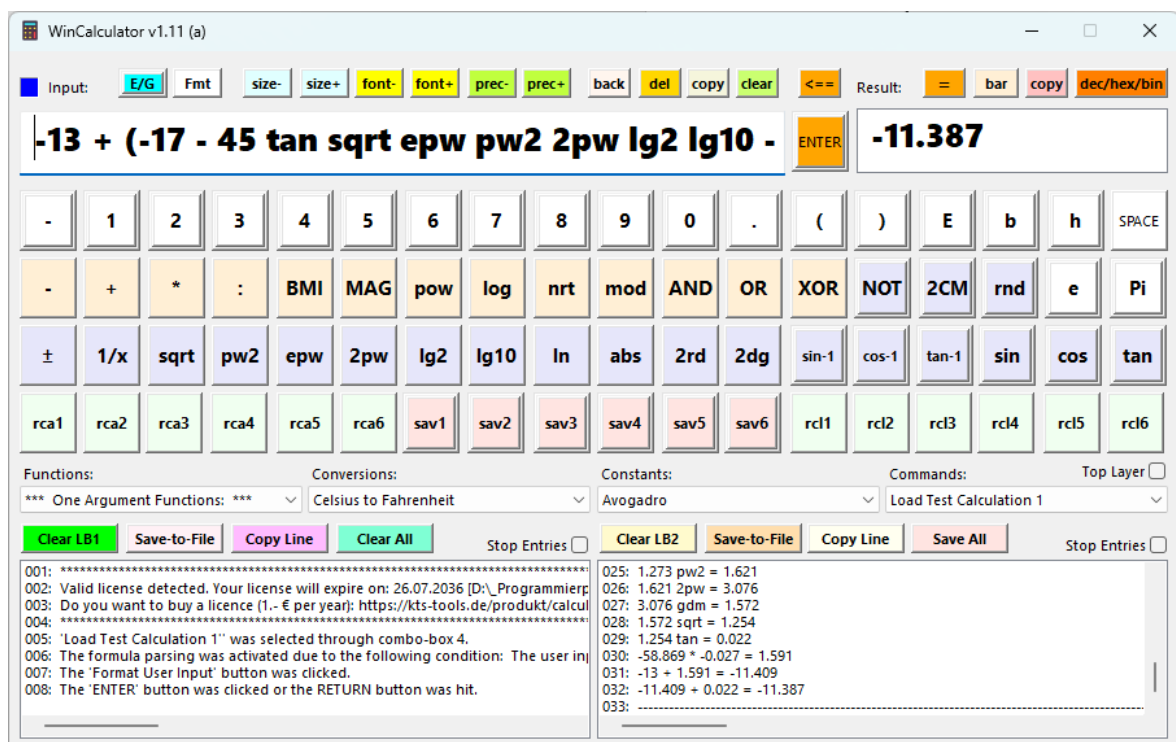


## WinCalculator KTS User Manual

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## 1. Summary of the most important Features

The calculator is a user-friendly Windows dialog application with many features, such as:

- It is bilingual (German and English). The language can be switched during operation, i.e., you do not have to close the application.
- It has an adjustable size in a wide range.
- All calculations within a session can be called up using the tab key (Tab: forwards, SHIFT-Tab: backwards).
- All old calculations and results from previous sessions carried out within the last eight weeks are saved and can be called up through the Exports subdirectory.
- The content of all input and output fields can be exported.
- The number of decimal places can be configured.
- Tool tips appear when hovering over almost all buttons (exception: buttons 0 to 9. Example mod button: *The modulo operator returns the remainder of a division, e.g.,  $7 \bmod 3 = 1$ .*
- In addition to the almost 100 function buttons, there are also four combo boxes with commands, constants, conversions and functions.
- There are 12 buttons for saving the last calculation results (6x automatic and 6x manual for the more important results from user's point of view).
- After starting the program, the user settings from the last session are loaded (language, window size, window position and decimal places).

### Further features:

- The calculator has 18 white colored buttons for entering values (e.g. the digits 0 to 9), whereby binary numbers must begin with b and hexadecimal numbers must begin with h.
- The calculator has 13 rose colored buttons for functions with two arguments (e.g. plus, minus, multiplication and division).
- The calculator has 21 gray-blue colored buttons for functions with one argument.
- The calculator has a button for the constant Pi and one button for the Euler number e.
- The calculator has six buttons for recalling automatically stored results.
- The calculator has six buttons for recalling manually stored results.
- The calculator has six buttons for manually storing results.
- The calculator has an input field for formulas and values, whose font size can be changed with the buttons font+ and font-.
- The calculator accepts all user input via the buttons as well as via the keyboard (if the cursor is positioned in the input field), whereby the user can jump randomly between keyboard and button input. This also applies to all functions (e.g.  $45 \sin$ ).
- The calculator has an output field for results. The number of decimal places can be changed between one and 20 using the prec+ and prec- keys.
- Basically, the calculator always works internally with the maximum accuracy. Only the display of intermediate or final results is shortened according to the current accuracy setting. If the accuracy is subsequently increased, the display is simply adjusted without recalculation.

- The calculator has two list boxes for the output of information. The left box displays the user input and the right box displays the calculations and results with all details and intermediate steps. The Stop Entries checkboxes can be used to stop the list box output.
- The calculator has four which can be used to call up further functions, conversions, constants and commands.
- The calculator has 24 action buttons for further user control.
- The calculator marks the active button over which the mouse is currently positioned in red color.
- The calculator gives Windows tool tips for buttons which are not self-explanatory (e.g. BMI, MAG, 2CM, nrt, rnd, etc.).

The calculator has a LED in the upper left corner to indicate the current processing or error status. After the start or after pressing the clear key, the LED is green. The calculator tries to execute all user inputs directly and shows all intermediate results in the right list box. However, if the user enters a bracket or the priorities are violated, the LED turns blue. Calculations are then only performed when the user presses ENTER or = or enters the next operator. A blue LED is therefore not an error condition, but only an indication condition for results. Example of an input leading to a blue LED:  $3 + 4 * 7 +$ . The calculator calculates  $3 + 4$ , but after entering the  $*$  operator the LED turns blue, because a multiplication has a higher priority than an addition). The  $3 + 4$  calculation shouldn't have been executed at all. However, the expression  $3 + 4 * 7$  is calculated directly afterwards correctly. The only disadvantage of a blue LED is the increasing number of entries in the right list box is probably a bit confusing.

The LED turns red when an error is detected that prevents a calculation from being performed. Reasons for this would be e.g. an unpaired number of opening and closing brackets or if a closing bracket comes before an opening bracket.

Pressing the ENTER or = key (by keyboard or button) immediately executes a calculation with the following difference. ENTER/RETURN leads to the incremental execution (if possible) and = leads to the final execution and the LED turns blue. As a rule, ENTER/RETURN should be preferred.

At the end of a session all executed calculations are stored within the sub-directory \_Exports. These files will be automatically deleted after eight weeks.

### Further Keystrokes:

Pressing the Tab key writes the calculation executed immediately before into the user input field. Pressing the Tab key again writes the previous calculation into the user input field, backwards until the calculator started. With SHIFT + Tab you can reverse the order, i.e. recall the newer entries. Pressing the Clear All key clears the user input memory.

The operating language (headings, tool tips, output, notes, function names, etc.) of the calculator is switchable between German and English. Also, the help manual is available in the two stated languages.

The calculator is portable, i.e., it does neither need nor make any entries in the Windows registry. Its directory structure is as follows:

- WinCalculator KT version.exe
- \\_Exports\ Exported text files
- \\_Help\ German and English help file
- \\_License\ The license file
- \\_Settings\ The settings file

## 2. The purchase of a License

Without a valid license, the calculator will only run for 10 minutes. However, there are no restrictions beyond this. A license costs €1 per year. A 10-year license (quantity 10 in the store) therefore costs 10.- € and also entitles to updates until one day my secret key has to be replaced by me, which is by no means planned (only after compromising the previous secret key). A license always runs from the date of purchase, i.e., you cannot extend a license. This means: wait until it expires (or shortly before) and then buy a new one. Licenses are available in my store:

<https://kts-tools.de/produkt/calculator-taschenrechner/>

<https://kts-tools.de/produkt/calculator-taschenrechner/>

A purchased license file is sent by e-mail within 5 seconds after payment with PayPal. The e-mail is typically delivered in less than 5 minutes. When paying by bank transfer, the license will be sent by e-mail immediately after receipt of the payment.

The license sent by e-mail (a text file with the extension lic) must be copied or moved to the subdirectory ...\\_License. After the next program start, it will be checked and the check result will appear in the list box on the left.

## 3. Priorities of Operators and Functions

The ranking of the operators is shown below in descending order of priority:

- All functions with a single operand such as sin, cos or 1/x. These functions refer to the operands to the left and are executed first, also several in a row, e.g.  $3 \frac{1}{x} \sqrt{2} \sin$ .
- \* and :
- + and -
- All functions with two operands such as pow, log or mod. These are executed in the order in which they occur.

To achieve a different priority, the user must set round brackets according to his desired processing sequence.

Also, for the exponential function pow no exception was made. To achieve the desired processing sequence, e.g.  $3 + 2^4$  must be set in brackets as  $3 + (2 \text{ pow } 4)$ .

## 4. Description of the Buttons on the Program Surface

All input keys are pink. The digits 0 to 9, the decimal point and the brackets do not require a description. The SPACE key creates a space. The minus sign must not be confused with the minus operator, since they have different functionality. However, using the = key leads to a final calculation in which a mixing of the two minus keys is corrected. For a correct incremental execution of calculations, the two Minus Buttons must not be confused.

- E:** Exponent. Identical usage as in C++. The number one million can be entered using E as 1E6 or 10E5 or 100E4 or 1000E3 or 10000E2 or 100000E1.
- b:** Identifies the input of binary numbers. The b must be entered first. Example: b10010110, which corresponds to the decimal number 150. Alternatively, a binary number may also begin with 0b instead of b.
- h:** To identify the input of hexadecimal numbers. The h must be entered first. Example: hB6, which corresponds to the decimal number 182. Alternatively, a binary number may begin with 0h instead of h. Hexadecimal numbers may also be entered as 0xB6 via the keyboard, because this input convention is widespread.

## 5. Description of the Storage and Recall Buttons

Each time the RETURN or = key is pressed, the calculator stores the result on one of the keys labeled rca1 (Recall Automatic) to rca6. In addition, a tooltip with the result and the calculation task is stored on the key (behind the result in square brackets). If you move the mouse over the key, the tooltip appears. If the button is pressed, the saved variable is copied to the user input field. The value appears in the input field as rca1 to rca6. The reason for using rca1 to rca6 instead of the results as numbers is to maintain full accuracy (52 binary digits behind the decimal point of real numbers) compared to reduced accuracy (e.g. to 6 digits behind the decimal point when using numbers). After the seventh automatic storage, the first stored value is overwritten.

Calculation results can be saved manually using the keys sav1 to sav6. Pressing the sav1 key saves the current calculation result under the rcl1 (recall) key, including a tooltip with the result and the calculation task in square brackets. The keys sav2-5 behave in the same way. When pressing the keys rcl2-5, the respective variable is copied to the user input field.

When the Clear All key is pressed, all cached results are deleted. The associated variables rca1-6 and rcl1-6 are reset to their initialization value 0.

## 6. Description of the Functions with a single Operand

The operand must always be entered before the function abbreviation for all functions. Examples:

**3 1/x or 4 sqrt or 5 pw2 or 6 epw or 7 2pw or 8 lg2 or 9 lg10.**

The following table contains all functions that require a single operand as well as a description of these functions. When entering functions via the keyboard, the function names are to be used exactly as indicated in the left column.

Function	Description	Example
<b>NOT</b>	Boolean inversion (1 complement)	0b11100011 NOT = 0b00011100
<b>2CM</b>	2's complement (= NOT (number + 1))	0b11100011 2CM = 0b00011011
<b>rnd</b>	Commercial rounding to whole numbers	1.51 rnd = 2
<b>±</b>	Reverse the sign, which corresponds to a multiplication by -1.	17 ± = -17
<b>1/x</b>	reciprocal of a number	3 1/x = 0.33333
<b>sqrt</b>	square root of a number	4 sqrt = 2
<b>pw2</b>	$x^2$	2 pw2 = 4
<b>epw</b>	Euler number <sup>ex</sup>	2 epw = $2.718^2 = 7.38906$
<b>2pw</b>	$2^x$	2 2pw = 4
<b>lg2</b>	Logarithm to base 2	4 lg2 = 2
<b>lg10</b>	Logarithm to base 10	100 lg10 = 2
<b>ln</b>	Natural logarithm to base e (Euler number)	10 ln = 0.69315
<b>abs</b>	Absolute value of a number (ignoring the sign)	-17 abs = 17
<b>2rd</b>	Conversion of an angle degree input into radian (number * Pi / 180)	45 2rd = 0.78540
<b>2dg</b>	Conversion of a radian value into angular degrees (number * 180 / Pi)	2 2dg = 114.59156
<b>asin</b>	Arc sine (inverse function of sine). Selection via the sin-1 button on the surface.	0.707 asin = 44.99135
<b>acos</b>	Arc cosine (inverse function of cosine). Selection via the cos-1 button on the surface.	0.707 acos = 45.00865
<b>atan</b>	Arc tangent (inverse function of tangent). Selection via the tan-1 button on the surface.	0.707 atan = 35.26031
<b>sin</b>	Sinus. The operand must be entered in angular degrees. If the operand is available as radian, the conversion function 2dg can be entered before.	45 sin = 0.70711
<b>cos</b>	Cosine. The operand must be entered in angular degrees. If the operand is available as radian, the conversion function 2dg can be entered before.	45 cos = 0.70711
<b>tan</b>	Tangent. The operand must be entered in angular degrees. If the operand is available as radian, the conversion function 2dg can be entered before.	45 tan = 1
<b>rup</b>	Round up. In the background, the C++ ceil function is called, which always rounds in the direction of the larger	-0.57 rup = 0

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Function	Description	Example
	integer depending on the sign, e.g. 0.57 rup = 1. Selection of the function via the drop-down menu.	
<b>rdw</b>	Round down. In the background, the C++ floor function is called, which always rounds in the direction of the smaller integer depending on the sign, e.g. 0.57 rdw = 0. Selection of the function via the drop-down menu.	-0.57 rdw = -1
<b>trnc</b>	Truncate truncates the comma portion of a number. This operation corresponds to a type conversion of a real number into an integer. Selection of the function via the drop-down menu.	-1.123 trnc = 1
<b>2ds</b>	Determines the number of days up to an entered date, which can be in the past or in the future. <u>Example:</u> In how many days will the 2024 Summer Olympics begin (query on 11/19/2019)?	26.07.2024 2ds = 1711
<b>wdy</b>	Determines the entered weekday for an entered date. <u>Example:</u> On which weekday did the Titanic sink?	14.04.1912 wdy = 0 [Sunday]
<b>fac</b>	Faculty of an integer. Selection of the function via the drop-down menu.	5 fac = $1*2*3*4*5 = 120$
<b>sinh</b>	Sine hyperbolic. Selection of the function via the drop-down menu.	1 sinh = 1.17520
<b>cosh</b>	Cosine hyperbolic. Selection of the function via the drop-down menu.	1 cosh = 1.54308
<b>tanh</b>	Tangent hyperbolic. Selection of the function via the drop-down menu.	1 tanh = 0.76159
<b>asinh</b>	Sine hyperbolic inverse function. Selection of the function via the drop-down menu.	1 asinh = 0.88137
<b>acosh</b>	Cosine hyperbolic inverse function. Selection of the function via the drop-down menu.	1 acosh = 0
<b>atanh</b>	Tangent hyperbolic inverse function. Selection of the function via the drop-down menu.	1 atanh = inf (infinite) 0.5 atanh = 0.54931

## 7. Description of the Functions with two Operands

The following table contains all functions that require two operands as well as a description of these functions. When entering functions via the keyboard, the function names are to be used exactly as indicated in the left column.

Function	Description	Example
-	subtraction	$4 - 1 = 1$
+	addition	$4 + 1 = 5$
*	Multiplication. Selection via the x key on the surface or * input on the keyboard.	$4 * 5 = 20$
: oder /	Division. Selection via the : key on the surface or : input on the keyboard or / input on the keyboard.	$4 / 5 = 0.80000$
BMI	Body Mass Index. Body weight (in kg) divided by the body height (in cm) to the square.	100 BMI 1.80 = 30.86420
MAG	Magnitude. The amount of a complex number or the length of the hypotenuse of a right-angled triangle.	3 MAG 4 = 5 (square root of $3^2 + 4^2$ )
pow	$x^y$	10 pow 2 = 100
log	Logarithm of a number to the base.	65536 log 2 = 16
nrt	n-th root of a number.	3 nrt 8 = 2
mod	Modulo. Rest of division of integers.	7 mod 3 = 1
AND	Logical AND of two integers	0b1101 AND 0b0001 = 0b0001
OR	Logical OR of two integers	0b1101 OR 0b0001 = 0b1101
XOR	Exclusive logical OR of two integers	0b1101 XOR 0b0001 = 0b1100
rem	Residual value in the division of decimal numbers.	7.83 rem 4.33 = 3.50000
sum	Sum of integers. Left number plus left number plus 1 ... plus right number, e.g. 3 sum 6 = 3 + 4 + 5 + 6.	3 sum 6 = 18
iBMI	Body Mass Index inverse function. Target BMI divided by the body height (in cm) to the square.	25 iBMI 1.80 = 81



## 8. Description of the Action Buttons

The following table contains all actions that are triggered when an action key is pressed.

Position of Button	Action Button	Description of Action
Above the user input field	<b>Open Dir</b>	Opens the calculator directory in the Windows file explorer.
	<b>Format</b>	Formats the formula entered by the user using the keyboard or Windows clipboard.
	<b>size+</b>	Increases the window size by 10% in both directions x and y as long as the maximum size has not yet been reached.
	<b>size-</b>	Decreases the window size by 10% in both directions x and y as long as the minimum size has not yet been reached.
	<b>font+</b>	Enlarges the font in the user input field until the maximum size of 35 is reached.
	<b>font-</b>	Reduces the font in the user input field until the minimum size of 15 is reached.
	<b>prec+</b>	Increases the number of decimal places displayed in the result field until the maximum number of 20 is reached.
	<b>prec-</b>	Reduces the number of decimal places displayed in the result field until the minimum number of 1 is reached.
	<b>back</b>	Deletes the last character (far right) in the user input field.
	<b>del</b>	Deletes the first character (far left) in the user input field.
	<b>copy</b>	Copies the current contents of the user input field to the Windows clipboard.
	<b>clear</b>	Deletes the contents of the user input field and all intermediate results.
Above the result field	<b>=</b>	Executes a calculation and lists all calculation steps and intermediate results in the right list box.
	<b>bar</b>	Forces the horizontal scrollbar to appear in the result field, if the result cannot be fully read.
	<b>copy</b>	Copies the current contents of the result field to the Windows clipboard.
	<b>dec/hex/bin</b>	Switches the display in the result field from decimal to hexadecimal to binary to decimal etc. continuously.
Above the list box 1	<b>Clear LB1</b>	Deletes the contents of the list box 1.
	<b>Save-to-File</b>	Saves the contents of list box 1 in a file and opens the file in the standard text editor.
	<b>Copy Line</b>	Copies the currently selected line in list box 1 to the Windows clipboard.
	<b>Clear All</b>	Erases all in-/output: User input, result, listbox 1 and listbox 2.
	<b>Stop Entries</b>	Prevents further entries in list box 1 as long as the check mark is set.
Above the list box 2	<b>Clear LB2</b>	Deletes the contents of the list box 2.
	<b>Save-to-File</b>	Saves the contents of list box 2 in a file and opens the file in the standard text editor.
	<b>Copy Line</b>	Copies the currently marked line in list box 2 to the Windows clipboard.

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Position of Button	Action Button	Description of Action
	<b>Save All</b>	Exports all in-/output: User input, result, listbox 1 and listbox 2 into a TXT file and opens it subsequently.
	<b>Stop Entries</b>	Prevents further entries in list box 2 as long as the check mark is set.
Below the <b>tan</b> button	<b>Top Layer</b>	Makes the calculator to the top layer in the Windows Z-Order. Afterwards all active windows are moving below the calculator instead of above when shoved.

## 9. Description of Combo-box 1 (Functions)

The following functions are available via combo-box 1:

Function	Description of Function
Round up (ceil)	See functions with a single operand
Round down (floor)	See functions with a single operand
Truncate (type-cast to integer)	See functions with a single operand
Number of Days until the input Date	See functions with a single operand
Week-day of the input Date	See functions with a single operand
n! (Faculty)	See functions with a single operand
Sine Hyperbolic	See functions with a single operand
Cosine Hyperbolic	See functions with a single operand
Tangent Hyperbolic	See functions with a single operand
Sine Hyperbolic Inverse	See functions with a single operand
Cosine Hyperbolic Inverse	See functions with a single operand
Tangent Hyperbolic Inverse	See functions with a single operand
Remainder	see functions with two operands
Sum (left op + left op + 1 ... + right op)	see functions with two operands
Inverse Body Mass Index	see functions with two operands
Create 16-bit Random Number	Generates a 16-bit long random number
Create 32-bit Random Number	Generates a 32-bit long random number
Create 64-bit Random Number	Generates a 64-bit long random number. The random numbers are taken from a 16-bit wide, fast running hardware counter at irregular intervals, written into an array and assembled according to the requested length after the function call. The equal distribution of the random numbers should therefore be relatively good.

## 10. Description of Combo-box 2 (Conversions)

The following conversions are available via **combo-box 2**:

Conversion Name in Combo-box	Short Name	Description of Conversion
Celsius to Fahrenheit	<b>c2f</b>	Output = Input * 9 / 5 + 32
Fahrenheit to Celsius	<b>f2c</b>	Output = (Input - 32) * 5 / 9
Kelvin to Celsius	<b>kel</b>	Output = Input - 273.15
mph to km/h	<b>mph</b>	Output = Input / 1.609244
knots to km/h	<b>knt</b>	Output = Input * 1,852
km/h to m/sec	<b>kmh</b>	Output = Input / 3.6
Sea Mile to Kilometer	<b>sea</b>	Output = Input * 1,852
Mile to Kilometer	<b>mil</b>	Output = Input * 1.609244
Yard to Meter	<b>yrd</b>	Output = Input * 0.9144
Foot to Meter	<b>fot</b>	Output = Input * 0.3048
Inch to Centimeter	<b>inc</b>	Output = Input * 2.54
Pound to Kilogram	<b>pnd</b>	Output = Input * 0.45359237
Ounce to Gram	<b>oun</b>	Output = Input * 28.349523125
Horsepower (Europe) to Kilowatt	<b>hpe</b>	Output = Input * 0.735499
Horsepower (USA) to Kilowatt	<b>hpa</b>	Output = Input * 0.74570
Kilocalorie to Kilojoule	<b>cal</b>	Output = Input * 4.18684
Kilocalorie to Watthour	<b>cal</b>	Output = Input * 1.16222
Kilopascal to Bar	<b>pas</b>	Output = Input / 100
Atmosphere to Bar	<b>atm</b>	Output = Input * 1.01325
Pound per Square Inch to Bar	<b>psi</b>	Output = Input * 0.06894757293
German DM to Euro	<b>gdm</b>	Output = Input / 1.95583
French Franc to Euro	<b>fra</b>	Output = Input * 0.152449
Italian Lira to Euro	<b>lir</b>	Output = Input * 0.000516457
Spanish Peseta to Euro	<b>pes</b>	Output = Input * 0.00601012

## 11. Description of Combo-box 3 (Constants)

The following constants are available via **combo-box 3**:

Constant	Value
Avogadro	6.02214076E23
Boltzmann	1.380649E-23
Earth Gravity	9.81274
Earth Weight	5.972E24
Electric Field	8.8541878128E-12
Elementary Charge	1.602176634E-19
Faraday	96485.33212
Light Speed Vacuum	299792458
Magnetic Field	1.25663706212E-6

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Constant	Value
Mass Electron	9.1093837015E-31
Mass Neutron	1.67492749804E-27
Mass Proton	1.67262192369E-27
Molar Gas	8.314462618
Newton Gravitation	6.67430E-11
Planck	6.62607015E-34
Avogadro	6.02214076E23

## 12. Description of Combo-box 4 (Commands)

The following commands are available via combo-box 4:

Command	Description of the Command
Restore the original Window Size	Resets the calculator window size to 100% (since it could be difficult to achieve exactly 100% window size by hand).
Open Help Manual (English Language)	Opening the user manual in English language.
Open Hilfe Manual (German Language)	Opening the user manual in German language.
Show Priorities	Display of operator processing priorities in a message box.
Show User Settings	Displays the available user settings within a message box.
Open Calculator Directory	Opens the calculator directory in the Windows explorer.
Open Help Directory	Opens the _Help subdirectory in the Windows explorer.
Open License Directory	Opens the _License subdirectory in the Windows explorer.
Open Settings Directory	Opens the _Settings subdirectory in the Windows explorer.
Open Exports Directory	Opens the _Export subdirectory in the Windows explorer.
Clear Exports Directory	Deletes all exported text files in the subdirectory.
Set Maximum Precision" ,	Sets the displayed decimal places to maximum (20).
Set Minimum Precision	Sets the displayed decimal places to minimum (1).
Show all Functions in Listbox 1	Lists all available functions in listbox 1. Due to the resizing of the calculator in conjunction with resizing of the fonts, not all function names may be fully readable. In listbox 1 they are.
Show all Conversions in Listbox 1	Lists all available conversions in listbox 1.
Show all Constants in Listbox 1	Lists all available constants in listbox 1.
Show all Commands in Listbox 1	Lists all available commands in listbox 1.
Load Test Calculation 1	Loads the test calculation 1 into the user input field. After pressing the Format key, the expression is formatted. After pressing the ENTER key, the formula is calculated.
Load Test Calculation 2	Loads the test calculation 2 into the user input field.
Load Test Calculation 3	Loads the test calculation 3 into the user input field.

## 13. Further Remarks to the Calculator

### 13.1. Remarks to the Calculator Accuracy

The calculator uses the C++ library Math to perform the calculations. In this library there are no longer numbers than 64 bits. The calculator performs all calculations with double precision floating point numbers, i.e., with 64 bits length. This also applies to binary operations (e.g. AND). These are converted to integer numbers in the function concerned. There the function is executed (logical AND) and afterwards the result is immediately converted back into DOUBLE and returned. The result is then displayed without decimal places if the difference to the nearest integer number is minimal.

DOUBLE numbers with 64 bits work with a sign bit, an 11 bit long (binary) exponent and a 52 bit long mantissa. This means that the accuracy for large numbers is quite limited, namely to about 16 digits behind the decimal point.

All calculations are always executed with the full accuracy of 64 bits, independent of the selected output precision. You can also increase the output precision at any time later and do not have to perform a calculation again.

### 13.2. Calculations with Date

There are two functions that can calculate with a date, namely **2ds** (to days = conversion to days = interval in days) and **wdy** (weekday, 0 = Sunday). For both functions, you must first enter a date in the format dd.mm.yyyy and then select one of the two functions via the combo box functions or type it in manually. Both functions work in the past, present and future. 22.06.2027 **2ds** results in 1223 days in the future, based on 15.02.2024. You can also calculate time spans if you take the signs into account correctly, e.g., 14.04.2032 **2ds** - 14.04.1912 **2ds** = 43830 days since the sinking of the Titanic.

### 13.3. The Inversion of Conversions

The Conversions combo box contains around 25 conversion options between (mostly physical) units. However, these conversions only work in one direction, e.g., nautical mile to kilometer (with sea as the abbreviation used for the conversion). With only one exception (between Celsius and Fahrenheit, for which there is an inverse function), these are always linear conversions, i.e., using a factor. I therefore wanted to save you and myself another 25 entries in the combo box for the inverse functions. You get the inverse of a conversion by appending a **1dx** (1 by x = reciprocal) to the respective conversion. Example:

**1 sea 1dx → 0.539956803**

The result means that 1 kilometer corresponds to 0.539956803 nautical miles.

## 14. Revision List

Date	Version/ Chapter	Description of the Change
27.03.2020	v1.00a	18 new buttons for storage of intermediate calculation results.
30.03.2010	v1.00b	Storage/recall of all executed calculations by pressing the tabulator key.
24.05.2022	v1.01a	Improved readability of stored, recalled variables in the input box. Instead of rcl1, the abbreviated current value is now prefixed, e.g. 7.8193_rcl1.
24.05.2022	v1.01a	Automatic saving of all calculations at the end of a session within an exported file.
24.05.2022	v1.01a	Automatic deletion of obsolete files in the _Export folder after a certain period of time (currently 8 weeks).
13.07.2022	v1.01b	Command set revised (mainly due to user settings).
15.02.2024	V1.10a	15 tool tips added. Errors in the dynamic tool tip generation (rca1 to rca6, sav1 to sav6 and rcl1 to rcl6) corrected.