

# Calc95 Help Index

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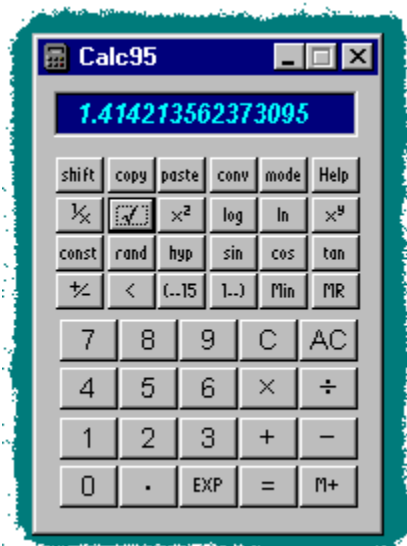
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## Introduction



Calc95 is a pocket calculator simulator program for the Microsoft Windows operating system. Calc95 originally came into existence as a component of the user interface of ObjectiF, our scientific and engineering applications development system. And in order to make it as widely available as possible, we have released a free distribution version with many of the features of the full product.

Calc95 allows you to do the following:

- Use a powerful scientific calculator with statistics and financial functions.
- Cut and paste data between the calculator and other applications.
- Access a comprehensive and extensible range of physical data constants and conversions.
- Store non-volatile copies of settings and data.
- Customise the appearance of the calculator.

In addition, the Professional version of Calc95 has the following features:

- Use the many features of Object Linking and Embedding (OLE) and launch applications.
- Customise the functions and features of the calculator.
- Program the calculator (in a high-level Fortran90-like language).
- Operate on large n-dimensional sets of data and matrices.
- Use powerful graphics.

The free distribution version of Calc95 is equivalent to a top-of-the-range scientific calculator with the addition of a very wide range of physical constants and conversions, and a subset of the features included in the fully licensed version. Programs written for Calc95 Professional can of course be used in ObjectiF to develop full Windows applications. Because of ObjectiF's compatibility with Fortran90, code can ultimately be compiled using a proprietary FORTRAN compiler if necessary. This means you have a path to grow from a simple function behind a calculator button, right up to compiled FORTRAN, without ever having to throw away code.

You are permitted to use the free distribution version of Calc95 for 90 days. If you wish to continue using the software, we ask you to register the product. There is no charge for registration. Registration allows us to keep you posted on developments of the software and helps us to plan further

development. The information you supply is not made available to any third parties. A registration form can be found in the file REGISTER.DOC supplied with the software, or print out the version in this help file. Alternatively, visit our World Wide Web site to register on-line at <http://www.fgroup.co.uk/neo/fsi/register.htm>.

## **Installation**

See the file INSTALL.DOC which comes with the Calc95 installation files for information about installation of the software.

## **Registration Form for Calc95**

There is no registration fee for the free distribution version of Calc95. Instead, we would be grateful if you could supply something that is even more valuable to us: your opinion!

Please complete the sections below and delete where inapplicable and if possible let us have your comments about Calc95 and how it could be improved. The information you supply below will not be made available to any third parties.

Name \_\_\_\_\_

Company \_\_\_\_\_

Street \_\_\_\_\_

Town/City \_\_\_\_\_

Post/Zip code \_\_\_\_\_

Country \_\_\_\_\_

Telephone \_\_\_\_\_

E-mail \_\_\_\_\_

Platform: Windows95\_\_\_ WindowsNT\_\_\_ Windows3.x\_\_\_

Type of use: Private/Professional/Corporate/Site use

Industry sector \_\_\_\_\_

Comments \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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\_\_\_\_\_

Our postal address is:  
Flow Simulation International Ltd.,  
Sheffield Science Park,  
Arundel Street,  
SHEFFIELD, S1 2NS,  
England.

E-mail: [fsi\\_info@fdgroup.co.uk](mailto:fsi_info@fdgroup.co.uk)

An interactive version of this form is available at our  
WWW site: <http://www.fdgroun.co.uk/neo/fsi>.

## **Calc95 Professional**

You can purchase the full professional version of Calc95 with greatly enhanced functionality. Calc95 is under constant development, so you will need to contact us for up-to-date pricing and technical details, but if you like the free distribution version of Calc95, you will almost certainly want to upgrade to the full version. For details of the current version and pricing or to place an order please telephone or contact us at the address below:

Flow Simulation International Ltd.  
Sheffield Science Park  
Arundel Street  
SHEFFIELD, S1 2NS  
England

E-mail: [fsi\\_info@fdgroup.co.uk](mailto:fsi_info@fdgroup.co.uk)

World Wide Web: <http://www.fdgroup.co.uk/neo/fsi/>

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## **Troubleshooting**

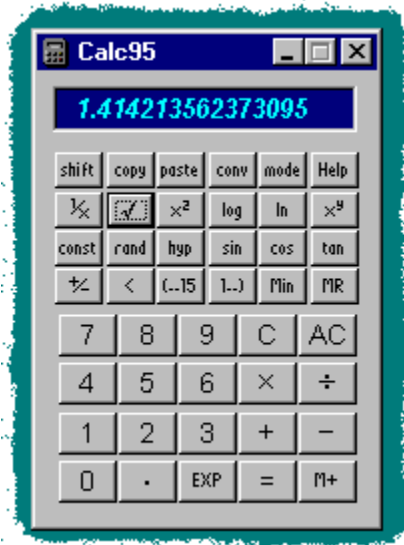
**The button legends do not match those given in the helpfile:** The calculator function buttons show a number of scientific symbols that require a special font from a file called BUTTONS.FNT. This file is in the same directory as the Calc95 program. If, for some reason, this file can not be loaded, Calc95 will use whatever font is available to represent the functions textually. In this case the appearance of the buttons will not exactly match those illustrated in the help file.

**When I start Calc95 I get a message “Unable to open properties database”:** For some reason Calc95 could not load the properties and constants data. These are stored in files in your Calc95 directory with the extension .PRP. Calc95 looks for a file called DEFAULT.PRP in this directory, which is where you would store customized properties and constants data for automatic loading. If this file is not found, the file FACTORY.PRP is loaded from the same directory. If both files are missing or inaccessible for some reason, Calc95 fails to load the data and the properties and constants will not be available. Check if these files have been deleted or moved. If no properties files can be found, they can be replaced from your backup copies of the distribution files, or you can re-run the Calc95 setup.


**After upgrading Calc95, it looks and behaves like the old version:** You may have had Calc95 running when you ran the installation wizard. As a result, the wizard may be unable to update the taskbar and registry properly. You need to make sure that Calc95 is not running, and then run the installation wizard again. It is a good idea to make sure that you don't have any applications running when installing any software.





## Calculator Basics



As you would expect, you use the calculator just as you would a real pocket calculator. Just as with a conventional calculator, space is at a premium, so many of the calculator buttons have to double up the functions they provide. The layout of the calculator in its normal state has the functions you would expect to see on a fairly standard scientific calculator, which means that it is probably self-explanatory.

Notice the  button in the top left-hand corner.

Enter numbers either by clicking on the buttons or using the keyboard (note: to use a numeric keypad make sure Num Lock is on). To enter a number in exponential format, enter the mantissa, followed by the  key, then +/- if required, then the exponent. To use the arithmetic functions, click their buttons. If the function is unary (i.e. acts on one number, e.g.

) the display is updated to the result. If the function is binary (e.g.













etc.) enter the second number and click

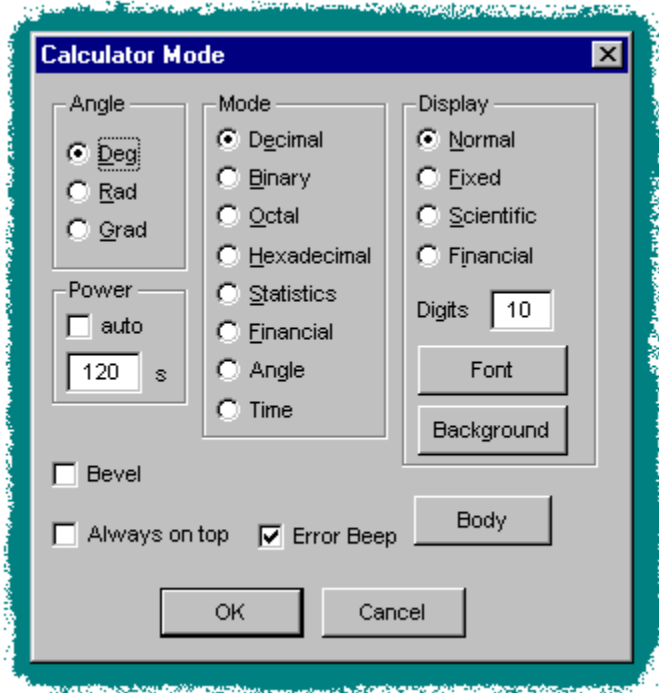
or another arithmetic key.

The functions of the buttons in their shifted state are not marked on the calculator body, but the buttons change when you press the  button. If you press the  button again, the buttons revert to their un-shifted state.

Most of the calculator buttons can be accessed from your computer keyboard (these are sometimes called 'keyboard shortcuts'). You can also use the Caps Lock key on your keyboard instead of the  button.

## **Mode**

Clicking the  button allows you to change the number base of the calculator or select special features, and to customize the appearance and behavior of the calculator.



Selecting one of the options in the *Angle* group determines how values of angles are interpreted when using the trigonometric functions.

The *Mode* selection changes the number base between decimal, binary, octal or hexadecimal. In the binary, octal and hexadecimal modes a number of the calculator functions are disabled and as a result some of the buttons will have no caption in these modes, and many functions will be replaced by bit-wise logical operations.

Changing number mode changes the calculator display, but any data stored in the calculator is retained. Therefore you can convert between different number systems by entering data and then selecting the new number base. However, only the decimal system has a decimal point; the other number bases work for integers only. Also note that a number in one system will require a larger number of digits in a lower number base, which may cause an overflow. This is especially likely when converting to binary.

Selecting *statistics* puts the calculator into statistics mode. This is the same as *decimal* mode except that the *M+* key changes to *Data* for entering data values into the statistics memory. On pressing the SHIFT button the *AC* (All Clear) and some of the number buttons change to show the statistical functions.

Selecting *financial* mode enables the financial functions of the calculator. This does not affect the precision of the display. To change the display precision to two decimal places select the financial display type.

The *Angle* and *Time* modes allow display and input as sexagesimal numbers

The *auto power off* feature means that after a specified number of seconds of inactivity, the calculator Minimizes itself.

The *always on top* option keeps the calculator as the top-most window at all times. It can still be minimized. In Windows 3.x this means the icon stays on top also.

The body of the calculator can be customized by choosing the colour and whether or not the edge of the calculator is beveled. Windows95 automatically bevels the edge of windows and so you would probably not want to use this option if you are running Windows95.

You can select the type of display - *normal*, *scientific*, *fixed-point* or *financial* (two decimal places). You can also choose the number of digits, which for *scientific* means the number of significant figures, and in *fixed-point* means the number of digits after the decimal point. Be careful not to increase the number of digits too far if the display font is large, otherwise there is a danger that digits may be hidden, particularly in scientific or exponent display mode. Hidden digits can be brought into view by using the mouse to scroll the contents of the display.


Other customizable features of the display are the font and background colour. Again, care is needed when changing font, as too large a font at higher precision may result in digits falling outside the boundaries of the display. They can be made visible by using the cursor or arrow keys, but there is the danger that digits may be accidentally overlooked, especially in exponent display.

You can also change the font of the large buttons (the small buttons and arithmetic keys use a special font).


## **Calculator Display**


You can select the type of display - *normal*, *scientific*, *fixed-point* or *financial* (two decimal places). You can also choose the number of digits, which for *scientific* means the number of significant figures, and in *fixed-point* means the number of digits after the decimal point. Note that if you compute a number in *fixed-point* display the value is not rounded at each step (i.e. numbers are internally stored to the maximum precision available). This can occasionally be a problem in financial calculations if the existence of the extra precision is overlooked. Be careful not to increase the number of digits too far if the display font is large, otherwise there is a danger that digits may be overlooked, particularly in scientific or exponent display mode.

Other customizable features of the display are the font and background colour. Again, care is needed when changing font, as too large a font at higher precision may result in digits falling outside the boundaries of the display. They can be made visible by using the cursor or arrow keys, but there is the danger that digits may be accidentally overlooked, especially in exponent display.

To change the display, use the  button.


 - **All Clear**

Clears the calculator, and resets any functions. The contents of the memory are not affected by .  
The memory can be cleared after pressing


 by pressing

.


 **Clear**

The  button erases the last number or operation entered.

 **Plus**


The  button performs addition.

 **Minus**


The  button performs subtraction.




 **Divide**


The  button performs division.

 **Multiply**


The  button performs multiplication.

## **Equals**

The  button displays the result of an arithmetic operation. It can be used during a calculation to ensure that an intermediate result has been evaluated. Unless the


 button is pressed, it is possible that an operation is incomplete - pressing

 ensures that no arithmetic operations are pending.

Certain functions make use of the  button to signify the end of input, in order to evaluate a result.



## **Memory Plus**

Pressing the  button adds the number displayed to the contents of the memory. Additional memories can be accessed by pressing the






key before pressing this button, which will change to




.

## **Memory n Plus**


Access one of ten memories (labelled 0-9) using the  button, which is obtained by pressing the  button. After pressing

 press the number button corresponding to the desired memory. Memory number zero is the default memory (i.e. the memory referred to by the unshifted memory buttons).

## **Memory Input**




Press the  button to enter the currently displayed number into the memory.

If you first press  before


 you can select one of the ten memories (0-9). Memory zero is the default memory, i.e. the memory available without pressing the


 button.


## **Memory n Input**

Access one of ten memories (labelled 0-9) using the  button, which is obtained by pressing the  button. After pressing  press the number button corresponding to the desired memory. Memory number zero is the default memory (i.e. the memory referred to by the unshifted memory buttons).

## **Memory Recall**




Use  to put the contents of the memory onto the display. The default memory is number zero. To display other memories, first press the

 button and then the


 button and select the required memory.





## **Memory n Recall**

Access one of ten memories (labeled 0-9) using the  button, which is obtained by pressing the  button. After pressing  press the number button corresponding to the desired memory. Memory number zero is the default memory (i.e. the memory referred to by the unshifted memory buttons).

## **Decimal Point**

Use the  button to enter the decimal part of a number. The decimal point is disabled in non-decimal number systems.

 **EXP (Exponent)**

Use the  button to enter a number in exponential form.

Example: to enter the number  $1.234 \times 10^6$  (1.234E6) press the following buttons:














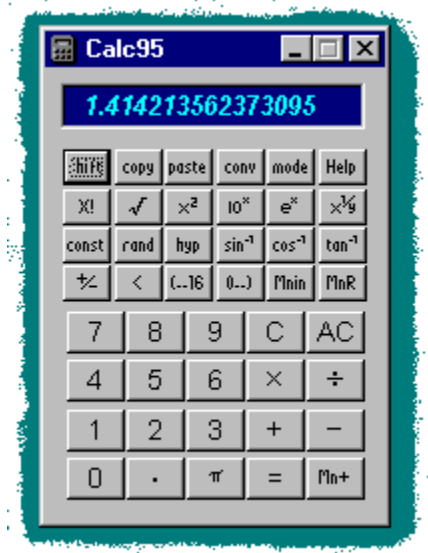


## **Number buttons (0-9)**

Number buttons are used in all modes. In Hexadecimal mode they are augmented by the letters A to F. In Octal mode the 8 and 9 buttons are disabled. In Binary mode only the numbers 0 and 1 are enabled.

In statistics mode the number buttons are used with the  button to obtain the statistical functions.

shift **Shift**



Use the **shift** to access additional functions. The functions available depend on the calculator mode, and are indicated by changes to the legends on the calculator buttons.

## Statistical Functions

To access the statistical functions, make sure you are in *Statistics* mode; the title bar should end with *[stats]*. If not, click **mode** and select *Statistics* from the Number/Mode group. In statistics mode, the bottom right-hand button on the calculator is

**Data**. To input values for analysis, enter numbers and click

**Data** after each number is input. Repeat this process until you have entered all the data values. If you press the

**shift** button on the calculator, some of the number keys change to the statistics functions:



For example, to get the number of points entered, press **n**; to get the mean of the data, press the button labeled

**$\bar{x}$**  (or *avg.*). Similarly


**$\sigma_n$**  (or *sdv*) is the standard deviation, etc.

To clear the statistics memory, press **shift** and then press


**SAC** (Statistics All Clear) button (which was labeled AC before pressing


**shift**).

 **Data Input**

To input values for analysis, enter numbers and click  after each number is input. Repeat this process until you have entered all the data values.

 **Statistics All Clear**

To clear the statistics memory, press the  button, followed by

 (i.e. shifted

).





## Permutations

Computes the number of permutations  $nPr$ .

Example: To compute the number of ways of arranging five objects chosen from a population of ten:



Result: 30240

The calculator must be in statistics mode.



## **Combinations**

Computes the number of combinations  $nCr$ .

Example: To compute the number of combinations of five objects chosen from a population of ten (without regard to the order of choosing):



Result: 252


The calculator must be in statistics mode.

 **Max**


To obtain the maximum of all the values entered into the statistics memory, press  then



.

 **Min**



To obtain the minimum of all the values entered into the statistics memory, press  then

.

 **Number of Data Points**


To obtain the total number of values entered into statistics memory, press  then .

 **Sum of Data**

To obtain the sum of all the values entered into statistics memory, press  then .

Note: if you are not using the special buttons font, this may appear as 'sum'.



## **Sum of Squares of Data**

To obtain the sum of the squares of all the values entered into statistics memory, press  then

.

Note: if you are not using the special buttons font, this may appear as 'ssq'.



 **Data Mean**

To obtain the mean (arithmetic average) of all the values entered into statistics memory, press  then .

Note: if you are not using the special buttons font, this may appear as 'avg'.





## **Data Standard Deviation**

To obtain the standard deviation of all the values entered into statistics memory, press  then .

Note: if you are not using the special buttons font, this may appear as 'sdev'.

## **Data Sample Standard Deviation**


To obtain the sample standard deviation of all the values entered into statistics memory, press  then .

Note: if you are not using the special buttons font, this may appear as 'ssd'.

## Financial Functions



Rate	Term	Ann	Mrtg	Inv	x <sup>y</sup>
const	NPV	V:1	SLD	DDB	SYD

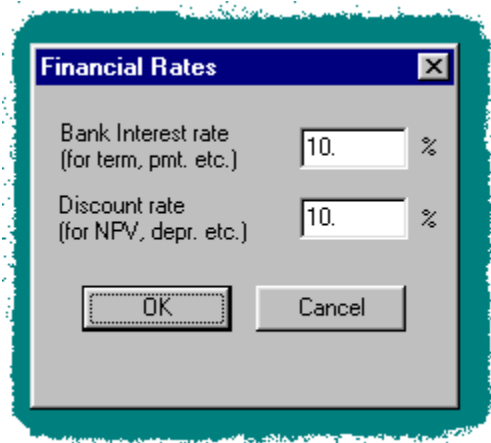
To select the financial functions, press  and select Financial mode. The title bar ends with *[fin]* when you are in financial mode. You can also select the Financial display mode which will show a fixed point notation with two decimal places.

In financial mode, some of the scientific functions are replaced by the financial functions. These fall into two groups: those concerned with calculating compound interest on loans, and those used for budgeting.

A further button is  used to specify the interest and discount rates.

For more information and examples, click on the button on the graphic above.

## Rate - Set Interest and Discount Rates



The bank interest rate is applied to the loan calculations (  ,

,

&

) and the discount rate to the Net Present Value calculations (

&

). Typically these will be assigned different values which prevail at the time and in the field of commerce in question.

It is assumed that the period in these calculations is one year. If a different period is required (monthly for example), then the rates should be adjusted to their equivalent monthly rates.

**Term** **Calculate term of investment**


To compute the term required for an investment to increase to a given value, enter the principal, followed by **Term** followed by the desired compounded sum at the term. The result is the number of periods (generally years) required for the investment to reach this value. If you wish to use a different period (monthly for example) you need to change the value of the interest rate accordingly, by pressing **Rate**.


Example: How many years of compound interest are required for an initial investment of \$100 to reach the value of \$200 (assuming 10% bank interest rate)?

shift  
0  
0  
Term  
shift  
0  
0  
shift

Result: 7.27 (i.e. 8 years to exceed \$200).

 **Calculate Value of Annuity**

To calculate the value of an annuity at maturity, enter the amount of the annual payment, then , followed by the number of years.

Despite the literal meaning of the word annuity, it is possible to use a period other than annual in the calculation, in which case you need to change the value of the interest rate accordingly, by pressing .

Example: What is the value at maturity of a 30 year annuity with an annual payment of \$200 (assuming an interest rate of 10%)?

















Result: \$32898.80

## **Calculate Mortgage payment**

To compute the required periodic payments to repay a given loan, enter the amount of the loan, click the

 button, then enter the duration (number of payments). Press

 to get the amount of each payment. Usually the number of periods is the number of years. If you wish to use a different period (monthly for example) you need to change the value of the interest rate accordingly, by pressing

.

Example: What is the monthly payment to pay off a loan of \$30,000 dollars over 25 years, assuming annual compound interest?

First check that the interest rate is set to correct value (10% for example)



















Result: \$3305.04 (the annual payment)










Result: \$275.42 (the monthly payment)

## **Calculate Value of an Investment**

To compute the value of an investment after a given number of years at the current interest rate, enter the principal, click  and the number of investment periods. Usually the number of periods is the number of years. If you wish to use a different period (monthly for example) you need to change the value of the interest rate accordingly, by pressing

.

Example: What is the value of \$100 invested for five years at compound interest (assuming a 10% annual interest rate)?













Result: \$161.05



**AC Calculate Net Present Value of a Future Cash Flow**

To calculate the present value of an amount to be paid at some time in the future, enter the value of the amount, followed by **AC** and then the number of periods before the payment will be made. Usually the number of periods is the number of years. If you wish to use a different period (monthly for example) you need to change the value of the discount rate accordingly, by pressing

**AC**.


You can enter a negative number of periods, in which case you get the present value of a payment which was paid at some time in the past. If you require the net present value of a series of periodic cash flows, use **AC**.


Example: What is the net present value of \$100 to be paid in five years time (assuming 5% discount rate).


**AC**  
**AC**  
**AC**  
**AC**  
**AC**  
**AC**

Result: \$78.35


## **Net Present Value of Cash Flows**

To calculate the net present value of a series of cash flows, enter the cashflow for each period followed by the  button. Each time this button is pressed, the button legend is incremented indicating the next periodic cashflow to be input, e.g. after the first period is input the button shows

. At any time you can display the cumulative net present value of the cashflows input so far by pressing

. To reset the period back to 1 and erase the accumulated values press the

 button.

Typically the period is annual. If you wish to use a different period (monthly for example) you need to change the value of the discount rate accordingly, by pressing . It is also permitted to alter the discount rate during the calculation (i.e. rate differs for different periods). If you require the net present value of a single cashflow at some point in the future, use the

 button instead.

Example: A project requires an initial capital expenditure of \$1,000,000. After five years the capital equipment is to be written off. The expected annual revenue stream, less running costs, is: year 1 - \$100,000; year 2 - \$200,000, year 3 - \$300,000, year 4 - \$300,000, year 5 - \$300,000. The net revenues exceed the initial capital cost, but is the investment a good one, assuming a discounting rate of 5% per annum?

































AC

AC

AC

AC

AC

V:3

AC

Result: \$535795.27 (optionally check NPV of years 1,2 & 3)

AC

AC

AC

AC

AC

AC

V:4

V:5

( 300,000 still in display from previous input - no need to re-enter same amount )

AC

Result: \$1017663.86

The result shows that, taking into account the time value of money, the revenue flows have a net present value of \$1017663.86, so that the project is just profitable (but probably not worth the risk!).

**SLD** **Straight Line Depreciation**

To calculate the fraction of the value of an asset which is depreciated after a given time using straight-line depreciation, enter the initial cost less any salvage value, then **AC**, followed by the useful asset life, then

**SLD**, followed by the number of periods after which the depreciation is to be calculated, followed by **AC**. The result is the total (cumulative) depreciation charge.

Usually the number of periods is the number of years. If you wish to use a different period (monthly for example) you need to change the value of the discount rate accordingly, by pressing **AC**.

Example: What is the depreciation after five years on a capital asset costing \$10,000 with a ten year life and a salvage value of \$1000 at the end of its life?

**AC**  
**AC**  
**AC**  
**AC**  
**AC**  
**AC**  
**AC**  
**AC**  
**AC**  
**AC**  
**AC**  
**AC**  
**AC**

Result: \$9000.00

**AC**  
**(..16)**  
**AC**  
**AC**  
**SLD**  
**AC**  
**(..)**  
**AC**

Result: \$4500.00

The depreciation is \$4500, therefore the value of the asset after 5 years is \$10000 - \$4500 = \$5500.00

**DDB** Double-declining Balance Depreciation

To calculate the fraction of the value of an asset which is depreciated after a given time using the double-declining balance method of depreciation, enter the initial cost less any salvage value, then **AC**, followed by the useful asset life, then

**DDB**, followed by the number of periods after which the depreciation is to be calculated, followed by **AC**. The result is the total (cumulative) depreciation charge.

Usually the number of periods is the number of years. If you wish to use a different period (monthly for example) you need to change the value of the discount rate accordingly, by pressing **AC**.

Example: What is the depreciation after five years on a capital asset costing \$10,000 with a ten year life and a salvage value of \$1000 at the end of its life?

**AC**  
**AC**  
**AC**  
**AC**  
**AC**  
**AC**  
**AC**  
**AC**  
**AC**  
**AC**  
**AC**  
**AC**  
**AC**

Result: 9000.00

**AC**  
**(..16)**  
**AC**  
**AC**  
**DDB**  
**AC**  
**(..)**  
**AC**

Result: \$6030.00

The depreciation is \$6030, therefore the value of the asset after 5 years is \$10000 - \$6030 = \$3970.00

**SYD** **Sum-of-Years-Digits Depreciation**

To calculate the fraction of the value of an asset which is depreciated after a given time using the sum-of-years-digits method of depreciation, enter the initial cost less any salvage value, then **AC**, followed by the useful asset life, then

**SYD**, followed by the number of periods after which the depreciation is to be calculated, followed by **AC**. The result is the total (cumulative) depreciation charge.

Usually the number of periods is the number of years. If you wish to use a different period (monthly for example) you need to change the value of the discount rate accordingly, by pressing **AC**.

Example: What is the depreciation after five years on a capital asset costing \$10,000 with a ten year life and a salvage value of \$1000 at the end of its life?

**AC**  
**AC**  
**AC**  
**AC**  
**AC**  
**AC**  
**AC**  
**AC**  
**AC**  
**AC**  
**AC**  
**AC**  
**AC**


Result: \$9000.00

**AC**  
**(..16)**  
**AC**  
**AC**  
**SYD**  
**AC**  
**(..)**  
**AC**


Result: \$6570.00

The depreciation is \$6570, therefore the value of the asset after 5 years is \$10000 - \$6570 = \$3430.00

## **Reciprocal**


The  button computes the reciprocal of the number currently displayed.

## **Square Root**


The  button computes the square root of the number currently displayed.



 **Square**

The  button computes the square of the number currently displayed.

## **Logarithm to base 10**

The  button computes the logarithm to base 10 of the number currently displayed.

## **Natural Logarithm**

The  button computes the natural logarithm (logarithm to base e) of the number currently displayed.

## **X to the Power of Y**

The  button computes X to the power of Y.

Example: Calculate 5 raised to the power of 6.

 AC


  $x^y$

 AC

 AC

Result: 15625.000000

## **Yth Root of X**

The  button computes the Yth root of X (i.e. X to the power of the reciprocal of Y).

Example: Calculate the cube root of two:

 AC

  $x^{1/y}$

 AC

 AC

Result: 1.259921004989



## Input Degrees/Hours, Minutes, Seconds

The  or



button is used to enter an angle/time in degrees/hours, minutes and seconds in one of the sexagesimal modes (i.e. Angle or Time). The button appears where the



button appears in Decimal modes.

To enter a number in sexagesimal format, first enter the number of whole degrees or hours, and press



or



. The legend changes to



to indicate that the next number input is the number of minutes. Enter the number of minutes and press



. The legend changes again, this time to



. Enter the number of seconds.

Arithmetic calculations can be carried out in Angle or Time mode, or the result or number entered can be converted to another format by selecting a different calculator mode. Similarly a Decimal (or other base) number can be converted to sexagesimal format by selecting the Angle or Time mode.

Note that selecting Time or Angle mode automatically selects appropriate properties and units for conversion.

Example 1: What is the sine of 17 degrees, 14 minutes and 30 seconds?

First select Angle mode in the mode dialog box.



Displays: 17° 14' 30"

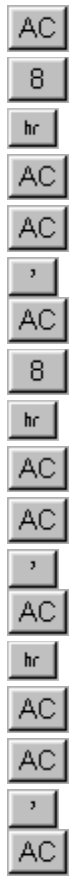
Change to Decimal mode in mode dialog box: Result: 17.241666666667




Result: 0.2964026699

Example 2: I started work at 08:30 and finished at 18:54, and I took a 45 minute lunch break. How many hours do I put on my timesheet?


First select Time mode in the mode dialog box.



Result: 9h 39' 0"


To continue the calculation to accumulate hours for a weekly timesheet, use the  button. To convert to a decimal number of hours, select Decimal mode.


## **Random Number**

The  button is used to enter a pseudo-random number between 0 and 1.




## **Hyperbolic**

The  button is used to select hyperbolic functions and inverse hyperbolic functions. Clicking the


 button causes the legends of the




 and


 to change to




 and



Pressing  either before or after the

 causes the inverse hyperbolic functions to be displayed:



 and



Example: Compute the hyperbolic sin of 1.0









Result: 1.175201193643801


 **Sine**

The  button computes the sine of an angle.


## **Inverse Sine**

The  button computes the angle for which the sine is the value entered.


 **Cosine**

The  button computes the cosine of an angle.


## **Inverse Cosine**

The  button computes the angle for which the cosine is the value entered.


## **Tangent**

The  button computes the tangent of an angle.

## **Inverse Tangent**

The  button computes the angle for which the tangent is the value entered.

## **Factorial**


The  button computes the factorial of a current number. If the current number displayed is not an integer, the result is the factorial of the integer value of the current number.






Enters the value of pi in the display.


 **Ten to the power of x**

The  button computes 10 raised to the power of the current number.


 **e to the power of x**


The  button computes the value of e raised to the power of the current number (exponential function).

## **Sign**


The  button changes the sign of the number currently displayed.

 **Backspace**

Use the  button to remove the most recently entered numbers, digit by digit.

To remove the whole of an entry, use .

## Parentheses

The  button is used to change the order of evaluation of an expression. For example, the expression  $1 + 2 \times 3$  would be evaluated as 9 because the operator precedence is determined by the order of entry. This is a different answer to the expression  $1 + 2 * 3$  in a programming language such as BASIC, C or FORTRAN, which gives multiplication and division precedence over addition and subtraction. The reason for this difference in the order of evaluation is that in a programming language the expression is *parsed* (the whole expression is analysed and translated into a sequence of instructions) whereas a calculator simply stores the result of each step of the calculation in the order given.

To make the calculator evaluate the multiplication first, use parentheses (brackets). Evaluating  $1 + (2 \times 3)$  gives the result 7.

See  .

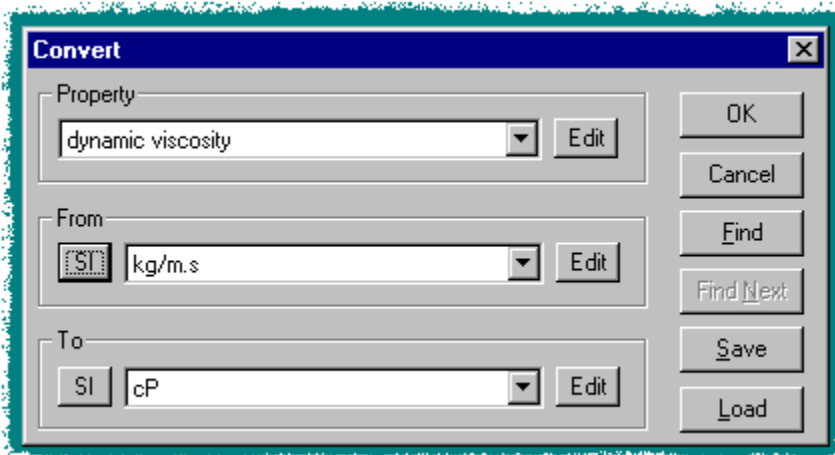
 **Right Parenthesis**


Closes a level of parentheses. The level of the current parentheses is reflected in the button legend.

See 

## **Units Conversions**

The calculator has in-built units conversions and constants. Using conventional calculators and reference books it is often difficult to find a conversion factor between the pair of units you are dealing with and you are forced to convert in several error-prone steps. This problem is eliminated with the units conversion facility in Calc95 which is probably the most comprehensive you will find anywhere. The conversion function also eliminates the risk of confusion about ‘which way’ to use a factor that arises when converting between different units systems of dimensionally complex quantities.



Suppose you have a value for a property, dynamic viscosity say, quoted in non-SI units, and the formula you are computing is in SI. First, enter the value into the calculator display. Next, click the  button and select the property *dynamic viscosity* from the Properties box. Then in the From box select the set of units in which the value has been entered (e.g. slug/ft-sec), by clicking on the down-arrow to the right of the box. Now select the desired units in the To box. If the desired units are SI, you can just click the SI button, rather than searching for them in the drop-down edit box. Finally click the OK button (or return on the keyboard) and the converted value will be shown in the calculator display. Click the Cancel button to return to the calculator without performing any conversion. To use the same conversion on another value, enter the new value and select

 again. Click OK or press return to use the same conversion on the new value.

You can use the Find button to search for a property or units from the properties database. Click on Find and enter the word or part word you are looking for. The first property or unit containing the word will appear in the convert dialog box. Press the Find Next button to find any further occurrences of the word.

To modify the properties database press the *Edit* button next to the properties or units. A dialog appears which allows you to Add, Delete or Rename units or properties. For units you can also update the factor or offset (for example if you have access to more accurate data). Select the units or property you want to rename or delete in the listbox.

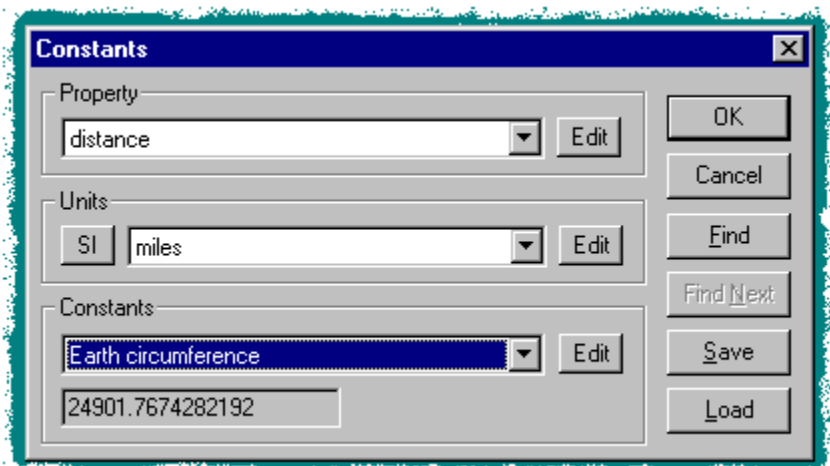
You can save your updated properties and units by clicking the Save button and giving a file name. You can subsequently load a set of properties, units and constants using the Load button. If you save the file with the name DEFAULT.PRP in the default directory, your file will be loaded automatically in future. The file FACTORY.PRP is the properties file which is supplied with the software and should not be overwritten. If you want to revert to the properties as supplied, simply delete or rename your DEFAULT.PRP file; FACTORY.PRP is automatically loaded if DEFAULT.PRP is absent. If you have saved a lot of data in this way, you might want to make sure you have a backup copy of your DEFAULT.PRP file.





## **Constants**

To get the value of a constant, click the 'const' button to get the constants dialog box. If necessary, select the property and suitable units, then select the desired constant from the Constants list box. When you have selected a constant its value is displayed. If you want to put the value into the calculator display, click OK. To quit without changing the calculator display, click Cancel. Note that for some properties the constants box will be empty because we have not been able to think of any useful constants!




The property, units and constants list boxes each have an adjacent button labeled *Edit*. To modify the properties database press the Edit button next to the properties, units or constants list boxes as required. A dialog appears which allows you to Add, Delete or Rename units, properties or constants. For constants you can also modify an existing value and for units you can update the factor or offset (for example if you have access to more accurate data). Select the unit, constant or property you want to rename or delete in the listbox.

You can use the Find button to search for a property or units from the properties database. Click on Find and enter the word or part word you are looking for. The first property or unit containing the word will appear in the convert dialog box. Press the Find Next button to find any further occurrences of the word.

You can save your new properties, units or constants by clicking the Save button and giving a file name. You can subsequently load a set of properties, units and constants using the Load button. If you save the file with the name DEFAULT.PRP in the default directory, your file will be loaded automatically in future. The file FACTORY.PRP is the properties file which is supplied with the software and should not be overwritten. If you want to revert to the properties as supplied, simply delete or rename your DEFAULT.PRP file; FACTORY.PRP is automatically loaded if DEFAULT.PRP is absent. If you have saved a lot of data in this way, you might want to make sure you have a backup copy of your DEFAULT.PRP file

## **Errors**

If you get an error, e.g. an overflow or attempt to divide by zero, the calculator display will contain the word Error, and possibly some further descriptive information. In the error state, the calculator functions are disabled and you need to press the  button to clear the error.

## **System menu commands**

The System menu offers the following:

<u>Restore</u>	Restore an iconized calculator to full size
<u>Move</u>	Move calculator
<u>Size</u>	Not used
<u>Minimize</u>	Minimize calculator (make into an icon)
<u>Maximize</u>	Not used
<u>Mode</u>	Change calculator mode
<u>Copy</u>	Copy contents of display to clipboard
<u>Paste</u>	Paste contents of clipboard onto display
<u>Help</u>	Offers you an index to topics on which you can get help.
<u>About</u>	Displays the version number of this application.
<u>Close</u>	Close the calculator (and end task)
<u>Switch To</u>	Switch to another task

## **Restore**

Restores an iconized or minimized calculator to full size.

## **Move**

Moves the calculator to a new position. The more common way of achieving this is to click on the title bar and drag the window to the desired position.

## **Size**

There is no re-size option function because the calculator window is of fixed size (other than by customization).

## **Minimize**

Minimizes the calculator. The effect depends on the version of the software and the operating system.

Calc95: On Windows95 the calculator disappears and is reactivated by clicking on its taskbar entry. On other Windows 3.x and WindowsNT (running the old shell) the calculator becomes an icon.

ObjectiF: The calculator disappears and is reactivated by clicking the calculator button on the ObjectiF toolbar, or selecting *Calculator* from the View item on the menu.



## **Title Bar**


The title bar contains the name of the software and additional information about the mode the calculator is operating in.

Click and drag on the title bar to move the calculator. In Windows95 you can click the right mouse button on the title bar in order to bring up the System menu.


## **Maximize**

There is no maximize function because the calculator window is of fixed size (other than by customization).


## **Copy**

The  button or Copy system menu command copies the contents of the display onto the clipboard. The displayed value can then be pasted into documents or other applications.

 **Paste**

The  button or Paste system menu command copies the contents of the clipboard onto the display. This can be used to import values from other documents and applications into the calculator.

## **Help**

Use this command or the  button to display the opening screen of Help. From the opening screen, you can jump to step-by-step instructions for using Calc and various types of reference information.

Once you open Help, you can click the Contents button whenever you want to return to the opening screen.

## **About**

Use this command to display the copyright notice and version number of your copy of the software. When you have finished, click the OK button to dismiss the About box.

Four further buttons are provided to give more details:

**FSI** gives more details about Flow Simulation, the developers of the software

**Ordering** presents details of upgrades that were known at the time your distribution disks were built. For more up-to-date information, use the contact details given behind the FSI button, described above.

**Authors** gives the credits for the program developers.

**System Info** gives details about your system and your software serial number.

## **Close**

Ends the calculator application if run stand-alone (Calc95).

Closing the calculator object in ObjectiF has the same effect as Minimize. The calculator disappears and is reactivated by clicking the calculator button on the ObjectiF toolbar, or selecting *Calculator* from the View item on the menu.

## **Switch To**

Allows you to switch to another task on your Windows desktop.



## **Program Structure**

The ability to program the calculator is not included in the shareware version of Calc95.

The structure of a program resembles FORTRAN90, which is itself an extension of the FORTRAN77 standard. It consists of the program directives, followed by one or more program segments.

## **Program Directives**

The ability to program the calculator is not included in the shareware version of Calc95.

## **Program Segments**

The ability to program the calculator is not included in the shareware version of Calc95.

