

# RedCrab

The Calculator

## User Manual

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# RedCrab The Calculator

Version 3.50

RedCrab is a freeware program.

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We are not liable for any error in software or manual. Usage at your own risk.

## System requirement

Minimum Pentium P4 and 512 MB RAM.

Operating system: *Microsoft Windows*.

The following fonts: ***Courier New*** and ***Symbol*** must be installed in your system.

These fonts belonged to Microsoft <sup>\*</sup>*Windows* systems.

The program works on *Linux* OS with *Wine* runtime system.

No installation of the software is required. You can just copy the software to your system and starts the programs.

Calculation range: 1.7e 308 to 5e-324

Accuracy: 16 digits

Display: 15 digits

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# RedCrab – The Calculator

RedCrab is a scientific calculator with a full screen editor. Mathematical expressions are not entered here in a single command line, but writing in any editor position similar to a sheet of paper.

The handling of the basic functions is just like a conventional calculator. There is no training required. Whoever can operate a pocket calculator can also use RedCrab without studying the manual. This guide describes fundamentally the advanced features which a normal calculator does not possess.

RedCrab is fully portable. The program can be started from external data storage source without installation. Settings can be stored as a file in the programs root directory instead in the PC' s Windows registry. If you start RedCrab from a USB flash drive, your settings are stored on the stick. See also the paragraph at the bottom: 6.57 Settings to Registry.

# 1.0 Mathematical Expressions

## 1.1 Basics

You can write your formula basically at any editor position. Any expression may occupied any number of rows and columns. It not allowed to split an expression and continue in the next row.

Wrong:      $z = 12+14+15+20$   
               $+5+10$

Correct:     $z = 12+14+15+20+5+10$

Correct:     $X = 12+14+15+20$   
               $Z = X+5+10$

RedCrab accepts different formats at the input of mathematical expressions:

- a)      $17+4$
- b)      $X=17+4$
- c)      $17+4=$
- d)      $X=17+4=$

Result is displayed below, depending on the format used. Input in the editor will be displayed in black letters. The output of the calculator is printed in blue.

a)  $17+4$

$21$

b)  $X=17+4$

$X=21$

c)  $17+4=21$

d)  $X=17+4=21$

You can write several mathematical expressions on one work sheet. The expressions result displays only if terminated with equal sign.

Example 1:

$a+b =108$

$a=27+9 =36$

$8*4 =32$

$b=12*6 =72$

Example 2:

$a+b =108$

$a=27+9$

$8*4 =32$

$b=12*6$



Example:

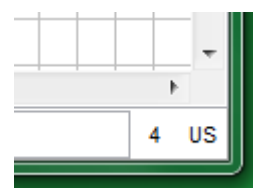
108

Example 1:

$$a = 3 : b = a + 7$$

Example 2:

a + 7	b = a + 7
-------	-----------



The minimum distance displayed at bottom right corner, next to the keyboard setting. In example 2 the minimum distance is set to 4 columns.

An equal sign behind a formula is always assigned to the previous formula, even if the distance to the formula is greater than the column space setting. In the example right, the distance of the equal sign is up to eight columns, although the minimum distance is only four columns.

Close proximity can caused unexpected errors. For error localization RedCrab marked the cell where an error is detected with a blue frame. It also marks the incorrect formula with a red frame. In the example below, an invalid assignment is signaled. The red box shows, however, that two formulas were joined because the distance is too close. The setting in this example is 4 columns, the distance between the formulas is only 2 columns.

## 1.2 Simple Addition

1. Enter the expression  $17 + 4$
2. For result press  $\langle \text{Ctrl} + \text{Enter} \rangle$

The  $\langle \text{Ctrl} + \text{Enter} \rangle$  key starts RedCrab and displays the result. Alternative click the function panels *Enter* button.

The display shows:

$$17 + 4$$

$$21$$

The result is displayed below the expression, beginning in the same column. Results are always displayed in blue.

## 1.4 Assignment of Values

1. Enter the expression  $17 + 4 + X$
2. Enter the assignment  $X = 43$
3. For result press  $\langle Ctrl + Enter \rangle$

RedCrab displays the result: 64

The display shows:

$17 + 4 + X$

$X = 43$

64

The assignment can be entered at any position below the expression

## 1.5 Equation

The same expression as above, however as an equation.

1. Enter the equation  $Z = 17 + 4 + X$
2. Enter the assignment  $X = 43$
3. Press  $\langle Ctrl + enter \rangle$  to display the result

The display shows:

$Z = 17 + 4 + X$

$X = 43$

$Z = 64$

## 1.6 Exponent

The expression:  $c = a^2 + 4^2$ .

1. Enter the expression:  $c = a$  <Ctrl + 2> + 4 <Ctrl + 2>
2. Press <Ctrl + Enter> to display result.

The keys <Ctrl + 2> write the exponent 2. With the keys <Ctrl + 3> you can write the exponent 3. For use of any other values for exponents, press the <Ctrl+6> keys to enter the *Super* mode. Then enter the exponent value. Press <Enter> to leave super mode.

The display shows:

$$c=a^2+4^2$$

$$c=16+a2$$

The example above includes no assignment for  $a$ , so RedCrab can only eliminate the exponent of 4. The following example shows the assignment and its solution.

The display shows:

$$c=a^2+4^2$$

$$a=3$$

$$c=25$$

## 1.7 Subscript and Implied Multiplication

Enter the formula:  $X_L = \omega L$

1. Press the following keys : X <Ctrl + \_> L <Enter> = <Ctrl + W> L
2. Enter the assignment  $\omega=2\pi f$  ; press the keys : <Ctrl + W> = 2 <Ctrl + P> f
3. Enter the assignment  $f = 2200$
4. Enter the assignment  $L=0.8 \cdot 10^{-3}$ ; press the keys : L = 0.8 10 <Ctrl + 6> - 3 <Enter>
5. Press the keys <Ctrl + Enter>

With the keys <Ctrl + underscore> you can switch *Subscript* on / off.  
Alternative use <Enter> to leave *Subscript* region.

The *Ctrl* key shifts the letters to the alternative font. The example above shows that the keys <Ctrl + P> displayed the Hellenic letter Pi ( $\pi$ ).

The display shows:

$$X_L = \omega L$$

$$\omega = 2 \pi f$$

$$f = 2200$$

$$L = 0.8 \cdot 10^{-3}$$

$$X_L = 11.1$$

The example above show three important features of RedCrab: the subscript mode, the implied multiplication and assignment of a formula to a variable ( $\omega=2\pi f$ ).

Implied multiplication means you do not need to include the multiplication operator

Example: RedCrab interprets  $X_L = \omega L$  as  $X_L = \omega * L$

RedCrab interprets a sequence of letters, for example,  $ab$ , as different variable. Exclude subscript letters, for example  $X_L$ . Subscript letters always belong to the variable on the left.

Example:

$$abc : a * b * c$$

$$3ab : 3 * a * b$$

$$2X_L = 2 * X_L$$

$$R_1 R_2 = R_1 * R_2$$

Use the Escape mode if you want a sequence of letters for a single variable.  
Read more about the Escape mode in the description below.

## 1.8 Fraction and Square Root

Enter a formula with a fraction and a square root.

1. Enter the fraction line and the numerator :  $f = \text{<Ctrl + /> <Enter> 1 <Enter>}$
2. Enter the denominator :  $2 \text{ <Ctrl + P> <Ctrl + 1> LC}$
3. Assignment L :  $L=0.8 \text{ } 10 \text{ <Ctrl + 6> - 3}$
4. Assignment C:  $C=4.7 \text{ } 10 \text{ <Ctrl + 6> - 6}$
5. Press  $\text{<Ctrl + Enter>}$  for result.

The display shows:

$$f = \frac{1}{2\pi\sqrt{LC}}$$

$$L = 0.8 \text{ } 10^{-3}$$

$$C = 4.7 \text{ } 10^{-6}$$

$$f = 2.596 \text{ } 10^3$$

To write a fraction line press  $\text{< Ctrl + / >}$  (forward slash) key. Read more information below about fractions in the description.

The keys  $\text{<Ctrl + 1>}$  write a root symbol at the cursor position, and then mark the range which should be below the root. Click the root symbol and the editor draw the root line above the marked range. Read more information about square roots in the description below.

## 1.9 Hexadecimal Input

The RedCrab editor accepts input of hexadecimal numbers up to 13 digits. The hexadecimal number must mark with a dollar symbol before it. The use of small or capital letters are allowed.

Example:

\$1F2A or 1f2a

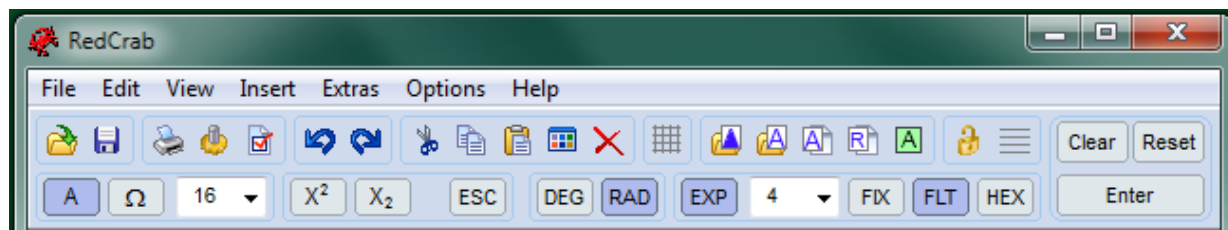
You can use a hexadecimal number in any position of a formula like decimal numbers. Between the hexadecimal number and the following number or variable must be a space or operator symbol.

Example:

Correct: \$1F2A\*X or \$1F2A X

Wrong: \$1F2AX => generate an error message.

## 2.0 The Toolbox



Picture 3.1

## 2.1 Fonts

The editor used the *New Courier* and *Symbol* fonts. They are usually included with Windows operating system. *New Courier* is the default font. The *Symbol* font includes *Hellenic* letters and special symbols.

You can toggle between the fonts by mouse click on the  $\langle a \rangle$  and  $\langle \pi \square \rangle$  buttons, left on the toolbar, or press  $\langle \text{Ctrl} + .(\text{dot}) \rangle$  keys. The button of the activated font is displayed in blue.

Usually the *New Courier* font is in use. Alternative font is generally needed for certain *Hellenic* letter. Without switching the font you can type in single letter of the alternative font by pressing the  $\langle \text{Ctrl} \rangle$  key. Example: press  $\langle \text{Ctrl} + P \rangle$  to write the character  $\pi$  or  $\langle \text{Ctrl} + L \rangle$  to write the letter  $\lambda$ . Conversely, if the *Symbol* font is switched on, press *Ctrl* key to use *New Courier* font.

## 2.2 Font Size

Next to the Font buttons the toolbox show the font size. You can change the font size with use of the combo button at the right or write the new font size in the box. The maximal font size is 512.



## 2.3 Superscript

Use Superscript to write an exponent. Toggle the Superscript mode per mouse click on the toolbox  $\langle a^x \rangle$  button. With the keyboard you can toggle with  $\langle \text{Ctrl}+6 \rangle$  or  $\langle \text{Shift}+\wedge \rangle$ , the  $\langle \text{Enter} \rangle$  key leave the Superscript mode.

Following additions were made in Version 1.33:

- Superscript mode can be enabled / disabled using the function key  $\langle \text{F3} \rangle$ .
- Superscript mode disabled if you enter a non alpha numeric sign .Same thing if you select cells.
- If Superscript is activated when the cursor is on a character, the character under the cursor changed from normal letters in superscript.
- Similarly, the character can be reseted by superscript in normal font. The superscript mode is not enabled in this case, only the sign is changed.
- As described above you can change selected cells to superscript or reset.

## 2.4 Subscript

Toggle Subscript mode per mouse click on the toolbox  $\langle a_x \rangle$  button. The *underscore\_* key and  $\langle \text{Ctrl}+_ \text{ (underscore)} \rangle$  toggles *Subscript* too. The  $\langle \text{Enter} \rangle$  key leaves the Subscript mode.

Following additions were made in Version 1.33:

- Subscript mode can be enabled / disabled using the function key  $\langle \text{F4} \rangle$ .
- Subscript mode disabled if you entering a non alpha numeric sign. Same thing if you select cells.
- If Subscript is activated when the cursor is on a character, the character under the cursor changed from normal letters in subscript.
- Similarly, the character can be reseted by subscript in normal font. The subscript mode is not enabled in this case, only the sign is changed.

- As described above you can change selected cells to subscript or reset.

## 2.6 Escape

A mouse click on the *<Esc>* button toggles the Escape mode. You can leave the Escape mode with the *<Enter>* key. If the editor is in Escape and Superscript mode the *<Enter>* key leaves Escape mode only.

Read below the description about Escape mode.

## 2.7 DEG / RAD

The *<DEG>* and *<RAD>* buttons select the input to a trigonometric function.

*<DEG>*: input must be in degrees.

*<RAD>*: input must be in radians.

The selected button is displayed in blue.

## 2.8 Exponent - EXP

If the *<EXP>* button switched on (displayed blue), the calculator write the result as power of ten.

## 2.9 Decimal Digits

Next to the *<EXP>* button you can change the number of decimal digits in your result. To change the decimal digits click the up/down button right or change the number in the display. RedCrab stores different number of digits for fix- and floating point results

## 2.10 Fix- / Floating point results

Choose between fix- and floating point results with mouse click on the *< FIX >* / *< FLT >* buttons.

- *FIX* : fix point
- *FLT* : floating point

## 2.11 Hexadecimal Output

Press the *<HEX>* button to show results as hexadecimal number. RedCrab can display hex numbers up to 13 digits. Any numbers more than 13 digits will be displayed as error message.

Left hand zeros of positive numbers will not be displayed. Only one left hand *<F>* by negative numbers will be displayed with a Minus symbol.

Example:

Decimal: -2 => Hexadecimal Result \$FFFFFFFFFFFFFFE

Displayed as: \$FE

## 2.12 Clear

The *Clear* function clears the worksheet and the undo memory.

The *Clear* function clears the worksheet and the undo list, without prompting. Instead data are stored in the startup directory in a file named *redcrab.his*. If the *Clear* button was clicked by mistake, the worksheet can be restored with *Reopen* function in the *file* menu.

## 2.13 Reset

Reset clear all calculators output (displayed in blue). It don't change the user input. It's equal to the <F7> key.

## 2.14 Enter

Enter start the calculator and display the result. It's equal to the <F8> and <Ctrl+Enter> keys.

## 3.0 Function Panel



The following part describes the *Function* panel buttons. Alternative you can use the keyboard to execute the panel functions. If you are not using the *Function* panel, you can switch this off under the *View* menu.

Read the description about Escape mode below.

## 3.5 Mathematical Functions (Function Panel)

sin()	sine
cos()	cosine
tan()	tangent
arcsin()	inverse sine
arccos()	inverse cosine
arctan()	inverse tangent
deg()	convert radian in degrees
rad()	convert degrees in radians
cot()	cotangent
exp()	exponent to Euler's constant : 2.7182818284590452...
ln()	natural logarithms to base e (2,7182818284590452...)
log()	logarithms base 10
log2()	logarithms base 2
log8()	logarithms base 8
log16()	logarithms base 16

## Extended Functions

e	Euler's constant : 2.7182818284590452...
$\pi$	constant PI: 3.1415....
ld()	logarithms base 2
lg()	logarithms base 10 (equal to log )
log10()	logarithms base 10 (equal to log )

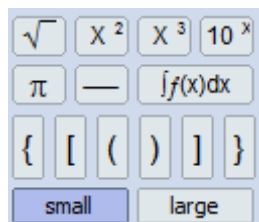
## 3.6 Operators

RedCrab uses the operators below:


+	Addition
-	Subtraction
*	Multiplication
/	Division


DIV	Integer number division without remainder.
MOD	Returns the remainder of the division of integer numbers


## 4.0 Symbol Panel





The *Symbol* Panel contained symbols, you can write with the keyboard too. But problem may arise by any non English keyboard or language. For more information about the keyboard read below the description about keyboard configuration.


 This button writes the *Root* symbol to the cursor position. It's equivalent to  $\langle \text{Ctrl} + 1 \rangle$  key. For more information read paragraph 7.6 Root.

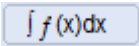
 This button writes exponent  $\langle 2 \rangle$  to the cursor position. It is equivalent to  $\langle \text{Ctrl} + 2 \rangle$  keys.

 This button writes exponent  $\langle 3 \rangle$  to the cursor position. It is equivalent to  $\langle \text{Ctrl} + 3 \rangle$  keys.

 This button writes the symbols  $\langle *10 \rangle$  to the cursor position and switched in the *Super* mode to input the exponent.

 This button writes the  $\pi$  – symbol to the cursor position. It is equivalent to  $\langle \text{Ctrl} + p \rangle$  keys.

 This button writes a *Fraction* line to the cursor position. It is equivalent to  $\langle \text{Ctrl} + / \rangle$  keys.

 This button writes the symbols of an *Integral* function to the cursor position. It is equivalent to  $\langle \text{Ctrl} + 4 \rangle$  keys.



This button writes different brackets to the cursor position. Dependant on selection (small or large), brackets will be displayed either in normal font size or triple row size.

Details can be found under paragraph 5.0 Keyboard

The *Symbol* panel contains extra large brackets which are not included in *ANSI* fonts. The following list shows the key codes for the English US keyboard:

- Ctrl + '9'                    (      Left round bracket
- Ctrl + '0'                    )      Right round bracket
- Ctrl + '['                    [      Left square bracket
- Ctrl + ']'                    ]      Right square bracket
- Ctrl + Shift + '['          {      Left curly bracket
- Ctrl + Shift + ']'          }      Right curly bracket

## 4.5 Programmer Panel



The following part describes the *Programmer* panel buttons. Alternative you can use the keyboard to execute the panel functions. Read the description about Escape mode below. If you are not using the *Programmer* panel, you can switch this off under the *View* menu.

**The following Programmer functions and operators perform manipulation on integer operands. If the operands real type numbers, the values are rounded toward zero.**

### 4.51 DIV

The **DIV** operator returns the result of an integer number division without remainder. If floating point numbers are entered, the **DIV** operator cuts off all digits after the decimal point before executing the division **DIV**.

Example:

```
11      DIV 3      = 3
11.2    DIV 3.9    = 3
```

## 4.52 MOD

The **MOD** operator returns the remainder of the division of two integer numbers. If floating point numbers are entered, the **MOD** operator cuts off all digits after the decimal point before executing the division **MOD**

Example:

```
11      MOD 3      = 2
11.7    MOD 3.9    = 2
```

## 4.53 HEX

This button writes the <\$> symbol for hexadecimal input to cursor position. More information can be found under paragraph 1.9 Hexadecimal Input.

## 4.54 AND

The logical AND operator performs bitwise AND manipulation on integer operands

Example:     $Z = X \text{ AND } Y$



## 4.55 OR

The logical OR operator performs bitwise OR manipulation on integer operands.

Example:  $Z = X \text{ OR } Y$

## 4.56 XOR

The logical XOR operator performs bitwise XOR manipulation on integer operands.

Example:  $Z = X \text{ XOR } Y$

## 4.57 SHL

The SHL operator performs bitwise shift left manipulation on integer operands.

Example:  $Z = X \text{ SHL } Y$

The operations  $X \text{ SHL } Y$  shift the value of  $x$  to the left by  $y$  bits.

## 4.58 SHR

The SHR operator performs bitwise shift right manipulation on integer operands.

Example:  $Z = X \text{ SHR } Y$

The operations  $X \text{ SHR } Y$  shift the value of  $x$  to the right by  $y$  bits.

## 4.59 NOT

The logical NOT function performs bitwise negation on integer operands.

Example:  $Z = \text{NOT}(X)$

## 4.60 INCL

The INCL operator adds a bit to the integer operands.

Example:  $Z = X \text{ INCL } Y$

In the example above INCL sets the bit number Y in operand X

Example:  $8 \text{ INCL } 3 = 12$

## 4.61 EXCL

The EXCL operator excludes a bit from an integer operands.

Example:  $Z = X \text{ EXCL } Y$

In the example above EXCL clears the bit number Y in operand X

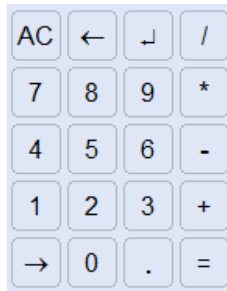
Example:  $15 \text{ EXCL } 4 = 7$

## 4.62 TRUNC

The Trunc function truncates a real-type value to an integer-type value. The values are rounded toward zero.

Example:  $\text{TRUNC}(123.67) = 123$

## 4.8 Number Panel



The following part describes the *Number* panel buttons. Alternative you can use the keyboard to execute the panel functions.

If you are not using the *Number* panel, you can switch this off under the *View* menu.



Clears the the mathematical expression at cursor position.



Backspace.



Linefeed-Return: moves the cursor to the first column at the next free row.



Space.

All other number and operator buttons function as shown.

## 5.0 Keyboard

The keyboard inputs in the following description correspond to the English keyboard and Windows regional and language option English-US. When using a non-English keyboard or language, some functions are acquired with other key combinations. This concern most of the *<Ctrl>* key functions. In the attachment of this manual you will find pictures about key codes of different keyboards. Read the description below about keyboard configurations.

Esc	Switch to escape mode.	To exit escape mode: press <i>enter</i> key or bracket open
	- Exit escape mode	

Enter	- Exit Superscript	Equal to the <i>Function</i> panels <i>Enter</i> button
	- Exit Subscript	
	- Moves cursor to numerator, if this position is end of fraction bar,	
	- Moves cursor to denominator, if this position in the numerator row.	
	- Moves cursor to end of fraction, if this position at the denominators row.	
Enter + Ctrl	Display result	
Enter + Shift	Line feed- return : move the cursor to the first used column in the next row	
Ctrl + (Shift)	switch to alternative font	
Ctrl + .	Toggle ANSI / Symbol font	
Ctrl + ,	Toggle on / off Subscript	
Ctrl + _	Toggle on / off Subscript (equal Ctrl + ,)	
Ctrl + Shift + ,	Toggle on / off Superscript (exponent)	
Ctrl + 6	Toggle on / off Superscript (equal Ctrl + Shift + ,)	
Ctrl + 9	large round bracket open	
Ctrl + 0	large round bracket close	
Ctrl + [	large square bracket open	
Ctrl + ]	large square bracket close	
Ctrl + Shift + {	large curly bracket open	
Ctrl + Shift + }	large curly bracket close	
Ctrl + /	fraction line	
Ctrl + 1	root	
Ctrl + 2	Exponent 2	
Ctrl + 3	Exponent 3	
Ctrl + 4	Integral Formula	
Ctrl + Shift + 4	Integral Symbol	
Ctrl + 5	Function Symbol	
Insert	Insert a column at cursor position	
Insert + Shift	Insert a row at cursor position	
Delete	Delete a column at cursor position	
Delete + Shift	Delete a row at cursor position	
Ctrl + Csr left	Page left	
Ctrl + Csr right	Page right	
Ctrl + Csr up	Scroll up	
Ctrl + Csr down	Scroll down	
Ctrl + Page up	Move cursor to the first row of the screen	
Ctrl + Page down	Move cursor to the last row of the screen	
F2	Marked/Unmarked the selected range or cursor position as remark	
F3	Enable or disable <i>Superscript</i> mode.	
F4	Enable or disable <i>Subscript</i> mode.	
F5	AC - Clears the the mathematical expression at cursor position.	
F6	Clear - clear all	
F7	Reset – clear the output of the calculator	
F8	Enter – starts the calculator	

Ctrl + A	$\alpha$	A	Alpha
Ctrl + B	$\beta$	B	Beta
Ctrl + C	$\chi$	X	Chi
Ctrl + D	$\delta$	$\Delta$	Delta
Ctrl + E	$\varepsilon$	E	Epsilon
Ctrl + F	$\phi$	$\Phi$	Phi
Ctrl + G	$\gamma$	$\Gamma$	Gamma
Ctrl + H	$\eta$	H	Eta
Ctrl + I	$\iota$	I	Iota
Ctrl + J	$\varphi$		Phi (alt.)
Ctrl + J		$\vartheta$	Theta (alt.)
Ctrl + K	$\kappa$	K	Kappa
Ctrl + L	$\lambda$	$\Lambda$	Lambda
Ctrl + M	$\mu$	M	Mu
Ctrl + N	$\nu$	N	Nu
Ctrl + O	$\omicron$	O	Omicron
Ctrl + P	$\pi$	$\Pi$	Pi
Ctrl + Q	$\theta$	$\Theta$	Theta
Ctrl + R	$\rho$	P	Rho
Ctrl + S	$\sigma$	$\Sigma$	Sigma
Ctrl + T	$\tau$	T	Tau
Ctrl + U	$\upsilon$	Y	Upsilon
Ctrl + V	$\varpi$		Pi (alt.)
Ctrl + V		$\varsigma$	Sigma (alt.)
Ctrl + W	$\omega$	$\Omega$	Omega
Ctrl + X	$\xi$	$\Xi$	Xi
Ctrl + Y	$\psi$	$\Psi$	Psi
Ctrl + Z	$\zeta$	Z	Zeta

## 6.0 The Menu Bar

### 6.01 File. Open

Click *Open* on the *File* menu. In the Navigation pane, click folder or drive that contains the file that you want to open. You can only load file that are saved with RedCrab before, with the file extension \*.rcc.

## 6.02 File.Reopen

*Reopen* function opens the last deleted file.

The *Clear* function clears the worksheet and the undo list, without prompting. Instead data are stored in the startup directory in a file named *redcrab.his*. If the *Clear* button was clicked by mistake, the worksheet can be restored with *Reopen* function.

## 6.03 File.Save

If you are saving a changed file click *Save* on the *File* menu or press <Ctrl+Alt+S>.

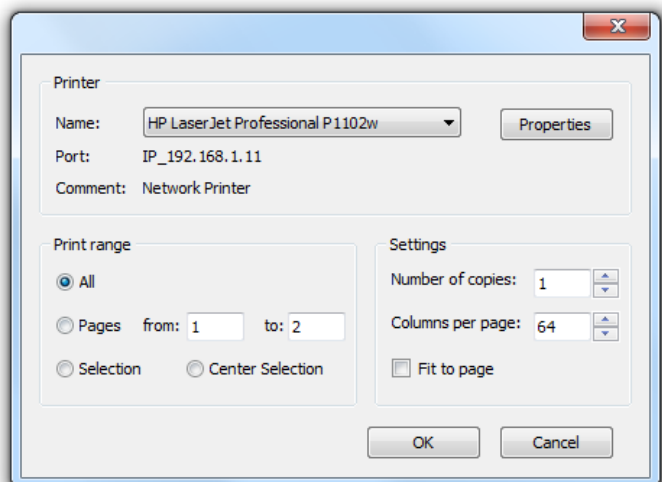
## 6.04 File.SaveAs

If you are saving the file for the first time use *SaveAs* on the *File* menu, the file browser prompt for a file name.

## 6.05 Print a worksheet

The right picture shows the print dialog box. By default, 64 columns per page are printed. The number of rows depends on the size of the page. By entering a different value, you can increase or decrease the printer output.

With the button *All* you print the working area of the worksheet from position (1.1). If necessary, the worksheet is split into several pages. The layout of the pages is shown in the following table.



If the button *Page* is selected, individual pages can be printed.

With the button *Selection* you can print selected area of the worksheets. The print-out is positioned on the top of the page. *Center Selection* prints the selected area at the center of the page.

With the check box *Fit to page* the print-out is adjusted to the page size. The *Columns per Page* setting is ignoring. A small selected area can so enlarged to the width or height of the page. Similarly, a print-out what normally occupied several pages are reduced to one page.

<p>Page 1</p> <p>Column 1..64 Row 1..68</p>	<p>Page 2</p> <p>Column 65..128 Row 1..68</p>	<p>Page 3</p> <p>Column 129..192 Row 1..68</p>
<p>Page 4</p> <p>Column 1..64 Row 69..136</p>	<p>Page 5</p> <p>Column 65..128 Row 69..136</p>	<p>Page 6</p> <p>Column 129..192 Row 69..136</p>

- 6.05.1 File. Page Setup

With Page Setup you can set the margins width and paper format.

- 6.05.2 File. Printer Setup

Select the printer and the printer settings.

## 6.10 Edit. Undo / Redo

You can undo and redo your action by clicking *Undo* or *Redo* on the Edit menu. You can undo and redo up to 100 actions. *Undo* and *Redo* is not possible by imported object like bitmaps.

## 6.11 Edit.Copy / Paste

With the *Copy* and *Paste* functions you can copy and insert data within RedCrab or from/to external programs. The *Copy* function copies the selected fields to the clipboard. Texts from/to external programs will posted as unformatted ASCII text.

Within RedCrab the data are copied in format style. Exception: square root. With *Paste* function only the symbol of the square root is inserted. The range belonging to this field must be selected at the new position again. Hence errors can be avoided, e.g. only the sub range square of a root is copied and inserted to other position.

## 6.12 Edit.Paste to Box

For complex technical calculations, it may be useful to include technical drawings to mathematical formulas. With *Paste to Box* on menu *Edit* you can import images and formatted texts from external programs. The image or the formatted text is inserted into a box and can be positioned freely. Multiple images or text boxes can be inserted. The amount is limited only by resources of your computer.

To change a box position, move the mouse pointer on a box, press the left mouse button and pull with pressed mouse button the box into the desired position.

Text and Images boxes are deleted with ***Delete*** on a popup menu. Open the menu with click on right mouse button, and then choose ***Delete***.

Information about the import of images and text files can be found below under Menu *Insert*.

## 6.13 Text Box

To edit the text or change the size of text box, text box must be active. Activate the text box with double-click of the left mouse button. The background of the activated text box will displayed coloured and the text cursor is indicated.

To change the size of the text box, position the mouse pointer on the lower right corner of the box and drag the box with pressed right mouse button to the desired size. The area to draw the text boxes is displayed with a NW- mouse pointer. Information for editing text can be found below at Chapter text editing.



Click the right mouse button to open the text box's popup menu. The text box must be activated first

Popup Menu:

- **Word Wrap:** Word wrap on / off
- **Lock Text:** text edit is disabled.
- **Scroll Bars:** scroll bars on / off
- **Font:** open Font Dialog to change the font type, size and colour.
- **Delete Text Box:** delete the text box.

If the editing of the box and text is completed, deactivate the box with double-click on the left mouse button.

## 6.14 Text Editing

For editing of text the following table shows a list of keyboard instructions.

Keys	Operations
Ctrl+Tab	Tab
Ctrl+Number Pad 5	Select all
Ctrl+A	Select all
Ctrl+E	Center alignment
Ctrl+J	Justify alignment
Ctrl+R	Right alignment
Ctrl+L	Left alignment
Ctrl+C	Copy
Ctrl+V	Paste
Ctrl+X	Cut
Ctrl+Z	Undo
Ctrl+Y	Redo
Ctrl+'+'	Superscript
Ctrl+'='	Subscript
Ctrl+1	Line spacing = 1 line.
Ctrl+2	Line spacing = 2 lines.
Ctrl+5	Line spacing = 1.5 lines.
Ctrl+' (apostrophe)	Accent acute

Ctrl+` (grave)	Accent grave
Ctrl+~ (tilde)	Accent tilde
Ctrl+; (semicolon)	Accent umlaut
Ctrl+Shift+6	Accent caret (circumflex)
Ctrl+, (comma)	Accent cedilla
Ctrl+Shift+' (apostrophe)	Activate smart quotes
Backspace	Delete previous character.
Ctrl+Backspace	Delete previous word.
F16	Same as Backspace.
Ctrl+Insert	Copy
Shift+Insert	Paste
Insert	Overwrite
Ctrl+Left Arrow	Move cursor one word to the left.
Ctrl+Right Arrow	Move cursor one word to the right.
Ctrl+Left Shift	Left alignment
Ctrl+Right Shift	Right alignment
Ctrl+Up Arrow	Move to the line above.
Ctrl+Down Arrow	Move to the line below.
Ctrl+Home	Move to the beginning of the document.
Ctrl+End	Move to the end of the document.
Ctrl+Page Up	Move one page up.
Ctrl+Page Down	Move one page down.
Ctrl+Delete	Delete the next word or selected characters.
Shift+Delete	Cut the selected characters.
Alt+X	Converts the Unicode hexadecimal value preceding the insertion point to the corresponding Unicode character.
Alt+Shift+X	Converts the Unicode character preceding the insertion point to the corresponding Unicode hexadecimal value.
Alt+0xxx (Number Pad)	Inserts Unicode values if xxx is greater than 255. Inserts ASCII values if xxx is less than 256
Ctrl+Shift+A	Set all caps.
Ctrl+Shift+L	Fiddle bullet style.

## 6.15 Edit.Cut/Delete

With functions *Cut* and *Delete* on the Edit menu the selected range on the computing sheet is deleted. With *Cut* the range is copied in the clipboard and can be inserted in other position again.

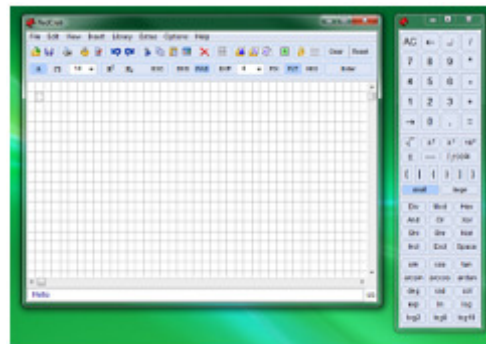
## 6.20 View.Grid

You can show or hide gridlines. Use *Grid* on the *View* menu to switch the grid on / off.

## 6.21 View.Panel Undocked

The function panel can be displayed within the main window or as new window.

This function is activated through Menu <View / Panel Undocked> or by double clicks on the function panel.



## 6.22 View.Scientific Panel

All functions on the *Scientific* panel can also be input with keyboard. You can switch it on / off with a click on *Scientific Panel* on the *View* menu.

## 6.23 View.Programmer Panel

All functions on the *Programmer* panel can also be input with keyboard. You can switch it on / off with a click on *Programmer Panel* on the *View* menu.

## 6.24 View.Symbol Panel

Toggle the *Symbol* panel with click on *Symbol Panel* on the *View* menu.

## 6.25 View.Number Panel

Switch the *Number* panel on / off with click on *Number Panel* on the *View* menu.

## 6.26 View.Virtual Keyboard

Switch the *Virtual Keyboard* on / off with click on *Virtual Keyboard* on the *View* menu.

## 6.30 Insert.Image File

Load a graphic file. For complex technical calculations, it may be useful to include technical drawings to mathematical formulas. Click *Bitmap File* in the *Insert* menu to open the image file browser and select the image file. RedCrab can imports photos from Jpeg files (\*.jpg) and Windows Bitmap files (\*.bmp). The Jpeg format is not suitable for technical drawings. It creates blurred images around edges and errors in the transparency of the images. When RedCrab saving files that includes bitmap images, RedCrab compressed images without loss and they are usually smaller than jpeg format.

Inserted image is positioned on the top left of the page. You can move it by clicking the left mouse button on the image and drag, while holding down the mouse button, the image to the desired position.

Text and Images boxes are deleted with **Delete** on a popup menu. Open the menu with click on right mouse button then choose **Delete**.

Click the right mouse button to open the image box's popup menu.

Popup Menu:

- ***Transparent***: displays the image with a transparent background. This function works only if the image has a background defined and all textboxes in deactivated mode.
- ***Delete***: delete the box.

## 6.31 Insert.Text File

For documentation purposes, text files can be inserted in any position in text box.

To load a text file click *Text File* on menu *Insert*. It opens a file browser to select a file. Files of the type TXT (unformatted text) or RTF (Rich Text Format) can be inserted.

The text is inserted in a text box positioned on the top left corner at the calculation sheet. To move the text box, position the cursor on the text box and press the left mouse key. Then drag the box in the desired position by holding down the left mouse button. . Multiple text boxes can be inserted. The amount is limited only by resources of your computer.

Text and Images boxes are deleted with ***Delete*** on a popup menu. Open the menu with click on right mouse button then choose ***Delete***.

Text boxes are always inserted in a preset size. You can resize the box according to text size. It is possible to edit the texts in the text box. For information about resize and edit textboxes read Textbox Editing above.

## 6.32 Insert.New Textbox

With *New Textbox* on menu *Insert* an empty text box will be inserted. To input text the box must be activated with a double click of the left mouse button. For more information about text box editing read the capital Text Box above.

## 6.33 Insert.Textbox to Image

The function *text Box to Image* converts a text box into an image box. The advantage of a graphics box is:

- 1) The texts cannot be changed.
- 2) The formatted text is displayed in original format (similar to a PDF file), even if the displayed font is not installed on the user computer.

The function should only be used if it makes sense. By changing the format of the file, the file size will be larger.

**!** Important: This function cannot be reversed!

## 6.34 Insert.Show Textbox

The function *Show Text box* in the menu *Insert* displayed all text boxes with a coloured background. The function is helpful in allocating an empty text box or showing the exact positioning.

## 6.35 Result box

With *Result* boxes you can display formatted results of calculations on any work sheet position. Click *Result box* on the *Insert* menu to open a result box.

Example: If the result of a calculation is a distance of 3650 meters, RedCrab write:  $= 3650$  or:  $= 3.65 \cdot 10^3$  in the work sheet.

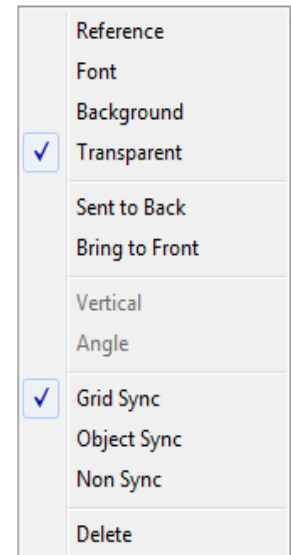
A result box can show the display format:  $= 3.65\text{km}$ .

A result box can be displayed on any position. So you can insert results directly on technical drawings. Result text can be displayed vertically, horizontally or inclined position. The size of the box is auto fitted to the size of the text.

# Popup Menu

With click of the right mouse key you open the result box popup menu. The list below show an overview of the various functions.

- **Reference** opens the *Reference* dialog box to enter the reference variable and pre setting of the display format .
- **Font** opens the *Font* dialog box. Adjustment is dependant from the setting of the sync function (see below).
- **Background** opens a colour dialog box to choose the result box background colour.
- **Transparent**: displays the result box with a transparent background.
- **Send to Back**: moves the top object to other object below.
- **Bring to Front**: ensures that a box is visible or to reorder overlapping boxes within a worksheet.
- **Vertical**: displays the result box content vertically.
- **Angle**: opens a dialog box to adjust the slant of results display. It can be an angle in the range of + / - 90 degrees, adjustable in 0.1 degree increments.
- **Grid sync**: synchronizes the box to the worksheet.
- **Object sync**: synchronizes the box to a *Text* or *Image* box.
- **Non sync**: size and position of the box are freely adjustable.
- **Delete**: deletes the box.



## 6.35.1 Reference und Format

The *Reference* popup menu opens the *Reference* dialog box to enter the reference variable and the display format instruction.

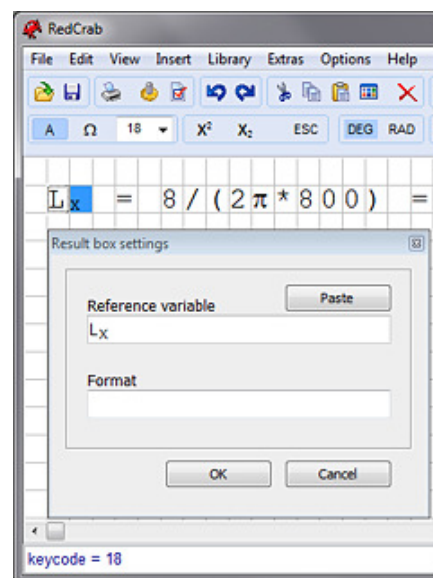
The row Reference variable show the name of the variable whose value is displayed in the box.

To determine the variable you select here the name on the worksheet. Then click the *Paste* button in the dialog box. The name is accepted and pasted to the reference row.

In the first example below the format row are empty. The Result box shows the same display format as the worksheet. But instead of the power of ten, the box displays the SI-Prefix ,m'. The result box background is displayed gray.

$$L_x = 8 / (2 \pi * 800) = 1.59 \cdot 10^{-3}$$

1.59m



## SI-Prefix

Result boxes used SI prefixes instead of exponents to reduce the number of zeros shown in numerical quantities before or after a decimal point. For example, an electrical current of 0.001ampere, or  $10^{-3}$  of an ampere, is written by using the SI-prefix *m* (milli) as 1 milliampere or 1mA. The SI prefixes are standardized by the International Bureau of Weights and Measures (IBWM).

The list below shows the prefixes which RedCrab used.

	Prefix		Decimal	Short scale	Long scale
Y	yotta	$10^{24}$	1.000.000.000.000.000.000.000.000	Septillion	Quadrillion
Z	zetta	$10^{21}$	1.000.000.000.000.000.000.000.000	Sextillion	Trilliard
E	exa	$10^{18}$	1.000.000.000.000.000.000.000.000	Quintillion	Trillion



P	peta	$10^{15}$	1.000.000.000.000.000	Quadrillion	Billiard
T	tera	$10^{12}$	1.000.000.000.000	Trillion	Billion
G	giga	$10^9$	1.000.000.000	Billion	Milliard
M	mega	$10^6$	1.000.000	Million	
k	kilo	$10^3$	1000	Thousand	
h	hecto	$10^2$	100	Hundred	
-	-	-	1	One	
d	deci	$10^{-1}$	0,1	Tenth	
c	centi	$10^{-2}$	0,01	Hundredth	
m	milli	$10^{-3}$	0,001	Thousandth	
μ	micro	$10^{-6}$	0,000.001	Millionth	
n	nano	$10^{-9}$	0,000.000.001	Billionth	Milliardth
p	pico	$10^{-12}$	0,000.000.000.001	Trillionth	Billionth
f	femto	$10^{-15}$	0,000.000.000.000.001	Quadrillionth	Billiardth
a	atto	$10^{-18}$	0,000.000.000.000.000.001	Quintillionth	Trillionth
z	zepto	$10^{-21}$	0,000.000.000.000.000.000.001	Sextillionth	Trilliardth
y	yocto	$10^{-24}$	0,000.000.000.000.000.000.000.001	Septillionth	Quadrillionth

## Formatting

In the *Reference* dialog box (described above) you can input control characters in the *Format* row to control and completion of the display format. For the example above among SI prefixes, the two characters, #A' are entered. The pound sign (#) is a placeholder for the result and prefix: 12m (12 million), the A stands for the unit ampere. The box shows the result: 12mA.

Before and after the pound you can insert any character. An exception is the backslash symbol (\) because it has a special function.

Examples:

Result	Formatted Text	Result Box Display
0.012		1 2m
0.012	#A	1 2mA
0.012	= # A	= 1 2 mA

125	US\$ #	US\$ 125
0.012	Current: #A~	Current: 12mA~

## Specification of a prefix

If the result of an expression is the distance between two points, the control symbols, #m' displays the result in meters (m).

Examples:

Result: 365	Display: 365m
Result: 3600	Display: 3.6km
Result: 3650000	Display: 3.65Gm

The displayed result: 3.65Gm (Giga meter) is correct, but unusual. Therefore, in RedCrab you can preset certain prefixes. This is written in the format text after the pound, a backslash (\) followed by the preferred prefix. In this example, the issue is better suited to kilometres, so the two characters 'k' are inserted. The format string looks like this: '#\km'.

Examples:

Result: 365	Display: 0.365km
Result: 3600	Display: 3.6km
Result: 3650000	Display: 3650km

RedCrab also has the option to select a group of prefixes or to determine an upper or lower limit. A '+' sign in front of the prefix determined the upper limit. The formatting string, '#\+km' shows all results of 1000 or above in kilometres. Results under 1000 are displayed according to the value in meters or millimetres etc. A '-' sign in front of the prefix determined the lower limit. The two limits can also be combined. The following examples show the output at a range setting of millimetres to kilometres.

Example: Format = ,# \-m\+k m‘

Result: 3650000	Display: 3650 km
Result: 36500	Display: 36.5 km
Result: 365	Display: 365 m
Result: 3.65	Display: 3.65 m
Result: 0.0365	Display: 36.5 mm
Result: 0.000365	Display: 0.365 mm

The ,x‘ symbol represents the base of an unit. The format string ,#\-x\+km‘ displays the result in meters or kilometres.

## Format Commands

The list below shows the format commands.

\$	Result displays hexadecimal
^	Displays the result with exponent
0..9	Number of decimal places
#.##	Number of pounds after decimal point = number of fixed decimal places

Example:

Format: ,#\\$‘	Display: 8F3.
Format: ,\$\\$‘	Display: \$8F3.
Format: ,#\^‘	Display: 1.36 10 <sup>3</sup>
Format: #\^4	Display: 1.368 10 <sup>3</sup>
Format: #.##	Display: 1.20

## 6.35.2 Font and Background

### Font

The *Font* menu opens a dialog box to adjust font settings. If the box synchronisation is set to *Grid sync*, the *Font* menu opens a colour dialog box. You can only change the font colour. All other font settings are as on the worksheet.

In *Object sync* or *Non sync* mode, the *Font* menu opens a font dialog box. You can adjust the font name, size, style and colour.

## Background

The menu *Background* opens a colour dialog box to choose the result box background colour.

## Transparent

The menu *Transparent* displays the result box with a transparent background.

### 6.35.3 Positions

## Send to Back – Bring to Front

Use *Send to Back* to change the order of overlapping result or image boxes. Click *Bring to Front* to ensure that a box is visible or to reorder overlapping boxes within a worksheet. For example if a result box is included in a technical drawing, click the *Send to Back* menu for the image object to move it below the result box. Fix the result box in foreground with a click on the *Bring to Front* menu.

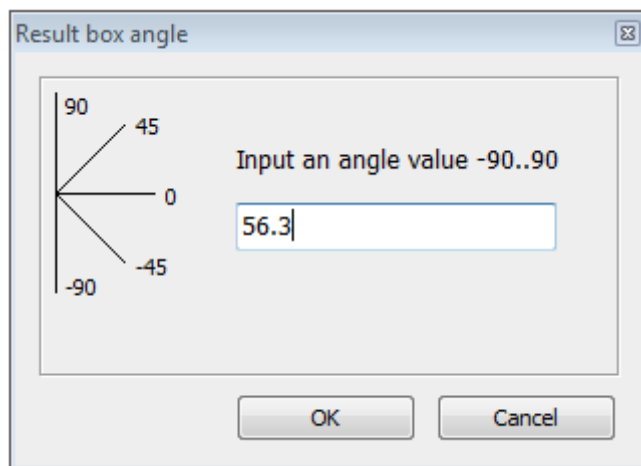
These settings will be saved if the worksheet store to a file. When you load the worksheet from file, *RedCrab* restores the previous settings. For overlapping boxes, it is important that *Send to Back* or *Bring to Front* is activated (the menu shows the check mark). Otherwise the boxes have a random order after reload from file.

## Vertical

A click on menu *Vertical*, displays the result box content vertically. This function is disabled, when *Grid sync* is selected.

## Angle

The menu *Angle* opens a dialog box to adjust the slant of results display. It can be an angle in the range of  $+/- 90$  degrees, adjustable in 0.1 degree increments. This function is disabled, when *Grid sync* is selected.



## 6.35.4 Synchronization

The properties and positions of *Result* boxes can be synchronized with the worksheet or text and image boxes.

## Grid sync

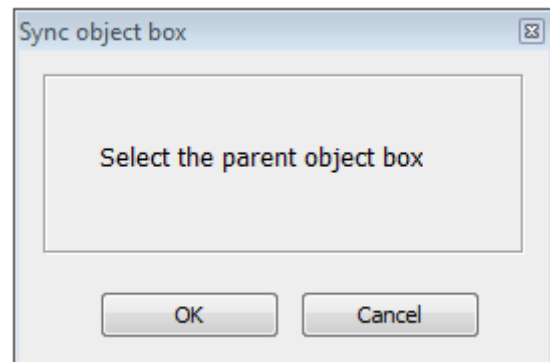
In *Grid sync* mode the position and font settings of the result box is synchronized with the worksheet. *Grid sync* is intended for formatted output with prefix and unit instead of the default result display. The font settings are automatically adapted to the worksheet. If you change the worksheet font size, the result box font size is changed accordingly. In the popup menu *Font*, the text colour can be changed.

RedCrab supports positioning on the worksheet. You can move the box in any position. After releasing the mouse button the box snap into place on a worksheet position, where their text is exactly in line to the text on the worksheet.

## Object sync

If the result box mode set to *Object sync*, the box position is synchronized to a text or image box. This mode is suitable for positioning results within engineering drawings. The synchronized result boxes always retain their position relative to the drawing when it is moved on the worksheet.

The popup menu *Object sync* opens a dialog box prompting user to determine the parent box which result box to be synchronized. Click the left mouse button on the corresponding text or image box and then click the *OK* button on the dialog box. The position of the result box is now synchronized with the parent box. You can move the result box to any position. Each time you move the parent box, the synchronized result boxes are moved automatically and always hold their position relative to the parent box.



The text of the result box can also be adjusted horizontally, vertically or diagonally, as described above. The font settings can be adjusted as desired by the popup menu font.

## Non sync

In *Non sync* mode the result box settings have all the features like *Object sync* mode. But the box is not synchronized with any other objects.

## 6.40 Extras.Page Lock

With *Page Lock* on the menu *Extras*, the editor's page will be blocked for additional entries. This function protects unintentional changes made. For data input the cells can be unlocked with *Unlock Cell*.

## 6.41 Extras.Cell Unlock

With *Unlock Cell* on menu *Extras* cells in a locked page, are unlocked for data entry. Select the cells by mouse, and then click *Unlock Cell* on menu *Extras*. The unlocked fields are marked with an underscore.

To clear the unlocked cells select the cells by mouse, then click *Unlock Cell* on menu *Extras*. The cells are locked now.

## 6.42 Extras.Remark

The *Remark* function marks data in a worksheet as a comment. This function can be performed with the function key F2. Comments are ignored by the calculator.

To mark the data, first select the range with the mouse, and then click *Remark*. The selected data is displayed in green. You can undo this function using the same step.

For longer comments, text boxes are more suitable. *Remark* is particularly suited to parts of a formula or input, temporarily excluded from the calculation

## 6.51 Options.Autocalc

When *Autocalc* is enabled, the results of the mathematical expression displayed, when equal sign is entered, like conventional calculators. It only displays results that have a value, not just consist of undefined variables. Exempt from the automatic calculation are complex functions, such as integral, because the calculation may take several and would bother entering complex formulas.

## 6.52 Options.Long Term

Switch to mode for long variable names. Example: "abc" is not interpreted as “a\*b\*c”, rather as one word. In *Long Term* mode the *ESC* Button is in orange colour. The *ESC* function is disabled.

## 6.54 Option. Keyboard

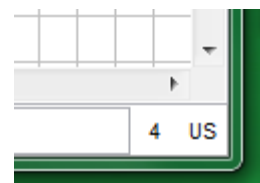
The keyboard input in this description refers to an English keyboard in the country's setting English-US. When using a non-English keyboard or language, some functions are acquired with other key combinations. This concerns most of the <Ctrl> key functions. If you have problems with the assignment of the keys, click *Keyboard* in the *Options* menu. It opens with a list of alternative keyboards, which differ significantly in important features of the English keyboard. Here you select a keyboard that corresponds to your specification. Attached you will find images about key codes of the alternative keyboards and the occupancy of the *Ctrl* functions.

## 6.55 Option.Display Buffer

RedCrab works with a dual screen memory. This will scroll faster and flicker is avoided. However, this feature works only on new generation computers and video cards. On older computers, it can lead to slower response to inputs. In this case, it is convenient to click *Display Buffer* on *Option* menu to eliminate this feature.

## 6.56 Option.Column Space

The menu *Column Space* opens a dialog window to set the minimum distance between two formulas in a row. The minimum value you can set is 2 columns. RedCrab displays the value in the bottom, right corner, next to the keyboard setting. You can also open the dialog window with click on the number.





## 6.57 Option.Settings to Registry

When you shut down RedCrab, all major settings are stored in the PC's Windows Registry. Whenever RedCrab is started, these settings are restored. This concerns the keyboard settings, font size, number of decimal places, window size and many more. If you start RedCrab from an external source, e.g. USB stick from different computers, it does not make sense to save the settings on all computers. With the menu Options.Settings to Registry this function can be switched. The menu will display the text Settings to File and RedCrab saves the settings in the file redcrab.con in the root directory of the program.

## 6.90 Help.About RedCrab

Display the version number and license.

## 6.92 Help.Check for Updates

Compare the version of the program with the latest version on the RedCrab server. It displays a message if an update is available. To use this function you must have an online connection.

## 7.0 Work with RedCrab

### 7.1 Start up

After program start RedCrab display an empty page, similar to an empty sheet of paper. In its basic setting the size of the arithmetic field are 72 x 72 cells. This corresponds approx. to one 12" or DIN A4 sheet with average type-size. The size of the arithmetic field can be changed in the menu *Option / Size* to 108 x 48, or 144 x 144 cells.

**!** The size of the arithmetic field can be changed only with empty screen. After input this function is blocked.

RedCrab store the current size in use. So after a new start of the programmed the previous setting will be displayed.

### 7.2 Write a Mathematic Expression

A mathematic expression can be written at any position. It is important that enough space remains to express the result.

Between each assignment and formula, there must be at least one blank line in between, or the assignment must be marked with a colon in the first column.

Example 1:

$$x = a + b =$$
$$a = 10$$
$$b = 12$$

Example 2:

$$x = a + b =$$
$$: a = 10$$
$$: b = 12$$

The result is written to the right of the assignment after the second equal sign. If on the right is no equal sign, RedCrab displays no result.

Format in the extension mode:

x=a+12=  
or x=a+12

Several different tasks or expressions can be entered. By setting the right equal sign, you can determine which results or intermediate results to be printed.

## 7.5 Fractions

Entering a fraction line: Press the keys `<CTRL + />` (Ctrl + Slash) and a three-character fraction bar will be displayed. By repeatedly pressing the keys the fraction bar is extended by one character forward. In general, it is sufficient if you continue entering data above and below the fracture line. When typing the numerator or denominator data, the fraction bar is automatically extended by the editor as far as it is required.

The input of data is supported here by the text editor. If you have taken the fraction line, the cursor is in the first column after the line. Press in this position `<Enter>` key, the cursor moves over the slash to the first position of the numerator. After entering the numerator, press again `<Enter>`, the cursor jump to the first position of the Denominators. After entering the data press `<Enter>` again. The cursor jump back into the column right of the fraction line.

**!** The fraction bar must exceed at least 1 character front and rear.

Examples:

$$\frac{123}{abc}$$
 wrong

$$\frac{123}{abc}$$
 correct

## 7.6 Root

Set the root character with the keys `<CTRL + I>` to the desired position. Then mark the area which is to be included under the root. Finally set the cursor on the root of character, the editor draws the root symbol over the marked area.

For one-line root calculation, the following steps apply:

1. Set root symbol with `<CTRL + I>` .
2. Enter the data
3. Holding down the Shift key and with `<Cursor-left>` key reposition to the root sign.

The editor draws the root symbol over the marked area.

For multi-line data in the root (e.g., fractions):

1. Set root symbol with `<CTRL + I>`.
2. Data entry.
3. Mark the area for the root with the mouse.
4. Click the mouse on the root symbol.

The editor draws the root symbol over the marked area.

In order to highlight the area, it is sufficient if the last column under the root is marked.

To change the area under the root, highlight, as described above, the new field and then click the cell of the root sign. The roots then marked the new area.

By double-clicking on the root symbol the root lines around the data is removed.

## 7.7 Escape Mode

RedCrab works as described above with implied multiplication. A sequence of letters be regarded as a single variable and be multiplied. If it is necessary for a variable or a function to use a name with more than one letter use the Escape mode. The Escape mode is activated by pressing the *ESC* key. All these characters are then interpreted as one word, until the Escape mode is switched

off. To cancel *ESC*, press *Return* or *'(*. The screen will be printed bold characters in Escape mode.

If an Escape variable follows a bracket you must set an operator before the bracket. Escape name followed by a bracket without operator is usually interpreted as a function call.

For example:      correct: sin (12 + a)  
                     correct: six \* (12 + a)  
                     wrong: six (12 + a)

Different Esc names must be separated by *SPACE* or operator; otherwise they are interpreted as a word

For example:      correct: apple \* banana  
                     correct: apple banana  
                     wrong : applebanana

## 7.8 Integral

For calculating the area of a curvilinear region RedCrab provides termed definite integrals. The Integral must be formatted as below:

$$\int_a^b f(x) dx$$

The input of the integral is simple. Press the <Ctrl + 4> keys and RedCrab display the complete integral formula on the screen shown above. Now you can overwrite or complete the formula as appropriate. See the example below.

$$\int_0^{90} f((\mathbf{sin}(x)/0.9)) dx$$

63.66

The names of the variables are interchangeable. For example instead of <x> you can chose <t>, which does not change the value of the integral.

In complex calculations, the function (integrand) can be outsourced and assign with a reference variable.

For example:

$$\int_0^{90} f(z) dx$$

$$z = (\sin(x) / 0.9)$$

63.66

In the example above, <z> represents the function of the integral. The allocation of <z> to the right of the equal sign must always be enclosed in brackets.

In the example above, the integration limits <a,b> > have been overwritten with values <0, 90 >.When overwriting the variables, it must be noted that as shown in the example, only one-line concept can be used (without fraction) and the term with no spaces must be written directly to the integral sign. The values of the limits of integration may alternatively be assigned outside of the integral to the variables <a> and <b>.

For example:

$$a=0$$

$$b=90$$

By default the subdivision of the calculation is in 360 units. The division can be changed by the variable <d > when assigned a different value.

For example:

$$d=1000$$

Functions assigned to keyboard:

Integral (formula):  $\langle Ctrl + 4 \rangle$

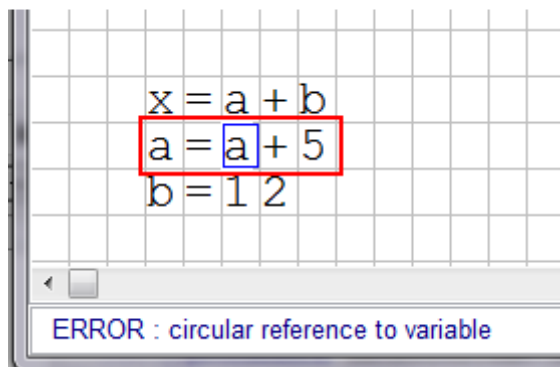
Integral symbol :  $\langle Ctrl + Shift + 4 \rangle$

Function symbol :  $\langle Ctrl + 5 \rangle$

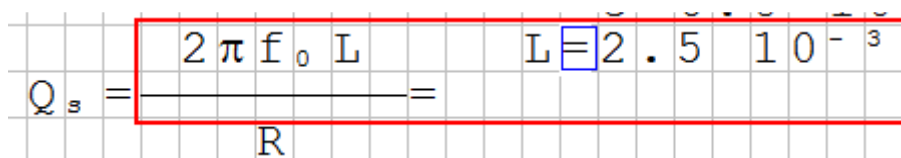
Typical accuracy by a sinus calculation:  $2/d^2$

## 7.9 Error Messages

For error location RedCrab marks the cell in where an error is detected with a blue frame. It also marks the incorrect formula with a red frame.



The marking of the entire formula simplifies the localization of errors that cause a false positioning. In the example below, an invalid assignment is signaled. The red selected box indicates, however, that two formulas were joined because the distance is too close. In this example the adjustment of the distance (column space) is 4 columns; the distance between the formula is only 2 columns.



# Attachment

## Key Code Configuration

### US-English

~ `	! 1 √	@ 2 X <sup>2</sup>	# 3 X <sup>3</sup>	\$ 4 ∫	% 5 f	^ 6 X <sup>y</sup>	& 7	* 8	( 9 (	) 0 )	- X <sub>y</sub> =	+ =	← Backspace
Tab ⇄	Q	W	E	R	T	Y	U	I	O	P	{ [	} ]	 \ 
Caps Lock ⇧	A	S	D	F	G	H	J	K	L	:	"	'	Enter ↵
Shift ⇧	Z	X	C	V	B	N	M	< ,	> .	? /	1 2	Shift ⇧	
Ctrl	Win Key	Alt							Alt	Win Key	Menu	Ctrl	

### German

° ^ X <sup>y</sup>	! 1 √	" 2 X <sup>2</sup>	§ 3 X <sup>3</sup>	\$ 4 ∫	% 5 f	& 1 2	/ 7 {	( 8 ([	) 9 ) ]	= 0 }	? { ß [ \	· } ]	←
↕	Q @	W	E €	R	T	Z	U	I	O	P	Ü	* + ~	↵
↓	A	S	D	F	G	H	J	K	L	Ö	Ä	' #	
↑	> <	Y	X	C	V	B	N	M μ	;	:	- X <sub>y</sub> .	↶	
Strg	(Win)	Alt							Alt Gr	(Win)	(Menu)	Strg	



## Italian

! \	1 ✓	2 X <sup>2</sup>	3 X <sup>3</sup>	£ ∫	\$ f	% €	& 6	/ 1/2	( 8	) 9	= 0	? ' i	^ X <sup>y</sup>	Backspace	
Tab	Q	W	E €	R	T	Y	U	I	O	P	é { }	* { }	è [ ]	+	Enter
Caps Lock	A	S	D	F	G	H	J	K	L	ç	° @	à #	§ ù		
Shift	>	Z	X	C	V	B	N	M	;	:	- X <sup>y</sup>	Shift			
	<								,	.					
Ctrl	Win Key	Alt								Alt Gr	Win Key	Menu	Ctrl		

## Brazil (Portuguese)

"	!	@	#	\$	%	¨	&	*	(	)	-	+ $\frac{1}{2}$	←
'	1	2	3	4	5	6	7	8	9	0	=	Backspace	
Tab	Q	W	E	R	T	Y	U	I	O	P	{	Enter	
	/	?	€								[		
Caps Lock	A	S	D	F	G	H	J	K	L	Ç	^	}	
↑											~	]	
Shift		Z	X	C	V	B	N	M	<	>	:	?	Shift
↑	\			ç					,	.	;	/	↑
Ctrl	Win Key	Alt							Alt Gr	Win Key	Menu	Ctrl	