ v ]** Future value. This calculation determines the future value of an investment. It computes the future value based on a series of equal payments, each of amount pmt, earning periodic interest rate int, over the number of payment periods in term.
Memory register usage:

| | | |
|---|---|---|
| Register 0 | pmt | (periodic payment). |
| Register 1 | int | (periodic interest rate). |
| Register 2 | n | (number of periods). |

**Pmt** **[ P ]** Periodic payment. Computes the amount of the periodic payment of a loan. Most installment loans are computed like ordinary annuities, in that payments are made at the end of each payment period.
Memory register usage:

| | | |
|---|---|---|
| Register 0 | prin | (principal). |
| Register 1 | int | (periodic interest rate). |
| Register 2 | n | (term). |

**Pv** **[ p ]** Present value. Determines the present value of an investment. It computes the present value based on a series of equal payments, each of amount pmt, discounted at periodic interest rate int, over the number of periods in term.
Memory register usage:

| | | |
|---|---|---|
| Register 0 | pmt | (periodic payment). |
| Register 1 | int | (periodic interest rate). |
| Register 2 | n | (term). |

**Rate** **[ ˆr ]** Periodic interest rate. Returns the periodic interest necessary for a present value of pv to grow to a future value of fv over the number of compounding periods in term.
Memory register usage:

| | | |
|---|---|---|
| Register 0 | fv | (future value). |
| Register 1 | pv | (present value). |
| Register 2 | n | (term). |

**Sln** **[ ˆs ]** Straight-line depreciation. Computes the straight-line depreciation of an asset for one period. The straight-line method of depreciation divides the depreciable cost (cost - salvage) evenly over the useful life of an asset. The useful life is the number of periods (typically years) over which an asset is depreciated.
Memory register usage:

| | | |
|---|---|---|
| Register 0 | cost | (cost of the asset). |
| Register 1 | salvage | (salvage value of the asset). |
| Register 2 | life | (useful life of the asset). |

**Syd** **[ ˆy ]** Sum-of-the-years-digits depreciation. The sum-of-the-years’-digits method of depreciation accelerates the rate of depreciation, so that

more depreciation expense occurs in earlier periods than in later ones. The depreciable cost is the actual cost minus salvage value. The useful life is the number of periods (typically years) over which an asset is depreciated.
Memory register usage:

| | | |
|---|---|---|
| Register 0 | cost | (cost of the asset). |
| Register 1 | salvage | (salvage value of the asset). |
| Register 2 | life | (useful life of the asset). |
| Register 3 | period | (period for which depreciation is computed). |

**Term** **[ T ]** Payment period. Returns the number of payment periods in the term of an ordinary annuity necessary to accumulate a future value of fv, earning a periodic interest rate of int. Each payment is equal to amount pmt.
Memory register usage:

| | | |
|---|---|---|
| Register 0 | pmt | (periodic payment). |
| Register 1 | fv | (future value). |
| Register 2 | int | (periodic interest rate). |

**LOGICAL MODE**

| | | |
|---|---|---|
| < | **[ < ]** | Shift the current entry to the left. The shift can be between 1 and 15 places [ 1-9, a-f ]. This calculator key has a popup menu associated with it. |
| > | **[ > ]** | Shift the current entry to the right. The shift can be between 1 and 15 places [ 1-9, a-f ]. This calculator key has a popup menu associated with it. |
| **&16** | **[ ] ]** | Truncate the current entry to a 16 bit unsigned integer. |
| **&32** | **[ [ ]** | Truncate the current entry to a 32 bit unsigned integer. |
| **Or** | **[ \| ]** | Perform a logical OR operation on the current entry and the next entry, treating both numbers as unsigned long integers. |
| **And** | **[ & ]** | Perform a logical AND operation on the current entry and the next entry, treating both numbers as unsigned long integers. |
| **Not** | **[ ˜ ]** | Perform a logical NOT operation on the current entry. |
| **Xor** | **[ ˆ ]** | Perform a logical XOR operation on the current entry and the next entry, treating both numbers as unsigned long integers. |
| **Xnor** | **[ n ]** | Perform a logical XNOR operation on the current entry and the next entry, treating both numbers as unsigned long integers. |

**SCIENTIFIC MODE**

| | | |
|---|---|---|
| **Trig** | **[ T ]** | Set the current trigonometrical base. This can be in degrees [ d ], grads [ g ] or radians [ r ]. This key also has a popup menu associated with it. |
| **Hyp** | **[ h ]** | Toggle the hyperbolic function indicator. This switch affects the type of sine, cosine and tangent trigonometric functions performed. |
| **Inv** | **[ i ]** | Toggle the inverse function indicator. This switch affects the type of sine, cosine and tangent trigonometric functions performed. |
| **eˆx** | **[ { ]** | Returns e raised to the power of the current entry. |

| | | |
|---|---|---|
| **10^x** | **[ } ]** | Returns 10 raised to the power of the current entry. |
| **y^x** | **[ y ]** | Take the last entry and raise it to the power of the next entry. |
| **x!** | **[ ! ]** | Return the factorial of the current entry. Note that the factorial function is only valid for positive integers. |
| **Cos** | **[ ^c ]** | Return the trigonometric cosine, arc cosine, hyperbolic cosine or inverse hyperbolic cosine of the current display, depending upon the current settings of the hyperbolic and inverse function switches. The result is displayed in the current trigonometric units (degrees, radians or grads). |
| **Sin** | **[ ^s ]** | Return the trigonometric sine, arc sine, hyperbolic sine or inverse hyperbolic sine of the current display, depending upon the current settings of the hyperbolic and inverse function switches. The result is displayed in the current trigonometric units (degrees, radians or grads). |
| **Tan** | **[ ^t ]** | Return the trigonometric tangent, arc tangent, hyperbolic tangent or inverse hyperbolic tangent of the current display, depending upon the current settings of the hyperbolic and inverse function switches. The result is displayed in the current trigonometric units (degrees, radians or grads). |
| **Ln** | **[ N ]** | Return the natural logarithm of the current entry. |
| **Log** | **[ G ]** | Return the base 10 logarithm of the current entry. |
| **Rand** | **[ ? ]** | Return a random number between 0.0 and 1.0. |

## FILES

| | |
|---|---|
| **~/.desksetdefaults** | stored X resources. |
| **.calctoolrc** | user’s personal calctool startup file. |

## SEE ALSO

*Solaris User’s Guide*
"About Calculator" in the Help Handbook available through the **Help** option on the Workspace menu.