Appendix

1 Error Message Table
2 Input Ranges
3 Specifications
4 Index
5 Key Index
6 P Button (In case of hang up)
7 Power Supply

1 Error Message Table

Message	Meaning	Countermeasure
Syntax ERROR	• Illegal syntax • Attempt to input an illegal command	• Press [ESC] to display the error and make necessary corrections.
Ma ERROR	• Calculation result exceeds the display range. • Calculation is outside the input range of a function. • Mathematical error (division by zero, etc.) • Sufficient precision could not be obtained for Σ calculation, differential calculation, etc. • Solution could not be obtained for equation calculation, etc.	• Check input values and make corrections to ensure that values are within allowable limits.
Go ERROR	① No corresponding Lbl n for Goto n. ② No program stored in program area Prog "file name".	① Correctly input a Lbl n to correspond to the Goto n , or delete the Goto n if not required. ② Store a program in program area Prog "file name", or delete the Prog "file name" if not required.
Nesting ERROR	• Nesting of subroutines by Prog "file name" exceeds 10 levels.	• Ensure that Prog "file name" is not used to return from subroutines to main routine. If used, delete any unnecessary Prog "file name". • Trace the subroutine jump destinations and ensure that no jumps are made back to the original program area. Ensure that returns are made correctly.
Stack ERROR	• Execution of calculations that exceed the capacity of the stack for numeric values or stack for commands.	• Simplify the formulas to keep stacks within 10 levels for the numeric values and 26 levels for the commands. • Divide the formula into two or more parts.

Message	Meaning	Countermeasure
Memory ERROR	• Operation or memory storage operation exceeds remaining memory capacity.	• Keep the number of variables you use for the operation within the number of variables currently available. • Simplify the data you are trying to store to keep it within the available memory capacity. • Delete no longer needed data to make room for the new data.
Argument ERROR	• Incorrect argument specification for a command that requires an argument.	• Correct the argument.
Dimension ERROR	• Illegal dimension or list used during matrix calculations.	• Check the matrix or list dimension.
Range ERROR	① Input of an improper V-Window value. ② V-Window range settings exceeded when a graph is redrawn. ③ Input of an improper value on the range screen and use of that value for execution.	① Change the V-Window value so it is within range. ② Redraw using the proper settings. ③ Input a proper range value.
Condition ERROR	• Execution of a calculation or function before all conditions required for execution are met.	• Check the conditions and make any necessary corrections.
Non-Real ERROR	① Calculation that produces a complex number when Real is specified for the Complex Mode setting on the SET UP screen, even though the argument is a real number. ② Calculation that produces a complex number when Real is specified for the Answer Type setting on the SET UP screen, even though the argument is a real number.	① Change the Complex Mode setting to something other than Real. ② Change the Answer Type setting to something other than Real.

Message	Meaning	Countermeasure
Complex Number In List	• Use of a list that contains complex numbers in a real number calculation.	• Change all data in the list to real numbers.
Complex Number In Matrix	• Use of a matrix that contains complex numbers in a real number calculation.	• Change all data in the matrix to real numbers.
Can't Solve! Adjust Initial Value Or Bounds. Then Try Again	• Solve could not obtain a solution within the specified range.	• Change the specified range. • Correct the input expression.
No Variable	• No variable specified within a graph function being used for Dynamic Graph. • No variable within a Solve equation.	• Specify a variable for the graph function.
Iteration ERROR	① No convergence of Solve solutions. ② No integration or differential calculation solution that satisfies operation ending condition (*tol* value).	① Change the initial estimated value to one that is nearer to the solution. ② Increase the *tol* value to reduce precision.
Com ERROR	• Problem with cable connection or parameter setting during program data communications.	• Check the cable connection.
Transmit ERROR	• Problem with cable connection or parameter setting during data communications.	• Check the cable connection.
Receive ERROR	• Problem with cable connection or parameter setting during data communications.	• Check the cable connection.
Memory Full	• Memory of receiving unit became full during program data communications.	• Delete some data stored in the receiving unit and try again.

Message	Meaning	Countermeasure
Download ERROR	• Data communication cable disconnect during add-in installation, or incorrect data transfer conditions.	• Press [EXE] and try again. • Press [ESC] and try again.
Model Mismatch	• Attempt to perform back up between two different models.	• Use two identical models.
Overflow ERROR	• Overflow of the calculation range in the Algebre Mode.	• Correct the input expression.
Domain ERROR	• Overflow of the input element range in the Algebre Mode.	• Correct the input expression.

2 Input Ranges

Function	Input range for real number solutions	Internal digits	Precision	Notes
$\sin x$ $\cos x$ $\tan x$	(DEG) $\|x\| < 9 \times (10^9)°$ (RAD) $\|x\| < 5 \times 10^7 \pi$rad (GRA) $\|x\| < 1 \times 10^{10}$grad	15 digits	As a rule, precision is ±1 at the 10th digit.	However, for $\tan x$: $\|x\| \neq 90(2n+1)$:DEG $\|x\| \neq \pi/2(2n+1)$:RAD $\|x\| \neq 100(2n+1)$:GRA * Complex numbers can be used as arguments.
$\sin^{-1}x$ $\cos^{-1}x$	$\|x\| \leqq 1$	"	"	
$\tan^{-1}x$	$\|x\| < 1 \times 10^{100}$			* Complex numbers can be used as arguments.
$\sinh x$ $\cosh x$	$\|x\| \leqq 230.2585092$	"	"	For sinh and tanh, when $x = 0$, errors are cumulative and precision is affected at a certain point.
$\tanh x$	$\|x\| < 1 \times 10^{100}$			* Complex numbers can be used as arguments.
$\sinh^{-1}x$	$\|x\| < 5 \times 10^{99}$	"	"	
$\cosh^{-1}x$	$1 \leqq x < 5 \times 10^{99}$			
$\tanh^{-1}x$	$\|x\| < 1$			* Complex numbers can be used as arguments.
$\log x$ $\ln x$	$1 \times 10^{-99} \leqq x < 1 \times 10^{100}$	"	"	* Complex numbers can be used as arguments.
10^x	$-1 \times 10^{100} < x < 100$	"	"	
e^x	$-1 \times 10^{100} < x \leqq 230.2585092$			* Complex numbers can be used as arguments.
$\sqrt{x}$	$0 \leqq x < 1 \times 10^{100}$	"	"	
x^2	$\|x\| < 1 \times 10^{50}$			* Complex numbers can be used as arguments.
$1/x$	$\|x\| < 1 \times 10^{100}, x \neq 0$	"	"	
$\sqrt[3]{x}$	$\|x\| < 1 \times 10^{100}$			* Complex numbers can be used as arguments.
$x!$	$0 \leqq x \leqq 69$ (x is an integer)	"	"	
nPr nCr	Result $< 1 \times 10^{100}$ n, r (n and r are integers) $0 \leqq r \leqq n$, $n < 1 \times 10^{10}$	"	"	

Function	Input range for real number solutions	Internal digits	Precision	Notes
Pol (x, y)	$\sqrt{x^2 + y^2} < 1 \times 10^{100}$	15 digits	As a rule, precision is ±1 at the 10th digit.	
Rec (r, θ)	$\lvert r \rvert < 1 \times 10^{100}$ (DEG) $\lvert \theta \rvert < 9 \times (10^9)°$ (RAD) $\lvert \theta \rvert < 5 \times 10^7 \pi$ rad (GRA) $\lvert \theta \rvert < 1 \times 10^{10}$grad	"	"	However, for $\tan\theta$: $\lvert \theta \rvert \neq 90(2n+1)$:DEG $\lvert \theta \rvert \neq \pi/2(2n+1)$:RAD $\lvert \theta \rvert \neq 100(2n+1)$:GRA
°, ,,	$\lvert a \rvert, b, c < 1 \times 10^{100}$ $0 \leqq b, c$	"	"	
$\overleftarrow{\text{°, ,,}}$	$\lvert x \rvert < 1 \times 10^{100}$ Sexagesimal display: $\lvert x \rvert < 1 \times 10^7$			
$\wedge(x^y)$	$x > 0$: $-1 \times 10^{100} < y \log x < 100$ $x = 0 : y > 0$ $x < 0$: $y = n, \frac{1}{2n+1}$ (n is an integer or a fraction) However; $-1 \times 10^{100} < \frac{1}{y} \log \lvert x \rvert < 100$	"	"	* Complex numbers can be used as arguments.
$\sqrt[x]{y}$	$y > 0 : x \neq 0$ $-1 \times 10^{100} < \frac{1}{x} \log y < 100$ $y = 0 : x > 0$ $y < 0 : x = 2n + 1, \frac{1}{n}$ ($n \neq 0$, n is an integer or a fraction) However; $-1 \times 10^{100} < \frac{1}{x} \log \lvert y \rvert < 100$	"	"	* Complex numbers can be used as arguments.
$a^b/_c$	Total of integer, numerator and denominator must be within 10 digits (includes division marks).	"	"	

* Errors may be cumulative and precision may be affected by ^ (x^y), $\sqrt[x]{y}$, $x!$, $\sqrt[3]{x}$ and other functions that require internal continuous calculations, and by calculations involving complex numbers.

Function	Input range
Binary, octal, decimal, hexadecimal calculation	Values fall within following ranges after conversion: DEC: $-2147483648 \leqq x \leqq 2147483647$ BIN: $1000000000000000 \leqq x$ $\leqq 1111111111111111$ (negative) $0 \leqq x \leqq 0111111111111111$ (0, positive) OCT: $20000000000 \leqq x \leqq 37777777777$ (negative) $0 \leqq x \leqq 17777777777$ (0, positive) HEX: $80000000 \leqq x \leqq$ FFFFFFFF (negative) $0 \leqq x \leqq$ 7FFFFFFF (0, positive)

3 Specifications

Variables: 28

Calculation range:

$\pm 1 \times 10^{-99}$ to $\pm 9.999999999 \times 10^{99}$ and 0. Internal operations use 15-digit mantissa.

Exponential display range: Norm 1: $10^{-2} > |x|, |x| \geqq 10^{10}$

Norm 2: $10^{-9} > |x|, |x| \geqq 10^{10}$

Program capacity: 144 kbytes (max.)

Power supply:

Main: Four AAA-size batteries (LR03 (AM4) or R03 (UM-4))

Back-up: One CR2032 lithium battery

Power consumption: 0.2 W

Approximate battery life

Main:

LR03 (AM4): 230 hours (continuous display of main menu)
150 hours continuous operation (5 minutes calculation, 55 minutes display)

R03 (UM-4): 140 hours (continuous display of main menu)
90 hours continuous operation (5 minutes calculation, 55 minutes display)

Back-up: 2 years

Auto power off:

Power is automatically turned off approximately six minutes or 60 minutes after last operation.

Ambient temperature range: 0 °C to 40 °C

Dimensions: 19.5 mm (H) × 82 mm (W) × 178 mm (D)
$^{3}/_{4}$" (H) × 3 $^{1}/_{4}$" (W) × 6 $^{7}/_{8}$" (D)

Weight: Approx. 213 g (including batteries)

Data Communications

Method: Start-stop (asynchronous), half-duplex

Transmission speed (BPS): 38400 bits/second (normal)
9600 bits/second (H-Copy & Send/Receive)

Parity: None

Bit length: 8 bits

Stop bit:

Send: 3 bits

Receive: 2 bits

Includes parity (None) 1-bit

X ON/X OFF Control: None

4 Index

Symbols

A

B

C

D

E

F

G

H

I

K

L

M

N

O

P

Q

R

S

T

V

W

X

Z

CAS, ALGEBRA, TUTOR Command Index

PRGM Command Index

5 Key Index

Key	Primary Function	Combined with CTRL	Combined with ALPHA
COPY F1	Selects 1st function menu item.	Performs copy operation.	
PASTE F2	Selects 2nd function menu item.	Performs paste operation.	
SET UP F3	Selects 3rd function menu item.	Shows the set up display.	
CAT/CAL F4	Selects 4th function menu item.	Shows the Catalog or opens the Calc Window.	
G ↔ T F5	Selects 5th function menu item.	Switches display between graph and text screens.	
H-COPY F6	Selects 6th function menu item.	Sends a shot of the current screen to a connected device.	
0	Enters number 0.	Toggles function menu display on and off.	

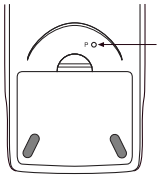
Key	Primary Function	Combined with SHIFT	Combined with ALPHA
SHIFT	Activates shift functions of other keys and function menus.		
CTRL	Activates functions marked above function keys.		
V-Window OPTN	Displays option menu.	Displays View Window parameter input screen.	
MENU	Returns to the Main Menu.		
A-LOCK ALPHA	Allows entry of alphanumeric characters shown in red.	Locks/Unlocks entry of alphanumeric characters.	
PRGM r VARS	Displays the variable data menu.	Displays program command menu.	Enters character r.
$\sqrt[x]{\ }$ θ ^	Press between two values to make second value exponent of first.	Press between entering values for X & Y to show xth root of y.	Enters character θ.
QUIT ESC	Back steps to the previous screen without making any changes.	Returns directly to initial screen of the mode.	

Key	Primary Function	Combined with SHIFT	Combined with ALPHA
▲	Moves cursor upward. Scrolls screen. Switches to previous function in trace mode.		
▼	Moves cursor downward. Scrolls screen. Switches to next function in trace mode.		
◀	Moves cursor to left. Scrolls screen. Press after EXE to display calculation from end.		
▶	Moves cursor to right. Scrolls screen. Press after EXE to display calculation from beginning.		
A X,θ,T	Allows input of variable X, θ, and T.		Enters letter A.
10^x B log	Press before entering value to calculate common logalithm.	Press before entering exponent value of 10.	Enters letter B.
e^x C ln	Press before entering value to calculate natural logarithm.	Press before entering exponent value of e.	Enters letter C.
$\sin^{-1}$ D sin	Press before entering value to calculate sine.	Press before entering value to calculate inverse sine.	Enters letter D.
$\cos^{-1}$ E cos	Press before entering value to calculate cosine.	Press before entering value to calculate inverse cosine.	Enters letter E.
$\tan^{-1}$ F tan	Press before entering value to calculate tangent.	Press before entering value to calculate inverse tangent.	Enters letter F.
d/c G ab/c	Press between entering fraction values. Converts fraction to decimal.	Displays improper fractions.	Enters letter G.
$\sqrt{\ }$ H x^2	Press after entering value to calculate square.	Press before entering value to calculate square root.	Enters letter H.
$\sqrt[3]{\ }$ I (	Enters open parenthesis in formula.	Press before entering value to calculate cube root.	Enters letter I.
x^{-1} J)	Enters close parenthesis in formula.	Press after entering value to calculate reciprocal.	Enters letter J.
K ,	Enters comma.		Enters letter K.
L →	Assigns value to a value memory name.		Enters letter L.
M 7	Enters number 7.		Enters letter M.
N 8	Enters number 8.		Enters letter N.

Key	Primary Function	Combined with SHIFT	Combined with ALPHA
O 9	Enters number 9.		Enters letter O.
INS DEL	Deletes character at current cursor location.	Allows insertion of characters at cursor location.	
OFF AC/ON	Turns power on. Clears the display.	Turns power off.	
P 4	Enters number 4.		Enters letter P.
Q 5	Enters number 5.		Enters letter Q.
R 6	Enters number 6.		Enters letter R.
{ S ×	Multiplication function.	Enters open curly bracket.	Enters letter S.
} T ÷	Division function.	Enters close curly bracket.	Enters letter T.
List U 1	Enters number 1.	Inputs List command.	Enters letter U.
Mat V 2	Enters number 2.	Inputs Mat command.	Enters letter V.
W 3	Enters number 3.		Enters letter W.
[X +	Addition function. Specifies positive value.	Enters open bracket.	Enters letter X.
] Y −	Subtraction function. Specifies negative value.	Enters close bracket.	Enters letter Y.
i Z 0	Enters number 0.	Inputs imaginary number unit.	Enters letter Z.
= SPACE •	Enters decimal point.	Enters character =.	Enters a blank space.
π " EXP	Enables entry of exponent.	Inputs value of pi. Enters pi symbol.	Enters double quotation mark.
Ans (−)	Enter before value to specify as negative.	Recalls most recent calculation result.	
↵ EXE	Displays result of calculation.	Inputs a new line.	

6 P Button (In case of hang up)

Pressing the P button resets the calculator to its initial defaults.



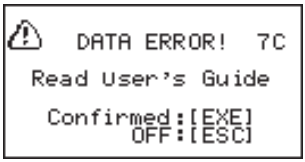
Warning!

Never perform this operation unless you want to totally clear the memory of the calculator. If you need the data currently stored in memory, be sure to write it down somewhere before performing the P button operation.

- Pressing the P button while a calculation operation is being performed (while the calculator is performing a calculation internally) deletes all data in memory.
- You can also reset the calculator using front panel key operations (see 9-4 Reset). Use the P button to reset only while the front panel keys are disabled for some reason.

• DATA ERROR Message

A data error indicates that data in calculator memory is seriously corrupted. This can be due to exposure of the calculator to strong electrostatic charge, temperature extremes, high humidity, etc. A data error is indicated by appearance of the screen shown below.



Press the [EXE] key to reset the calculator.

- The data error screen appears when you press the P button to reset the calculator or when you turn on calculator power.

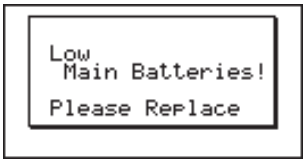
Warning!

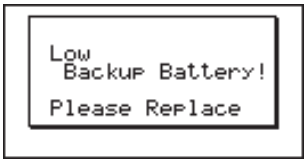
Pressing [EXE] deletes all data in calculator memory.
If a data error occurs when you press [EXE], it could mean that your calculator is malfunctioning. If the data error screen keeps appearing, press [ESC] to turn off power. Next, take the calculator to the retailer where you purchased it or to your local CASIO service provider.

7 Power Supply

This calculator is powered by four AAA-size (LR03 (AM4) or R03 (UM-4)) batteries. In addition, it uses a single CR2032 lithium battery as a back up power supply for the memory.

If either of the following messages appears on the display, immediately turn off the calculator and replace main batteries or the back up battery as instructed.





If you try to continue using the calculator, it will automatically turn off in order to protect memory contents. You will not be able to turn power back on until you replace batteries.

Be sure to replace the main batteries at least once every two years, no matter how much you use the calculator during that time.

The batteries that come with this calculator discharge slightly during shipment and storage. Because of this, they may require replacement sooner than the normal expected battery life.

Warning!

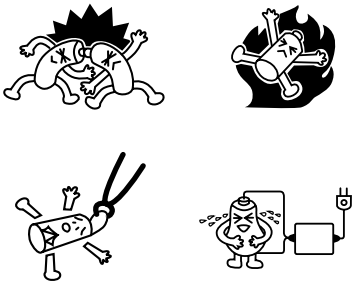
All memory contents will be deleted if you remove both the main power supply and the memory back up batteries at the same time. If you ever remove both batteries, correctly reload them and then perform the reset operation.

■ Replacing Batteries

Precautions:

Incorrectly using batteries can cause them to burst or leak, possibly damaging the interior of the calculator. Note the following precautions:

- Be sure that the positive (+) and negative (–) poles of each battery are facing in the proper directions.
- Never mix batteries of different types.
- Never mix old batteries and new ones.
- Never leave dead batteries in the battery compartment.
- Remove the batteries if you do not plan to use the calculator for long periods.
- Never try to recharge the batteries supplied with the calculator.
- Do not expose batteries to direct heat, let them become shorted, or try to take them apart.



(Should a battery leak, clean out the battery compartment of the calculator immediately, taking care to avoid letting the battery fluid come into direct contact with your skin.)

Keep batteries out of the reach of small children. If swallowed, consult with a physician immediately.

● To replace the main power supply batteries

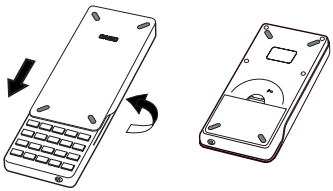
* Before replacing the main power supply batteries, turn on the calculator and check to see if the “Low Backup Battery!” message appears on the display. If it does, replace the memory back up battery before replacing the main power supply batteries.
* Never remove the main power supply and the memory back up batteries from the calculator at the same time.
* Never turn on the calculator while the main power supply batteries are removed or not loaded correctly. Doing so can cause memory data to be deleted and malfunction of the calculator. If mishandling of batteries causes such problems, correctly load batteries and then perform the RESET operation to resume normal operation.
* Be sure to replace all four batteries with new ones.

1. Press SHIFT AC/ON (OFF) to turn off the calculator.

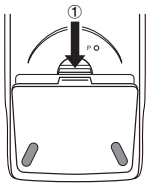
Warning!

*Be sure to turn the calculator off before replacing batteries. Replacing batteries with power on will cause data in memory to be deleted.

2. Making sure that you do not accidently press the AC/ON key, slide the case onto the calculator and then turn it over.

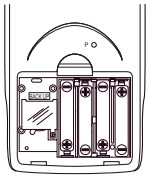


3. Remove the back cover from the calculator by pulling with your finger at the point marked ①.



4. Remove the four old batteries.

5. Load a new set of four batteries, making sure that their positive (+) and negative (–) ends are facing in the proper directions.



6. Replace the back cover.

7. Turn the calculator front side up and slide off its case. Next, press AC/ON to turn on power.

Power supplied by memory back up battery while the main power supply batteries are removed for replacement retains memory contents.

Do not leave the calculator without main power supply batteries loaded for long periods. Doing so can cause deletion of data stored in memory.

If the figures on the display appear too light and hard to see after you turn on power, adjust the tint.

• To replace the memory back up battery

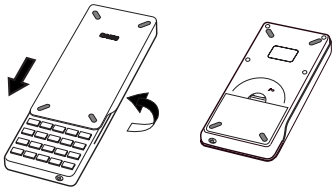
* Before replacing the memory back up battery, check to make sure the main batteries are not dead.
* Never remove the main power supply and the memory back up batteries from the calculator at the same time.
* Be sure to replace the back up power supply battery at least once 2 years, regardless of how much you use the calculator during that time. Failure to do so can cause data in memory to be deleted.

1. Press [SHIFT] [AC/ON] (OFF) to turn off the calculator.

Warning!

* Be sure to turn the calculator off before replacing battery. Replacing battery with power on will cause data in memory to be deleted.

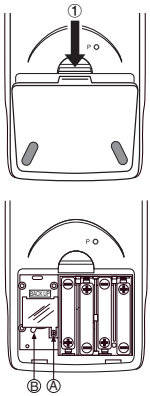
2. Making sure that you do not accidently press the [AC/ON] key, slide the case onto the calculator and then turn it over.



3. Remove the back cover from the calculator by pulling with your finger at the point marked ①.

4. Remove screw Ⓐ on the back of the calculator, and remove the back up battery compartment cover.

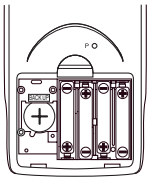
5. Insert a thin, pointed non-metal object (such as a toothpick) into the hole maked Ⓑ and remove the old battery.



6. Wipe off the surfaces of a new battery with a soft, dry cloth. Load it into the calculator so that its positive (+) side is facing up.

7. Install the memory protection battery cover onto the calculator and secure it in place with the screw. Next, replace the back cover.

8. Turn the calculator front side up and slide off its case. Next, press [AC/ON] to turn on power.



■ About the Auto Power Off Function

Calculator power turns off automatically if you do not perform any operation within the Auto Power Off trigger time you specify. You can specify either six minutes or 60 minutes as the trigger time (see “APO Settings” on page 9-3-1). To restore power, press [AC/ON].

MEMO

MEMO

MEMO

CASIO

CASIO COMPUTER CO., LTD.

6-2, Hon-machi 1-chome
Shibuya-ku, Tokyo 151-8543, Japan

U.S. Pats. 4,938,263 / 4,410,956

SA9906-A Printed in Malaysia
A313984-11