SciPlus-3300

Scientific Calculator

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User Guide

Table of Contents

Getting Started	
Charging your SciPlus-3300	2
Auto Shutoff	
The SciPlus-3300 Display	3
SciPlus-3300 Operations	4
Soft Keys	4
A Note Regarding Nomenclature:	
Working with Previous Results	5
Implied Operators	5
Speech Output	6
Settings	7
Basic Functions	10
Mathematical Functions	12
Trigonometry	14
Converting Angles	15
Converting Coordinates between Polar and Rectangular	16
Working With Fractions	



Memory Operations	18
Statistical Operations	20
Using the SciPlus-3300 to Evaluate Mathematical Functions	22
Errors	27
Troubleshooting	28
Service	29
Warranty	29

Getting Started

Your SciPlus-3300 calculator performs a wide variety of mathematical, statistical, and trigonometric calculations. The speech output provides an audible description of all operations.

The SciPlus-3300 also enables you to evaluate mathematical functions.

This User Guide will explain how to get the best from your calculator. Let's first get familiar with the SciPlus-3300 controls.



Learning Mode: If you press and hold for five seconds the SciPlus-3300 enters "Learning Mode". In this mode, the keys do not operate normally. Rather, they simply announce (through the earbuds) their function. This allows you to become comfortable navigating the keyboard. If you precede a key with will speak its alternate function if one exists. Press and hold again to return to normal operation.



Charging your SciPlus-3300

Charging the calculator is easy. Your SciPlus-3300 calculator includes a USB Wall Charger and cord. Simply plug the USB wall charger into a regular outlet, and plug the USB cable into the SciPlus-3300. The calculator should fully charge overnight. On a full battery the SciPlus-3300 will operate for about 6-8 hours of continuous use. Note this is less than an ordinary calculator because of the bright backlight, which makes the display much easier to read.

When the SciPlus-3300 is charging, you will notice the battery symbol is animated. The battery is completely charged if when the animation stops and three solid bars are shown. When the battery requires recharging, you will hear a beep in your earbuds every 30 seconds.

Note: If your SciPlus has been unused for a very long time, you may need to charge it for a while before it will even turn on. When this happens, make sure you "RESET" the SciPlus by carefully inserting a paperclip into the hole on the backside of the calculator. This restores factory settings to ensure proper operation.

Auto Shutoff

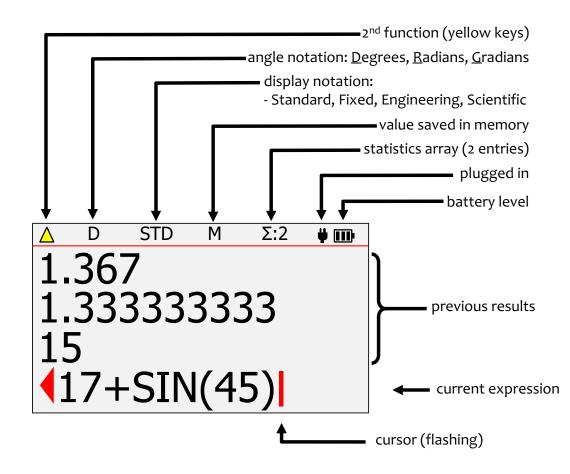
Your SciPlus-3300 calculator will automatically shut off after a few minutes of inactivity. Many of the calculator's current settings such as the angle mode, number format, etc., will be saved, so that it will turn on again in the same state. Values stored in memory and the statistics table are also saved.

If the calculator is left off for an extended period (typically many weeks), these settings may be lost.

The SciPlus-3300 Display

The SciPlus-3300 screen has four lines. The bottom line with the flashing red cursor is where you enter expressions. The other three lines show the results of previous operations. Once you press an expression is evaluated and its result is moved up a line, leaving the bottom line empty to enter another expression.

Note: When lengthy expressions or results do not fit on the screen you will notice a or as shown in the diagram. This is to indicate that characters are hidden to the left or right. Use the keys to move the cursor. In expressions use the backspace key what is to the left of the cursor and edit the expression.



The characters above the horizontal red line at the top of the screen show the **status line** of the calculator. If the battery symbol is animated, this indicates that the battery is being charged. Some of the characters in the status line may not appear at all times. For example, if there is no entry in memory, or if the statistics register is currently empty, these items will not appear.



SciPlus-3300 Operations

The SciPlus-3300 follows the "BEDMAS" rule for order of operations:

Brackets \rightarrow Exponents \rightarrow Divide \rightarrow Multiply \rightarrow Addition \rightarrow Subtraction

Many of the SciPlus-3300 keys have two functions. The lower function appears in a white font. The alternate function appears in a yellow font. To access this function, the alternate function appears in a yellow font. To access this function, the alternate function appears in a yellow font. To access this function, the alternate function appears in a yellow font. To access this function, the alternate function appears in a yellow font. To access this function, the alternate function appears in a yellow font. To access this function, the alternate function appears in a yellow font. To access this function, the alternate function appears in a yellow font. To access this function, the alternate function appears in a yellow font. To access this function, the alternate function appears in a yellow font. To access this function, the alternate function appears in a yellow font. To access this function, the alternate function appears in a yellow font. To access this function, the alternate function appears in a yellow font. To access this function, the alternate function appears in a yellow font. To access this function, the alternate function appears in a yellow font. To access this function, the alternate function appears in a yellow function appears

Soft Keys

The keys A B C D do not have a specific function. Instead, labels at the bottom of the display define the function of these keys. If there are no labels, these keys will not do anything. You will use these keys when adjusting the SciPlus-3300's settings, and for memory and statistics operations, and when using the function (f(x)) feature.

A Note Regarding Nomenclature:

Throughout this manual, a key press is indicated either by the key image or a boldface blue character. For example, 3 indicates the 3 key on the keyboard. Note that sometimes boldface blue characters might be implemented using the SciPlus-3300's soft keys ABCD.

Page 4 of 30 version 1.3

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Working with Previous Results

When entering expressions in the bottom line, it's very easy to use the results of previous calculations displayed in the lines above it. Using the keys, position the cursor at the location in the expression where you wish to insert a previous result. Now, using the you wish to insert into the current expression, and press.

Implied Operators

In some cases there is no need to enter x in an expression. Here are some examples:

```
2 (3+1) is the same as 2 \times (3+1)

2 sin(30) is the same as 2 \times \sin(30)

2 \pi is the same as 2 \times \pi

(3+2)(7-3) is the same as (3+2) \times (7-3)
```



Speech Output

Your SciPlus-3300 will automatically read the results of expressions when they are evaluated. You will also notice that the speech output describes settings screens, etc., when they appear. At any time, pressing a button to continue operations will halt the speech output. To replay previous results, simply use the 🔨 🛡 keys to highlight the line to be read, and select 🦙 .

Turn speech output on/off: 2nd



Read status line:



HINT: Always ensure that the volume control on your ear buds is turned up.

Settings

There are five settings screens in the SciPlus-3300, accessed by the key. Cycle through the settings screens using , or by entering 1 through 5. Change settings using the ABCD keys.

Number Format (Settings Screen #1)

There are four number formats supported by the SciPlus-3300:

1 NU	1 NUM FORMAT			
STD)	0 1	2 34	
FIX FIX		5 6	789	
SCI				
ENG	5			
↑ ↓		-	+	
A	В	C	D	

Standard: Numbers show up to ten-digit precision.

Examples: 101, 41250.5, 0.3333333333

Fixed Notation: Number of decimals is fixed.

Examples: 101.00, 41250.50, 0.33

Scientific Notation: Numbers are displayed in powers of ten,

with a fixed number of decimals.

Examples: 1.01E+02, 4.13E+04, 3.30E-01

Engineering Notation: Numbers displayed in powers of ... 10⁻⁶,

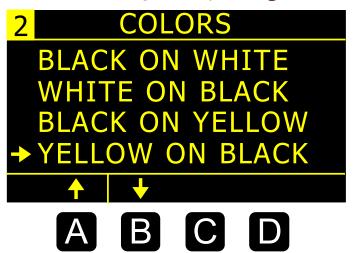
10⁻³, 10⁰, 10³, 10⁶..., with fixed decimal precision. These steps express values corresponding with "micro, milli, kilo,

mega, etc.".

Examples: 101, 41.25E+03, 333E-03



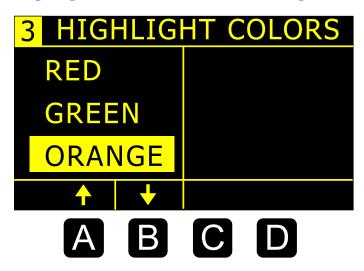
Screen Color Options (Settings Screen #2)



Often, people with low vision are able to benefit from different color options. Use A and B to scroll through the available options.

As you scroll through the options you will notice the calculator display changes accordingly.

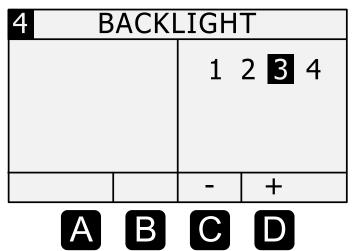
Highlight Color Options (Settings Screen #3)



Highlight colors are used for items like the cursor and overflow arrows.

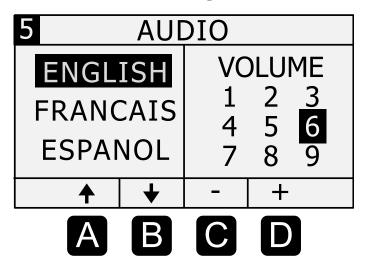
Use A and B to select the highlight color.

Backlight Brightness (Settings Screen #4



Use the **C** and **D** softkeys to adjust the brightness of the backlight. Maximum brightness will create the most contrast in brightly lit environments. Lowering the brightness will extend the battery life between charging.

Audio Output (Settings Screen #5)



The SciPus-3300 can operate in English, Spanish, French, and Arabic.

Use the A and B softkeys to select the language.

The **C** and **D** softkeys adjust the output volume.



Basic Functions

The tables below describe the functions of the SicPlus-3300 calculator. Note that several examples are included. You will find that some functions automatically introduce a left bracket "(", indicating that you need to enter an expression, which could be as short as a simple number, or a long mathematical expression. For these functions you must close the expression with a right bracket ")".

KEY	NAME	DESCRIPTION
2nd	function. You will notice the \(\triangle \) symbol \(\triangle \) Note: In this table, if the key symbol	Press this key before any dual-function key to access the upper (yellow) function. You will notice the \triangle symbol flashing in the status line.
2nd		Note: In this table, if the key symbol at right appears on a yellow background, the description applies to the upper (yellow) function.
O CLR	ON/Clear	Turn calculator ON. The cursor will appear on the bottom line. Most of the settings from the previous session will remain as they were. If the calculator is already on this key clears the bottom line.
O CLR	OFF	Save settings, memory and statistics data, and turn calculator OFF.
MEM BKSP	Backspace	Delete last entry or function.

KEY	NAME	DESCRIPTION
	Enter (=)	Resolves the current expression, displaying the result in the second line. If the expression contains errors, an error message will appear.
4	Clear Screen	then clears the current expression and all previous results.
R→P (Open Parentheses	Open parentheses. Note: Some expressions automatically include the opening parentheses.
DD)	Close Parentheses	Close parentheses.
+/_	Change Sign	Change the sign of the operand. After some operators (e.g. \times ÷), this operation will insert a negative sign into the expression.
AB ↔ X EE	Scientific Notation	This is equivalent to "×10 raised to the power"
禁	Settings	Manage settings (see section on Settings). Toggles on/off.



Mathematical Functions

KEY	NAME	DESCRIPTION
π %	Pi	Enters the symbol π into an expression. If you press $\frac{\pi}{2^{nd}}$ then the result 3.141592654 will be displayed.
x! 1/x	Factorial	Calculates the factorial of the value to the left. Enter this <i>after</i> you enter the value of 'x'.
$\frac{2\sqrt{x}}{x^2}$	χ^2	Squares the value to the left. Enter 'x' first. e.g: 10 followed by vields a result of 10², or 100.
y√x y×	y ^x	Raises the value to the left, to an exponent. Enter 'y' first. Shown as '^'. e.g.: 2 3 followed by 2 yields a result of 23 or 8.
x! 1/x	Reciprocal	Calculates the reciprocal of an expression in brackets. e.g: 25 x 4 followed by vields 1/100, or 0.01.
$2\sqrt{x}$ x^2	Square Root	Calculates the square root of a value. e.g.: 2nd 4 followed by 4, or 2.
y√x y ^x	n th Root	Calculates the n th root of a value. e.g.: 3 2nd 8 followed by yields the ³ V8, or 2.
10× LOG	LOG	Calculates the base10 logarithm of an expression in brackets. e.g.: 10 25 \times 4 $)$ followed by $\overset{10}{\leftarrow}$ yields $\log_{10}(100)$, or 2.

KEY	NAME	DESCRIPTION
		The behavior of the % function depends upon context.
		If the expression is simply a number with the % operator, the result of the expression is the number divided by 100.
π	Percentage	If the $\%$ operator is appended to a number which is itself to the right of the $+-\times$ or \div operator, the percentage is added to, subtracted from, multiplied by, or divided by the number to the left of the operator.
$\frac{\pi}{\%}$		e.g.: 3 \longrightarrow 50 $\frac{\pi}{\%}$ followed by \longrightarrow yields a result of 4.5.
		If used in a larger expression the operand must be enclosed in brackets.
		e.g.: $7 = 3 + 50 = 7 = 1 $ results in 5.5
		If $\frac{\pi}{\%}$ is followed by any operator without a preceding closing bracket as shown above example, a Syntax Error will result.
e ^x	LN	Calculates the natural logarithm of an expression.
LN	LIN	e.g.: 25 × 4) followed by yields In(100), or 4.605170186.
e ^x	e ^x	Calculates the value of e (2.2718282) raised to an expression.
LN	<u> </u>	e.g.: $\frac{2nd}{2}$ $\frac{e^{x}}{2}$ $\frac{2}{1}$ $\frac{1}{3}$ $\frac{1}{3}$ followed by $\frac{1}{4}$ yields e^{5} , or 148.4131591.
10× LOG	10 ^X	Calculates the value of 10 raised to a value. e.g.: 2nd 10x



Trigonometry

Trigonometry functions are very straightforward with the SciPlus-3300. Note that the values used in trigonometry functions, and the result, are expressed in Degrees, Radians, or Gradians, as indicated by 'D' 'R' or 'G' in the status line. The examples shown below assume the SciPlus-3300 is in "DEGREES" mode.

KEY	NAME	DESCRIPTION
SIN-1 SIN	Sine	Calculates the sine of an expression. e.g.: SIN 30 followed by yields 0.5.
SIN-1 SIN	Arcsine	Calculates the inverse sine (arcsine) of an expression. e.g.: 2nd SIN 0.5) followed by yields 30.
DRG → DRG	Set Angle Mode	This simply toggles through Degrees, Radians, Gradians. The current setting is indicated in the status line. After setting this parameter, subsequent input values and the results of expressions are expressed accordingly.
DRG→ DRG	Convert Angle	2nd DRG converts the current value displayed in the second line, and changes the status line parameter.

The Cosine and Tangent functions, and their inversions, work the same way.

Converting Angles

KEY	NAME	DESCRIPTION
DMS	Decimal Degrees to DMS	Converts decimal degrees into degrees, minutes, seconds. e.g.: 2nd 5 45.5 followed by vields (45,30,0.00). Note that if the second line is in DD format, entering 2nd followed by converts that value into DMS format.
DD)	DMS to Decimal Degrees	Converts degrees, minutes, seconds into decimal degrees. e. g.: 2nd 45,30,0 followed by yields (45.5) Note that if the second line is in DMS format, entering followed by converts that value into DD format.



Converting Coordinates between Polar and Rectangular

KEY	NAME	DESCRIPTION
R→P (Rectangular to Polar	Converts rectangular (x,y) coordinates into polar (r,θ). Note that angles are expressed in degrees, radians or gradians as indicated on the status line. e.g.: 2nd 1,1 followed by ujelds (1.41,45.00) Note that if the result line is in rectangular (x,y) format, entering 2nd followed by converts that value into polar (r,θ) format.
P→R ■	Polar to Rectangular	Converts polar (r,θ) coordinates into rectagualar (x,y) . Note that angles are entered as degrees, radians or gradians as indicated on the status line. e.g.: 2nd 1.41, 45 followed by vields $(1.00,1.00)$ Note that if the second line is in polar (r,θ) format, entering 2nd followed by converts that value into rectangular (x,y) format.

Working With Fractions

KEY	NAME	DESCRIPTION
		Use this key to enter a fractional amount into an expression. The result is displayed as a fractional amount ONLY if all the operands in the expression are entered as either fractions or integer numbers.
		e.g.: 2 + 2nd 4, 3 ÷ 6) followed by yields 6 1/2
AB ↔ X EE	Enter a Fraction	2.0 + 2nd (4, 3 : 6) followed by 4, 3 : 6
		Note: If no whole number component and comma ("4," in the examples above is entered it is assumed that the whole number component of the fraction is zero.
		e.g.: 2.0 • grad • 3 • 6 7 followed by yields 2.5
A B EE	Convert Between Fraction and Decimal	Pressing 2nd without any arguments converts the contents of the second line from fraction to decimal (or vice versa).



Memory Operations

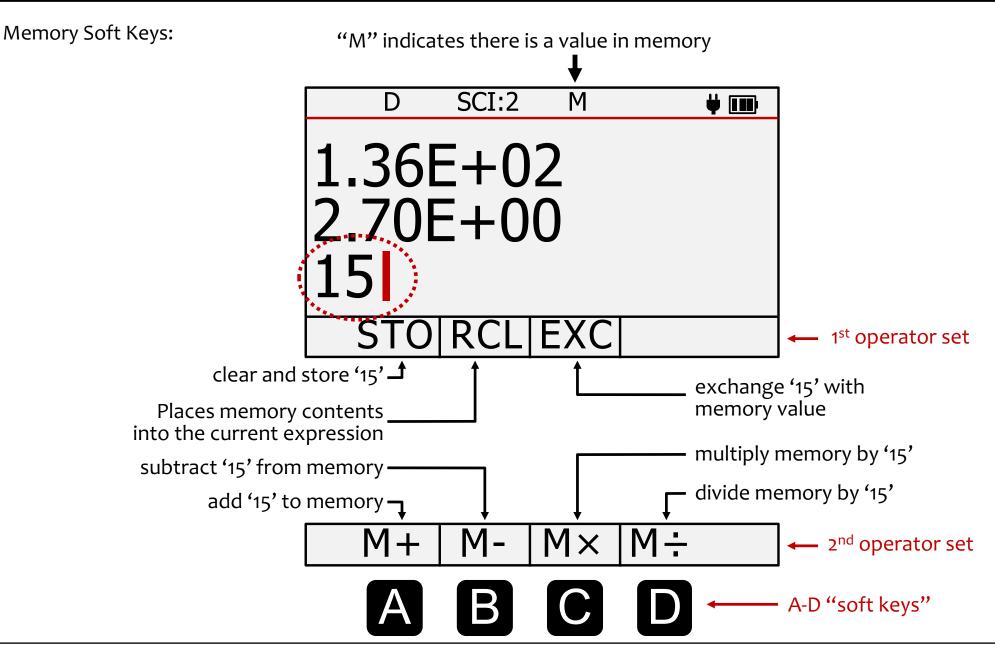
Note that some memory operations with the SciPlus-3300 use the soft keys A B C D.

KEY	NAME	DESCRIPTION
MEM BKSP	Display Memory Soft Keys	causes the memory soft keys to be displayed. Note that there are two sets. Pressing a second time will bring up the second set of memory soft keys. A third time will disable the soft keys.

Soft keys $\mathbf{A} \mathbf{B} \mathbf{C} \mathbf{D}$ are used to clear the memory, swap the value in memory with the current line, and perform simple arithmetic operations (+-× ÷) on the value stored in memory using the current line. Memory soft keys are shown on the opposite page. In this example, the value '15' resides in the current line. Note that storing a value of '0' clears the memory.

Note that the STO (A), if pressed at the end of an expression, will solve the expression and store the result. **EXC**, M+, M-, M×, and M+ all work in the same manner.

Pressing the RCL (B) will add "RCL" to the current expression. When the expression is evaluated, the value currently stored in memory is used. To display the value currently in memory, simply enter RCL by itself, followed by .





Statistical Operations

The SciPlus-3300 performs statistical operations on a table of up to 99 entries. Note that most statistical operations with the SciPlus-3300 use the soft keys ABCD.

KEY	NAME	DESCRIPTION
Σ+	Add Data Point in Stats Register	Adds the current value into the statistics table. If pressed at the end of an expression, the expression is solved, and the result added. Note that if a value already exists in the table, it will be added a second time.
		e.g.: 2 $\sum_{\Sigma+}^{\Sigma}$ 3 $\sum_{\Sigma+}^{\Sigma}$ 5 $\sum_{\Sigma+}^{\Sigma}$ 3 $\sum_{\Sigma+}^{\Sigma}$ will create a table (2, 3, 5, 3)
Σ+	Display Statistics Soft Keys	causes the statistics soft keys to be displayed. Note that there are two sets. Pressing $\frac{2nd}{\Sigma+}$ a second time will bring up the second set of soft keys. A third time will disable the soft keys.

Soft keys A B C D are used to perform various statistical operations. Statistics soft keys are shown on the opposite page. Just enter the soft key followed by to display that value in the second line. For example, for the table (2, 3, 5, 3), selecting C will show the mean value 3.25.

Note: μ , $\Sigma(x)$, $\Sigma(x^2)$, σ , σ^2 and M can all be used in expressions.

indicates there are two entries in the statistics table Statistics Soft Keys: SCI:2 Σ:2 ₩ ||| D Μ 1.36E + 022.70E + 00 $\Sigma(x)$ μ 1st operator set delete from table (if present) - sum of entries clear table mean (average) of entries variance standard deviation · median (middle entry) sum of squares $\Sigma(x^2)$ M 2nd operator set σ A-D "soft keys"



Using the SciPlus-3300 to Evaluate Mathematical Functions

When you select the $f^{(x)}$ key, the display will look like the picture on the opposite page. Note that, while in functions mode, the following features of the SciPlus-3300 are not accessible:

- Fraction calculations
- $(x,y) <-> (r,\theta)$ conversions
- DMS <-> DD conversions
- Memory operations (the value stored in memory is maintained)
- Statistical operations (the statistics table is maintained)

When in f(x) mode, the three lines displayed each have unique meaning:

Equation Line: The top line shows the equation that is being evaluated. Note that equations are in the form y = f(a,b,c,x), and can have up to four variables a, b, c, and x. Of course, convention normally considers a, b, and c, to be "constants", x the "independent variable", and y the "dependent variable".

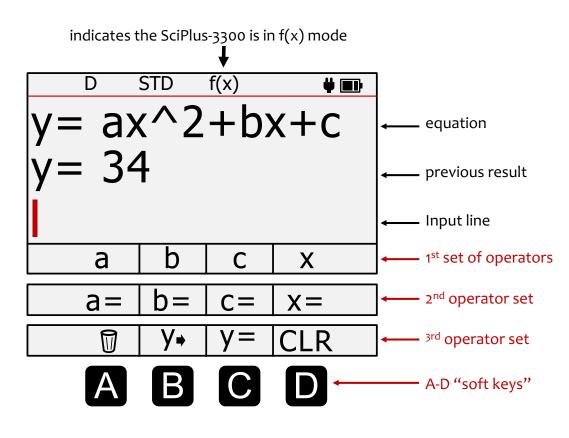
Results Line: The middle line shows the result of the most recent calculation. This may be the entry (or query) of one of the variables a, b, c, x, or the resulting value of the equation (y) for a given set of input constants a, b, c, and a specific x value.

Input Line: This is the line in which you enter the equation using the various mathematical functions of the SciPlus-3300. You also enter values a, b, c, and x. Later, we will talk about how to determine one of these values if y is known.

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The "soft keys" of the SciPlus-3300 have the following meaning while in functions mode:



First operator set: P f(x) once. The four soft keys allow you to use the variables a, b, c, x to define a function in the form y = f(a,b,c,x).

Second operator set: Push f(x) again. This second set of soft keys allows you to define values for the variables a, b, c, x.

Third operator set: Pus f(x) a third time. This third set of soft keys allows you to enter, edit and clear the equation, find y, and CLR all the stored information related to f(x) mode.

Note: In this section, softkey entries are shown in blue.

For example "y=" means press C in the third softkey set.



Calculating values of f(x):

Let's investigate how to use the SciPlus-3300 in functions mode by evaluating the expression:

$$y=ax^2+bx+c$$

- 1. Enter functions mode: First, use the f(x) key to enter functions mode.
- 2. **Enter the equation:** Push f(x) two more times and select y=(C). The bottom line of the display will show "y=". Now push f(x) again to get back to the variables list a, b, c, x. Enter the expression as follows using the soft keys:

$$y=a \times x$$
 b $x + c$ NOTE: Remember that D represents "x"!

Once you press the equation will be displayed in the top line. Of course, if the equation contains a syntax error, you will get an error message when you attempt to get a result.

For now, the middle line will remain blank.

3. **Entering values for the variables:** Push $f \otimes a$ again so that the soft keys show "a=", "b=", etc. Now let's enter specific values for a, b, c and x as follows:

Note from the above example that it's perfectly acceptable to enter a variable as an expression (e.g. TAN(45)). Provided the expression can be resolved, it'll just enter the result as that variable.

You will notice that, as these values are entered, they appear in the middle "results" line.

At any time, you can query a variable by simply selecting the key without a value or expression after the variable. For example, a= will display "3" in the results line. If you have not yet entered a value for a, then "a=undefined" will be displayed in the results line.

You can always over write any variable with a new value.

- - If the equation contains a divide by zero condition, the result Y=DIVo will be displayed.
 - If you see "y=..." in the middle line, it means that not all of the necessary variables have been entered yet. Zero values must be entered as such.
- 5. **Changing variables:** At any point, you can change one of the values of a, b, c, x by repeating step '3' above. A new value of y will be calculated each time a variable is entered.
 - For example, to find the value of $y=ax^2+bx+c$ for a new value of x=4, simply enter x=4 .
- 6. **Editing the equation:** To edit the equation, use $y \rightarrow$ to put the equation into the input line. Move the cursor to the location you wish to edit. Remember removes operators from the equation.
- 7. **Entering a new equation:** You can easily enter a new equation by repeating step 2 above. The values for a, b, c, x will remain unchanged until you change them as explained in step 3.
- 8. Clearing everything: You can use CLR to clear all the constants as well as the equation and start fresh.



Exiting functions mode:

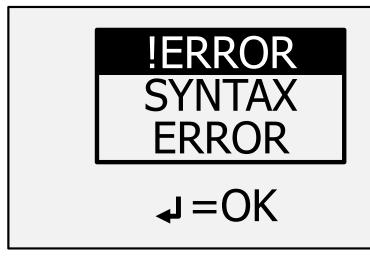
You can exit function mode by simply pressing f(x).

Some guidelines while in functions mode:

- You can also change the equation and keep the same variables.

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Errors



Sometimes you'll enter things incorrectly, such as not closing a bracket or dividing by zero. In this case, you'll get a **SYNTAX ERROR** message like the image at left.

You might see other types of error messages such as "INVALID ARGUMENT" or "INFINITE RESULT".

To remove this message simply press . This returns you to the entry line. Use the keys to correct the error.



Troubleshooting

Battery does not recharge:

The SciPlus battery may fully discharge after a month or more of inactivity. Simply plug in the calculator as if to recharge, for about half an hour. Next, perform a reset by inserting a paper clip into the small hole on the underside of the calculator, and gently push until you hear/feel a small click. Then keep the calculator plugged in at least overnight to fully recharge.

If a reset does not resolve the problem, determine whether it is an issue with the USB charger or cord by attempting to recharge with another USB charger and /or cord.

SciPlus calculator is acting erratically:

Perform a reset by inserting a paper clip into the small hole on the underside of the calculator, and gently push until you hear/feel a small click.

The SciPlus has no sound:

The SciPlus-3300 is designed to be used with earbuds or speakers. There is no external speaker. Refer to "Speech Output" to ensure the sound is turned on and set to the proper volume. If there is still no sound, check to ensure you are using working earbuds, and that any volume dial on the earbuds is turned up.

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Service

If for any reason you require service or support for your SciPlus-3300, please contact the authorized dealer from whom it was purchased.

If you purchased directly from Sight Enhancement Systems, contact **service@sightenhancement.com** and include the following information:

- The serial number of the SciPlus-3300 (see the label on the underside of the calculator).
- A description of the problem.

The robustness of Sight Enhancement Systems SciPlus calculator is legendary, and you should enjoy years of reliable operation

Warranty

The SciPlus-3300 is covered by a one year limited warranty from the date of purchase. Warranty includes parts, labour and shipping costs. Goods may be returned only upon authorization by Sight Enhancement Systems. Warranty covers "normal wear and tear", and does not cover damage resulting from obvious misuse of the product. Examples of misuse include, but are not limited to, damage due to exposure to moisture or extreme heat, damage due to dropping the device, and physical damage to connectors and plugs.



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