

The KCalc Handbook

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Abstract

KCalc is a scientific calculator for KDE

Chapter 1

Introduction

This document describes KCalc version 2.4.

KCalc offers many more mathematical functions than meet the eye on a first glance. Please study the section on keyboard accelerators and modes in this handbook to learn more about the many functions available.

In addition to the usual functionality offered by most scientific calculators, KCalc offers a number of features, which I think are worthwhile pointing out:

- KCalc provides trigonometric functions, logic operations, and it is able to do statistical calculations.
- KCalc allows you to cut and paste numbers from/into its display.
- KCalc features a *results-stack* which lets you conveniently recall previous results.
- You can configure KCalc's display colors and font.
- You can configure KCalc's precision and the number of digits after the period.
- KCalc offers a great number of useful [key-bindings](#), which make using KCalc without using a pointing device easy.

Hint: pressing (and holding) the **Ctrl**-key, displays on every button, the corresponding key-binding.

Have fun with KCalc!

Bernd Johannes Wuebben

Chapter 2

Usage

2.1 General Usage

General usage is straight forward and similar to the way most simple scientific calculators operate, but take note of the following special KCalc features:

Result Stack Each time you left mouse button click on the = button or press your keyboard's **Enter** or = keys, the display result is written to KCalc's result stack. You can navigate through the result stack with your keyboard's Ctrl+Z and Ctrl+Shift+Z keys.

Percent Function The percent function works somewhat differently to that on most calculators. However, once understood, its enhanced functionality proves quite useful. See the section about the [percent](#) function for further details.

Cut and Paste • Pressing Ctrl+C will place the displayed number on to the clipboard.

- Pressing Ctrl+V will paste the clipboard content into the display if the content of the clipboard is a valid floating point number.
- It is still possible to copy/paste by clicking on KCalc's display, but this may disappear in future versions.

Advanced functions When you start KCalc for the first time, the calculator will only display buttons for basic arithmetic computations.

Under the menu entry Settings it is possible to open extra buttons for KCalc: it is for example possible to choose [Statistic](#) or [Science/Engineering](#) buttons.

Button Layout To give easy access to all the functions in KCalc, many keys have a second layout. Click on Inv or press the shortcut **I** to make the second layout of the buttons visible.

2.2 Statistical Mode

In this mode the left column of buttons is allocated to statistical functions:

Most of the functionality in this mode is centered around the Dat button. To create a data list of numbers, enter a number into the calculator and press Dat. A sequentially increasing number is shown on the display indicating which position in the Data 'list' the number occupies. A traditional calculator only stores three values for statistical functions: The number of discrete items in a list, the sum of the data items entered and the sum of the square of all data items in the list. KCalc differs by actually storing each discrete value, allowing you to calculate the median value of the data.

Buttons	Function
N	Recall the number of data items entered
InvN	Display the sum of all data items entered
Mea	Display the mean of the data items entered
InvMea	Display the sum of the square of all data items entered
Std	Display the standard deviation (n)
InvStd	Display the population standard deviation (n-1)
Med	Display the median
Dat	Enter a data item
InvDat	Clear last data item entered
CSt	Clear the store of all data item entered

2.3 Trigonometric Mode

In this mode the left column of buttons is allocated to trigonometric functions:

Buttons	Function
Hyp	Enter Hyperbolic sub mode. Hyp Sin for example is the hyperbolic sine: $\sinh(x)$
Sin	Compute the sine
InvSin	Compute the inverse sine
Cos	Compute the cosine

InvCos	Compute the inverse cosine
Tan	Compute the tangent
InvTan	Compute the inverse tangent
Log	Compute the Log base 10
InvLog	Compute 10 to the power of x
Ln	Compute the natural logarithm. That is the log to base e
InvLn	Compute e to the power of x

2.4 Memory Operations

KCalc supports the memory operations given by standard calculators plus six slots to hold constants.

2.4.1 Standard Memory Operations

KCalc can remember results of operations for you, and re-use them in later calculations. You can access these functions via several buttons labelled MR, MS, M+ and MC.

MS The MS button stores the currently displayed result in memory.

M+ The M+ button adds the current result to the one in memory. So, if you had stored a 20, and the current result is a 5, your memory would contain 25 when you press it. If the memory is empty, it acts like MS and simply stores the result.

MR The MR button gets the value stored in memory and puts it in the display.

MC The MC button clears the memory.

If a value is stored in memory a M will appear in the status bar, next to the calculator mode indicator

2.4.2 Constants

The six constants buttons C1 to C6 will only be visible after activating the item Constants Buttons in the menu Settings of the menu bar.

To store the number shown in the KCalc display in one of the six constants, first press Inv followed by the desired button key C1 up to C6.

To use the value stored in any of the constants in a calculation, just press the desired button (C1 to C6), and the corresponding number will appear in the display.

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It is possible to change the label of the constants button to make it easier to remember which button holds which constant. Click with the right mouse button on one of the buttons C1 to C6. A popup menu appears, in which you select Set Name.

There are many (mostly physical) predefined constants, which can be put on any of the six buttons C1 - C6 by selecting the desired constant in the popup menu that appears after right clicking on one of the constant buttons and selecting Choose from List. Though the predefined constants can also be accessed via the Constants in the menu bar, storing it on a constants button is very handy, if the number is used frequently.

2.5 Single Key Accelerators

To simplify entering calculations from the keyboard KCalc has single key accelerators for most functions. For example entering $7R$ or $7r$ will calculate the reciprocal of 7 ($1/7$).

During a computation, you can always press **Ctrl** to make each button display its key-binding.

Key	Function	Notes
H	Hyp	Hyperbolic as in Hyp Sin, the $\sinh(x)$
S	Sin	
C	Cos	
T	Tan	
N	Ln	log base e
L	Log	log base 10
I	Inv	Inverse, e.g. if you want $\arcsin(x)$ type i s
\	+/-	Change sign
[x^2	
^	x^y	
!	$x!$	Factorial
<	Lsh	Left shift
>	Rsh	Right shift.
&	AND	Logical AND
x or *	X	Multiply
/	/	Divide
D	Dat	Enter data item in statistical mode
 	OR	Logical OR. Note: InvOR is XOR
R	$1/x$	Reciprocal

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Enter	=	
Return	=	
PgUp	C	Clear
Esc	C	Clear
PgDown	AC	Clear all
Del	AC	Clear all
Shift+:	Mod	remainder of dividing
Alt+1 to Alt+6	C1	use the value stored in C1 to C6

Chapter 3

Comments on Specific Functions

3.1 Mod and IntDiv

Mod gives the remainder of dividing the displayed number by the next input number.

22 Mod 8 = will give the result 6

22.345 Mod 8 = will give the result 6.345

Inv IntDiv does integer division of the displayed number by the next input number.

22 Inv IntDiv 8 = will give the result 2

22.345 Inv IntDiv 8 = also gives 2

3.2 %

Used instead of the = key, % interprets the final operation carried out in the current calculation as follows:

- If the final operator is + or - the second argument is interpreted as percentage of the first operand.
- If the final operator is * divide the result of the multiplication by 100.
- If the final operator is / give the left operand as a percentage of the right operand.
- In all other cases the % key gives identical results to the = key.

Examples: 150 + 50 % gives 225 (150 plus 50 percent of this amount)

42 * 3 % gives 1.26 (42 * 3 / 100)

45 / 55 % gives 81.81... (45 is 81.81.. percent of 55)

3.3 Lsh and Rsh

Lsh left shifts the integer part of the displayed value (multiplies it by 2) n times, where n is the next input

10 Lsh 3 = gives 80 (10 multiplied by 2 three times).

10.345 Lsh 3 = also gives 80.

Rsh right shifts the value (performs an integer divide by 2) n times. 16 Rsh 2

= gives 4 (16 divided by 2 twice).

16.999 Rsh 2 = also gives 4.

3.4 Cmp, And, Or and Xor

The Cmp, And and Or functions perform bitwise logical operations and therefore appear more meaningful if the base is set to Hex, Oct or Bin rather than Dec. In the following examples base is set to Bin.

Cmp performs a 1's complement (inverts the bits). 101 Cmp gives 111...111010

AND does a logical AND. 101 AND 110 = gives 100

OR does the logical OR. 101 OR 110 = gives 111

XOR performs the logical XOR (exclusive OR) operation. 101 XOR 110 = gives 11

Chapter 4

Questions and Answers

1. *How do I get e , the Euler number?*

Type 1 Inv Ln.

2. *How do I get two fixed digits after the period?*

Select Settings → Configure KCalc... on the menubar, this will bring up the configuration dialog. Check Set decimal precision and adjust the spin control so that it shows a 2.

3. *What about Precision?*

The main factor determining the precision of KCalc is whether your libc and libmath supports the C data type long double. If this is the case, KCalc will detect this at compile time and use it as its fundamental data type to represent numbers. Adjust the Precision in KCalc's Configure dialog so that the above computations work correctly. I recommend a precision of 14 if the fundamental data type for your copy of KCalc is long double, otherwise 8 or 10. Higher precision doesn't necessarily lead to better results. Play with the precision and you will see what I mean.

Chapter 5

Command Reference

5.1 The File Menu

File → **Quit (Ctrl+Q)** Quit KCalc.

5.2 The Edit Menu

Edit → **Undo (Ctrl+Z)** Go back in the result stack.

Edit → **Redo (Ctrl+Shift+Z)** Go forward in the result stack.

Edit → **Cut (Ctrl+X)** Delete the displayed result and copy it to the clipboard.

Edit → **Copy (Ctrl+C)** Copy the displayed result to the clipboard.

Edit → **Paste (Ctrl+V)** Insert the cut or copied result in the display.

5.3 The Constants Menu

Constants → **Mathematics** Display Pi, Euler Number or Golden Ratio.

Constants → **Electromagnetism** Display Light Speed, Elementary Charge, Impedance of Vacuum, Permeability of Vacuum or Permittivity of Vacuum.

Constants → **Atomic & Nuclear** Display Planck's Constant, Elementary Charge or Fine-Structure Constant.

Constants → **Thermodynamics** Display Boltzmann Constant, Atomic Mass Unit, Molar Gas Constant, Stefan-Boltzmann Constant or Avogadro's Number.

Constants → **Gravitation** Display Constant of Gravitation or Earth Acceleration.

5.4 The Settings Menu

Settings → **Science/Engineering Buttons** Display science and engineering buttons.

Settings → **Statistic Buttons** Display [statistic buttons](#).

Settings → **Logic Buttons** Display [logic buttons](#).

Settings → **Constants Buttons** Display constants buttons.

Settings → **Show Bit Edit** Displays a bit edit field. Click on a bit to toggle it.

Settings → **Show All** Display all buttons available.

Settings → **Hide All** Hide all extra buttons and display only standard default buttons.

Settings → **Configure Shortcuts...** Configure the keyboard shortcuts used by KCalc.

Settings → **Configure KCalc...** Display the KCalc settings dialog.

5.5 The Help Menu

Help → **KCalc Handbook (F1)** Invokes the KDE Help system starting at the KCalc help pages. (this document).

Help → **What's This? (Shift+F1)** Changes the mouse cursor to a combination arrow and question mark. Clicking on items within KCalc will open a help window (if one exists for the particular item) explaining the item's function.

Help → **Report Bug...** Opens the Bug report dialog where you can report a bug or request a 'wishlist' feature.

Help → **Switch Application Language...** Opens a dialog where you can edit the Primary language and Fallback language for this application.

Help → **About KCalc** This will display version and author information.

Help → **About KDE** This displays the KDE version and other basic information.

Chapter 6

Credits and License

KCalc Program Copyright (c):

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KCalc was inspired by Martin Bartlett's xfrmcalc, whose stack engine is still part of KCalc.

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Appendix A

Installation

KCalc is part of the kdeutils package within the KDE project and will normally be provided as part of a KDE installation. For more details about KDE visit <http://www.kde.org>.

A.1 Compilation and Installation

KCalc is part of the KDE project <http://www.kde.org/> .

KCalc can be found in the kdeutils package on <ftp://ftp.kde.org/pub/kde/> , the main FTP site of the KDE project.

For detailed information on how to compile and install KDE applications see [Building KDE4 From Source](#)

Since KDE uses **cmake** you should have no trouble compiling it. Should you run into problems please report them to the KDE mailing lists.

A.2 How to enable long double precision for KCalc

If your machine supports the C data type long double and if you have a working libc you can enable long double precision for KCalc.

Here is what to do:

1. Check `config-kcalc.h` and see whether `HAVE_LONG_DOUBLE` is defined, i.e. you should be able to locate a line saying:

```
#define HAVE_LONG_DOUBLE 1
```

If you cannot find such a line your system doesn't support long double IEEE precision.

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2. **Edit the files** `kcalctype.h`, `configdlg.cpp`, `kcalc.cpp` **and** `kcalc_core.cpp` **and remove the lines:**

```
#ifdef HAVE_LONG_DOUBLE  
#undef HAVE_LONG_DOUBLE  
#endif
```

3. **Recompile KCalc.**