

RedCrab

The Calculator

User Manual

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RedCrab The Calculator

Version 1.21

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RedCrab – The Calculator

The calculation software RedCrab was developed with the aim a calculator made available that combines the function of a calculator with a text editor.

RedCrab enable the user to input a mathematical expression in a full-screen editor, providing input of mathematical symbols like fraction, roots e.t.c. The positioning of the expressions on the page is arbitrary. The format must conform to general mathematical rules.

Designed as a tool for daily use, useability has highest priority. Almost all entries, regardless of whether values, variables, exponents, radical signs or fraction lines can be written with the keyboard.

Comments and suggestions to the software and user manual are very welcome and helpful for further developments and improvements. Feedback please email: info@redchillicrab.com

System requirement

Minimum Pentium P4 and 250MB RAM. Operating system: Microsoft Windows The following fonts: Courier New and Symbol must be installed in your system. These fonts belonged to Microsoft Windows systems. 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: 18 digits

Display : 15 digits

1.0 Mathematical Expressions

1.1 Basics

You can write your formula principle at any editor position. For the following examples we usefully begin in the upper left 4th or 5th column in one of the first lines. Input in the editor will be displayed in black letters. The output of the calculator is printed in blue.

It must be written only a mathematical expression per line. Between mathematical expressions must be either a blank line or in front of the expression in the next line a colon in the first column must be set.

Example: $x = a + 12$

$$a = 5$$

or $x = a + 12$
: $a = 5$

RedCrab distinguishes between two different formats at the input of mathematical expressions: the single-mode and the extension mode. The single mode allows only the input of a single arithmetic problem, but is more flexible than in the formatting of the extension mode.

Format in single mode:

$$a + 12$$

or $x = a + 12$

or $x^2 = (a + 12)^2$

The result is always written below the expression.

Format in the extension mode:

$$x = a + 12$$

or $x = a + 12 =$

In the extension mode must always be left of the equals sign a single variable. The result is written to the right of the task after the second equal sign. If the right is no equal sign, is also output no result.

The mode is toggled with the $\langle \Rightarrow \rangle$ button in the toolbar above.

$\langle \Rightarrow \rangle$ off (gray) : Single mode
 $\langle \Rightarrow \rangle$ on (blue) : Extension mode

! The examples below are written using single mode.

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.

1.3 Assignment Of Values

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

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

1.4 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 $\langle \text{Ctrl} + \text{enter} \rangle$ to display the result

The display shows:

$$Z = 17 + 4 + X$$

$$X = 43$$

$$Z = 64$$

1.5 Exponent

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

1. Enter the expression: $c \langle \text{Ctrl} + 2 \rangle = a \langle \text{Ctrl} + 2 \rangle + b \langle \text{Ctrl} + 2 \rangle$
2. Press $\langle \text{Ctrl} + \text{Enter} \rangle$ to display result.

The keys $\langle \text{Ctrl} + 2 \rangle$ write the exponent 2. With the keys $\langle \text{Ctrl} + 3 \rangle$ you can write the exponent 3. For use of any other values for exponents, press the $\langle \text{Ctrl} + 6 \rangle$ keys to enter the supermode. Then enter the exponent value. Press $\langle \text{enter} \rangle$ to leave supermode.

The display shows:

$$c^2 = a^2 + b^2$$

$$c = \sqrt[2]{a^2 + b^2}$$

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

The display shows:

$$c^2 = a^2 + b^2$$

$$c = \sqrt[2]{a^2 + b^2}$$

$$a = 3$$

$$b = 4$$

$$c = 5$$

1.6 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 shift the letters to the alternative font. The example above shows that the keys <Ctrl + P> displayed the Hellenic letter Pi (π).

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.

1.7 Fraction and Square Root

Enter a formula with a fraction and a square root.

1. Enter the fraction line and the numerator : $f = \frac{1}{2\pi\sqrt{LC}}$ $\langle Ctrl + / \rangle \langle Enter \rangle 1 \langle Enter \rangle$
2. Enter the denominator : $2 \langle Ctrl + P \rangle \langle Ctrl + 1 \rangle LC$
3. Assignment L : $L=0.8 \cdot 10^{-3}$ $\langle Ctrl + 6 \rangle - 3$
4. Assignment C : $C=4.7 \cdot 10^{-6}$ $\langle Ctrl + 6 \rangle - 6$
5. Press $\langle Ctrl + Enter \rangle$ for result.

The display shows:

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

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

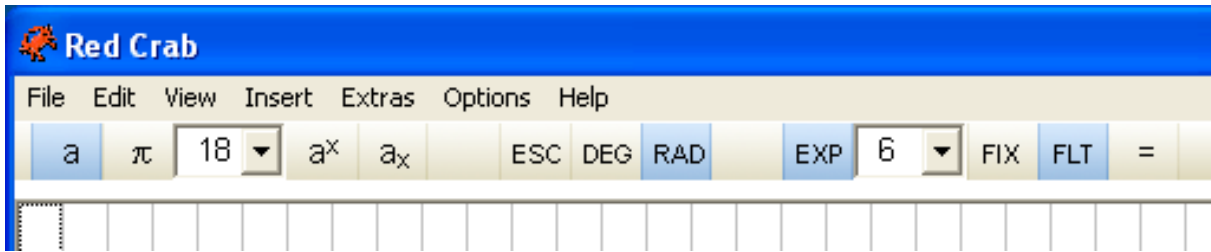
$$C = 4.7 \cdot 10^{-6}$$

$$f = 2.596 \cdot 10^3$$

To write a fraction line press $\langle Ctrl + / \rangle$ (forward slash) key. Read more information below about fractions in the description.

The keys $\langle Ctrl + 1 \rangle$ write a root symbol at the cursor position, 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.

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 $\langle \pi \rangle$ buttons, left on the toolbar, or press $\langle \text{Ctrl} + \text{.}(\text{dot}) \rangle$ 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 π or $\langle \text{Ctrl} + L \rangle$ to write the letter λ . 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.

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.

2.6 Escape

A mouse click on the $\langle \text{Esc} \rangle$ button toggles the Escape mode. You can leave the Escape mode with the $\langle \text{Enter} \rangle$ key. If the editor is in Escape and Superscript mode the $\langle \text{Enter} \rangle$ key leaves Escape mode only.

Read below the description about Escape mode.

2.7 DEG / RAD

The $\langle \text{DEG} \rangle$ and $\langle \text{RAD} \rangle$ buttons select the input to a trigonometric function.

$\langle \text{DEG} \rangle$: input must be in degrees.

$\langle \text{RAD} \rangle$: 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 Single And Extension Mode

The Single / Extension mode is toggled with the *<=>* button in the toolbar.

RedCrab distinguishes between two different formats at the input of mathematical expressions: the single-mode and the extension mode. The single mode allows only the input of a single arithmetic problem, but is more flexible than in the formatting of the extension mode. More information about the modes see above 1.1 Basics

3.0 Function Panel

The following part describes the *Function* panel button. 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.

Alternative function keys:

- F5 – *Clear*
- F6 – *Reset*
- F7 – *Refresh*
- F8 – *Enter*



Picture 3.2

It is very simple to write the mathematical function in the text editor without the use of the function panel. Example: $\sin(x)$. It is important that you write the letter *sin* in Escape mode. Read the description about Escape mode below.

3.1 Clear

The *Clear* button prepares the *Clear* function. Simply press $\langle \text{Enter} \rangle$ to execute the *Clear* function. *Enter* must be pressed not later than 2 seconds after *Clear*. *Clear* clears the screen, the main memory and the undo memory.

3.2 Reset

Reset clear all calculators output (displayed in blue). It don't change the user input.

3.3 Refresh

Refresh starts a display redraw.

3.4 Enter

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

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...
π	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

3.7 DIV

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

Example :

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

3.8 MOD

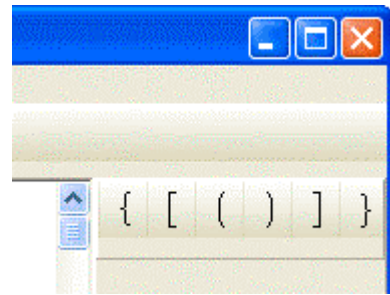
The **MOD** operator returns the remainder of the division of two integer numbers. If there are floating point numbers are entered, the **MOD** operator cuts the digits after the decimal point before executing the division **MOD**.

Example :

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

4.0 Symbol Panel

The *Symbol* Panel contains large bracket symbols. You can write this symbols with the keyboard too. But problem may arise by any non English keyboard or language. In this case you can use the *Symbol* Panel. If you have no problem, switch off the *Symbol* panel in the View menu. Most time the keyboard input is more comfortable. For more information about the keyboard read below the description about keyboard configuration.



Picture 3.3

The *Symbol* panel contains extra large brackets which are not included in system 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

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
	<ul style="list-style-type: none">- Exit escape mode- Exit Superscript- Exit Subscript- Moves cursor to numerator, if this position is end of fraction bar,	
Enter	<ul style="list-style-type: none">- 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	Equal to the <i>Function</i> panels <i>Enter</i> button
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
F5	Clear - clear all, to demand execution confirm with enter (F8)
F6	Reset – clear the output of the calculator
F7	Refresh – redraw the screen
F8	Enter

6.0 The Menu Bar

6.1 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 *.rec.

6.2 File.Save

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

6.3 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.

6.10 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 copy 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.

To delete a box click first on the *Clear* button on the function panel (or press <F5> key) and click on the box to be deleted.

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

6.13 Text Box

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.

To edit text or the text box it must be activated first. Activate the text box with a doubleclick 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. Information for editing text can be found below at Chapter text editing.

If the editing of the box and text is completed, deactivate the box by doubleclick with 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.Function Panel

All functions on the Function Panel can also be input with keyboard. If you don't use the Function panel you can switch it off. Just click on *Function Panel* on the *View* menu.

6.22 View.Symbol Panel

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

6.30 Insert.Bitmap 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. Only file type Windows Bitmap (*. bmp) can be inserted. 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.

To delete a box, click first on the *Clear* button on the function panel (or press <F5> key) and then click on the box to be deleted.

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.

To delete a box, click first on the *Clear* button on the function panel (or press <F5> key) and then click on the box to be deleted.

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 *NewTextbox* 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.

6.40 Extras.Page Lock

With *Page Lock* on the menu *Extras*, the editors 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, 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.

6.50 Option.Size

You can change the numbers of cells in a worksheet. Use the *Size* submenu on the menu *Option*. The size can be changed only with an empty page. Once data is input, this function is disabled.

You can choose between three size of worksheet:

1. 72 x 72 cells
2. 144 x 144 cells
3. 108 x 48 cells

6.51 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 concern 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.

6.52 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.

7.0 Work With RedCrab

7.1 Startup

After programm start RedCrab display an empty page, similar to an empty sheet of paper. In its basic setting the size of the arithmetic field is 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 programme 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. Certainly, it is useful to begin somewhere in columns / rows up on the left. RedCrab distinguishes between two different formats during input of mathematical expressions: Single-Mode and Extension mode. Single mode in comparison to extension mode allows only the entry of a single mathematical problem, but is more flexible in formatting than of the extension mode.

The mode is toggled with the \Leftrightarrow button in the toolbar above.

\Leftrightarrow off (gray) : Single-mode
 \Leftrightarrow on (blue) : Extension Mode

7.3 The Single Mode

In single mode it does not matter whether the mathematical assignment is written as an equation or not. The expression $17 + 4$ will display the result 21. The equation $X = 17 + 4$ displayed the result $X = 21$. The result is always

written below the expression. If calculation is carried out repeatedly, the results are written below each other.

For mathematical tasks with variable following rule must be observed:

! In Single mode the assignment to variable must always below the formula. 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:

$x = a + b$

: $a = 10$

: $b = 12$

7.4 The Extension Mode

In the extension mode, a single variable must always be left of the equal sign. 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.

! The order of mathematical functions of the allocation is quite arbitrary. Between each assignment or formula, there must be at least one blank line in between, or the assignments must be marked with a colon in the first column.

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 fraction 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 jumps to the first position of the Denominators. After entering the data, press `<Enter>` again. The cursor jumps back into the column after the slash.

! 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 $\langle CTRL + I \rangle$ 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 $\langle CTRL + I \rangle$.
2. Enter the data
3. Holding down the Shift key and with $\langle Cursor-left \rangle$ 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 $\langle CTRL + I \rangle$.
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 follow 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 .

For example:

$$\begin{aligned} a &= 0 \\ b &= 90 \end{aligned}$$

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: $2/d^2$

Attachment

KeyCode Configuration

US-english

~ `	1 ! √	2 @ X ²	3 # X ³	4 \$ ∫	5 % f	6 ^ X ^y	7 &	8 *	9 (	0)	- X ^y	+ =	← 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 ^y	! 1 √	" 2 X ²	§ 3 X ³	\$ 4 ∫	% 5 f	& 6 1/2	/	(8 [	) 9]	=	? 0 }	{ B \	} | '	←
↔	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 ^y	↵		
Strg	(Win)	Alt								Alt Gr	(Win)	(Menu)	Strg	

Italian

! \	1 ✓	2 X ²	3 X ³	4 ∫	5 f	6 &	7 1/2	8 (	9)	0 =	? ' ^ X ^y	Backspace
Tab ↹	Q	W	E €	R	T	Y	U	I	O	P	é { * }	Enter ↵
			è [+]									
Caps Lock ⬆	A	S	D	F	G	H	J	K	L	ç	° @ à # ù	
Shift ⬆	>	Z	X	C	V	B	N	M	;	:	- X ^y	Shift ⬆
	<								,	.		
Ctrl	Win Key	Alt						Alt Gr	Win Key	Menu	Ctrl	

Brazil (Portuguese)

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