TEXAS INSTRUMENTS

QUICK REFERENCE GUIDE

57 LCD
PROGRAMMABLE
CALCULATOR

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TI-57 LCD Quick Reference Guide

Always refer to the *TI-57 LCD Sourcebook* for complete details and examples of calculator operation.

TI-57 LCD Functions

Standard Functions

Calculator Control—On/Clear, Off, and APD™ Automatic Power Down.

Data Entry—Change Sign, X exchange t, Pi, and AOS™ Algebraic Operating System (up to 15 parentheses and 4 pending operations).

Display Control—Fix/Floating Decimal and Scientific Notation.

Mathematical Functions—+, −, x, ÷, x^2, $\sqrt{x}$, 1/x, y^x, $\sqrt[x]{y}$, x!, Absolute Value, Integer, and Fraction.

Trigonometric Functions—Sine, Cosine, Tangent, and Inverses in Degrees, Radians, or Grads.

Logarithmic Functions—Common Log, Natural Log, and Inverses (e^x and 10^x).

Conversions—Polar to Rectangular, Degrees/Minutes/Seconds to Decimal Degrees, Degrees to Radians, Radians to Grads, Grads to Degrees, and all above conversions in reverse order.

Memory Functions—Store, Recall, Exchange, Clear memories, utility memory, clear utility, and Direct Memory Operations with +, −, x, ÷, and y^x, $\sqrt[x]{y}$.

Programming— 2nd Part, LRN, R/S, RST, 2nd Pause, 2nd CP, BST, SST, 2nd Del, LBL, GTO, 2nd SBR, INV 2nd SBR, 2nd Dsz, INV 2nd Dsz, 2nd x≥t, INV 2nd x≥t, 2nd x=t, and INV 2nd x=t

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AOS™ ALGEBRAIC OPERATING SYSTEM

AOS™ algebraic operating system allows entering numbers and combined operations in the same order in which they are written mathematically. Operations are performed in the following descending order of priority:

1. The following are performed immediately: trigonometric, square, square root, factorial, reciprocal, DRG and DMS-DD conversions, and logarithmic keys
2. The universal powers and roots keys
3. Multiplication and division keys
4. Addition and subtraction keys
5. The equals key = completes all pending operations

The calculator allows up to four pending operations and 15 open parentheses.

CLEARING

The following are the effects of the clearing keys.

ON/C following a digit—clears the display.

ON/C following an operation—clears the display and pending operations.

ON/C ON/C—clears the display and pending operations.

2nd CM—clears the user data memories.

2nd CP (learn mode only)—clears the program memory.

2nd C.t—clears the t register.

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DISPLAY FORMATS

The internal display register holds calculated results to 11 digits. The value displayed is rounded to eight digits.

[EE]—Scientific notation allows numbers as small as $\pm 1 \times 10^{-99}$ and as large as $\pm 9.9999999 \times 10^{99}$. Numbers smaller than $\pm 1 \times 10^{-7}$ and larger than $\pm 9.9999999 \times 10^{7}$ must be entered into the calculator in scientific notation. If calculations exceed these limits, the results are automatically displayed in scientific notation. Leave scientific notation with the [INV][EE] or [ON/C] keys.

[2nd][Fix] N—Pressing the fix decimal key directs the calculator to round the display to N decimal places. The internal display register still retains the full 11 digit accuracy for use in subsequent calculations. Reset to floating decimal mode with the [INV][2nd][Fix], [2nd][Fix] 8, or [2nd][Fix] 9 keys.

MEMORY OPERATIONS

The calculator may have a maximum of seven user data memories, numbered 0 through 6. User data memories 0 through 6 are available when partitioning is for seven memories.

[2nd][Part] N	program steps	. memories
1	48.1	
2	40.2	
3	32.3	
4	24.4	
5	16.5	
6	8.6	
7	0.7	
0, 8, or 9	Not allowed, *Error*	

The following keys and operations allow manipulation of the numbers in the user data memories.

2nd CM—clears all the user data memories.

STO N—stores the value shown in the display in user data memory N.

RCL N—recalls to the display the number in user data memory N.

EXC N—exchanges the value in the display with the value in user data memory N.

Operations on a number stored in a user data memory with the result stored back in the same memory may be performed by following a calculation with **STO**, the operation to be performed, and the number of the user data memory in which to store the result. The displayed number and calculations in progress are not affected. The following keys may be used in conjunction with **STO**:
+, **−**, **X**, **÷**, **yˣ**, and **INV yˣ**.

POWERS AND ROOTS

yˣ—The universal power key raises any positive number to any power. To use this function:

1. Enter the number to be raised to a power ("Y")
2. Press **yˣ**
3. Enter the power ("X")
4. Press **=**

INV yˣ—The universal root key takes any root of any positive number. To use this function:

1. Enter the number to take the root of ("Y")
2. Press **INV yˣ**
3. Enter the root to be taken ("X")
4. Press **=**

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MATHEMATICAL FUNCTIONS

The following keys perform the indicated operations on the number in the display:

[2nd] [|x|] —Absolute value

[x²] —Square

[2nd] [Intg] —Integer portion

[¹/x] —Reciprocal

[2nd] [Frac] —Fractional portion

[√x] —Square root

[2nd] [x!] —Factorial

TRIGONOMETRIC OPERATIONS

[DRG] —Pressing the angular mode key changes from degree mode to radian mode to grad mode and back to degree mode. You may also go through the modes in reverse order by pressing the [INV] [DRG] key.

[sin], [cos], [tan], [INV] [sin], [INV] [cos], [INV] [tan] —The trigonometric keys calculate the sine, cosine, tangent, arcsine, arccosine, and arctangent of the number in the display.

CONVERSION KEYS

These keys are used to convert from one system to another. To convert in the opposite direction, preceed the key with [INV].

[2nd] [DRG▸], [INV] [2nd] [DRG▸] —The angular mode conversion key changes the mode displayed and converts the number in the display to the new units. You may also go through the modes and values in reverse order by pressing [INV] [2nd] [DRG▸].

[2nd] [DMS-DD], [INV] [2nd] [DMS-DD] —Degrees/minutes/seconds, expressed as DD.MMSSss, are converted to decimal degrees, expressed as DD.dddddd, with the [2nd] [DMS-DD] key. Conversion from decimal degrees to degrees/minutes/seconds is with [INV] [2nd] [DMS-DD].

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$\boxed{\text{2nd}}$ $\boxed{\text{P:R}}$, $\boxed{\text{INV}}$ $\boxed{\text{2nd}}$ $\boxed{\text{P:R}}$ —Polar/rectangular conversions are entered as follows:

Polar to Rectangular	Rectangular to Polar
Enter the r value	Enter the x-coordinate
Press $\boxed{\text{x:t}}$	Press $\boxed{\text{x:t}}$
Enter the θ value	Enter the y-coordinate
Select the proper mode with $\boxed{\text{DRG}}$	Select the proper mode with $\boxed{\text{DRG}}$
Press $\boxed{\text{2nd}}$ $\boxed{\text{P:R}}$	Press $\boxed{\text{INV}}$ $\boxed{\text{2nd}}$ $\boxed{\text{P:R}}$
The y-coordinate is displayed.	The θ value is displayed.
Press $\boxed{\text{x:t}}$	Press $\boxed{\text{x:t}}$
The x-coordinate is displayed.	The r value is displayed.

PROGRAMMING KEYS

$\boxed{\text{2nd}}$ $\boxed{\text{Part}}$ N—Before programming, space must be made available in the calculator's memory. The partition key sets the partition to N user data memories. The remaining space is used for program steps, with eight program steps available for each memory that is not used. See the Memory Operations Section of this guide for available partitioning.

$\boxed{\text{LRN}}$—Pressing the learn key once puts the calculator in the learn mode if *any* programming steps are available. If not, *Error* is displayed. Pressing $\boxed{\text{LRN}}$ again returns the calculator to the manual operation mode and restores the display to its original state.

$\boxed{\text{R/S}}$—The run/stop key reverses the status of processing. Pressing $\boxed{\text{R/S}}$ starts program processing at the current position of the program pointer. Pressing $\boxed{\text{R/S}}$ while a program is running stops the program.

[RST]—The reset key resets the program pointer to *St*, and, when used as a program step, also continues program execution. [RST] can be used from the keyboard or as a program instruction. [RST] also clears the subroutine return register.

[2nd] [Pause]—The pause key, when encountered during program execution, causes the current value of the display register to be displayed for one to two seconds.

[2nd] [CP]—Pressing the clear program key while in the learn mode removes the program from program memory so that the calculator is ready for a new program.

[BST], [SST]—The backstep key moves back one step. The singlestep key moves forward one program step. [SST] can also be used to execute a program, one step at a time, with the result of each step displayed.

[2nd] [Del]—The delete key allows changing a program by deleting old keystrokes. When [2nd] [Del] is pressed, the step is deleted and a backstep automatically occurs. There is no insert key because of the automatic insert feature.

[LBL]—The label key allows you to label up to 10 points in a program, labels 0 through 9.

[GTO] N—The go to instruction allows the execution to transfer to label N from any point in a program. Pressing [GTO] N from the keyboard directs the program pointer to label N.

[2nd] [SBR] N, [INV] [2nd] [SBR]—Begin a subroutine with [LBL] N and end it with [INV] [2nd] [SBR]. Each time the subroutine is needed in a program, use the [2nd] [SBR] N instruction.

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2nd **Dsz** —Decrement and Skip on Zero key Sequence. Uses memory zero. Each time **2nd** **Dsz** is encountered in a program, the content of memory zero is decreased by one (increased by one if the content is negative). The content of memory 0 is then compared to 0. If the content is non-zero, execution proceeds to the step following **2nd** **Dsz**. If the content is zero, execution skips the first step following **2nd** **Dsz**. If memory zero contains a noninteger, decrementing is by ones until the last decrement when the fractional portion is subtracted.

INV **2nd** **Dsz** —Decrement and Skip if not Zero key Sequence. Uses memory zero. Each time **INV** **2nd** **Dsz** is encountered in a program, the content of memory zero is decreased by one (increased by one if the content is negative). The content of memory 0 is then compared to 0. If the content is non-zero, execution skips the step following **INV** **2nd** **Dsz**. If the content is zero, execution proceeds to the step following **INV** **2nd** **Dsz**. If memory zero contains a noninteger, decrementing is by ones until the last decrement when the fractional portion is subtracted.

Comparison to the t Register Key Sequences

The content of the display and the content of t are compared (excluding guard digits). If the comparison is true, execution proceeds to the next step. If the comparison is false, execution skips the step following the comparison.

2nd **x≥t** —Is X greater than or equal to t

INV **2nd** **x≥t** —Is X less than t

2nd **x=t** —Is X equal to t

INV **2nd** **x=t** —Is X not equal to t

KEY CODES
TI-57 LCD Keyboard Showing Key Code and Function Name

** : [2nd]	— : [INV]	13: [R/S]	* : [OFF]	15: [ON/c]
26: [x=t]	27: [x≥t]	28: [SBR]	29: [Dsz]	* : [Del]
21: [RST]	22: [GTO]	23: [LBL]	* : [BST]	* : [SST]
31: [log]	32: [lnx]	33: [1/x]	34: [x²]	35: [√x]
46: [DRG↑]	47: [P≥R]	48: [DMS·DD]	49: [π]	40: [x!]
41: [DRG]	42: [sin]	43: [cos]	44: [tan]	45: [yˣ]
56: [C.t]	57: [Fix]	58: [Intg]	59: [Frac]	50: [|x|]
51: [x≥t]	52: [EE]	53: [(]	54: [)]	55: [÷]
* : [Part]				
61: [STO]	07: [7]	08: [8]	09: [9]	65: [×]
76: [CM]				
71: [RCL]	04: [4]	05: [5]	06: [6]	75: [−]
* : [CP]				
81: [EXC]	01: [1]	02: [2]	03: [3]	85: [+]
96: [Pause]				
* : [LRN]	00: [0]	93: [.]	94: [+/−]	95: [=]

*: No key code. These keys cannot be put in programs.
**: [2nd] is merged with the next key stroke.

Key Codes in Numeric Order

– : INV	29: 2nd Dsz	53: (
00: 0	31: log	54:)
01: 1	32: lnx	55: ÷
02: 2	33: 1/x	56: 2nd C.t
03: 3	34: x²	57: 2nd Fix
04: 4	35: √x̄	58: 2nd Intg
05: 5	40: 2nd x!	59: 2nd Frac
06: 6	41: DRG	61: STO
07: 7	42: sin	65: ×
08: 8	43: cos	71: RCL
09: 9	44: tan	75: –
13: R/S	45: yˣ	76: 2nd CM
15: ON/C	46: 2nd DRG►	81: EXC
21: RST	47: 2nd P↔R	85: +
22: GTO	48: 2nd DMS-DD	93: .
23: LBL	49: 2nd π	94: +/–
26: 2nd x=t	50: 2nd |x|	95: =
27: 2nd x≥t	51: 2nd x↔t	96: 2nd Pause
28: 2nd SBR	52: EE	

Merged Key Codes

Code	Function
– 26	X ≠ t
– 27	X < t
– 28	Subroutine return
– 29	Decrement and skip if not zero
– 31	Base 10 antilog
– 32	Base e antilog
– 41	Inverse DRG select
– 42	Inverse sin
– 43	Inverse cosine
– 44	Inverse tangent
– 45	$\sqrt[X]{Y}$

|	
− 46	Inverse DRG conversion
− 47	Rectangular to polar
− 48	Decimal degrees to Degrees/minutes/seconds
− 52	Cancel scientific notation
− 57	Floating decimal notation
57.0N	Fix N decimal places
22.0N	Go to label N
23.0N	Label N
28.0N	Call subroutine N
61.0N	Store in memory N
71.0N	Recall from memory N
81.0N	Exchange the display with memory N
61.45.0N	Store (memory N content)^X in memory N
− 61.45.0N	Store $\sqrt[X]{\text{(memory N content)}}$ in memory N
61.55.0N	Store − in memory N
61.65.0N	Store × in memory N
61.75.0N	Store − in memory N
61.85.0N	Store + in memory N

BATTERY REPLACEMENT

NOTE: The calculator cannot hold data in its user data memories or program memory when the batteries are removed or become discharged.

The calculator uses 2 of any of the following batteries for up to 750 hours of operation: Panasonic LR-44, Ray-O-Vac RW-82, Union Carbide (Eveready) A-76, or the equivalent. For up to 2000 hours of operation use Mallory 10L14, Union Carbide (Eveready) 357, Panasonic WL-14, Toshiba G-13, Ray-O-Vac RW-42, or the equivalent.

1. Turn the calculator off. Place a small screwdriver, paper clip, or other similar instrument into the slot and gently lift the battery cover.
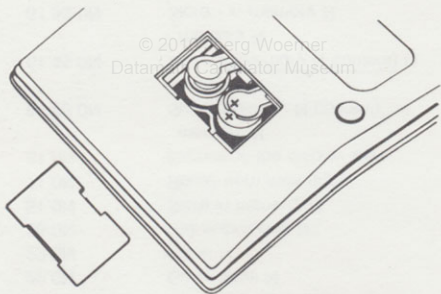
2. Remove the discharged batteries and install new ones as shown. Be careful not to crease the film contacts while installing the new batteries. Be sure the film contacts are positioned to lay on top of the batteries after the batteries are installed.

3. Replace the cover top edge first, then gently press until the bottom of the cover snaps into place.

4. Press `ON/c` `ON/c`, `2nd` `Part` 7, `2nd` `CM`, `2nd` `C.t`, `RST`, and `ON/c`. The display then shows 0 and the calculator is ready to be used

CAUTION: Do not incinerate the old batteries.