

## Appendix A: Reference Information

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This appendix contains reference information that you may need as you become more experienced in using your calculator.

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## System Parameter Settings

The calculator has several parameters which can be set and reset to different conditions. These parameters are affected when you change batteries, reset the calculator, turn the calculator off and on, clear the calculator, or use the HELP function. The information in this table lists the effects of these actions on each parameter.

Parameter	Effect of New Batteries* (Default Condition)	Effect of RESET or OFF ON	Effect of CLEAR	Effect of HELP <YES>
Display	cleared	cleared	cleared	cleared
Display format	standard	standard	removes EE	standard
Decimal point	floating	floating	no effect	floating
Number base	decimal	decimal	no effect	decimal
Memory partition	125 data registers, 1000 program steps, and 5200 file bytes	no effect	no effect	**
Data registers	cleared	no effect	no effect	no effect
Program registers	cleared	no effect	no effect	no effect
File space	cleared	no effect	no effect	no effect
Statistics registers	cleared	no effect	no effect	no effect
Temporary register	cleared	cleared	no effect	cleared
AOST™ stack	cleared	cleared	cleared	cleared
User subroutine stack	cleared	cleared	no effect	no effect

\* You can use a PC-324 printer (if available) to power the calculator while you change batteries to avoid these effects.

\*\* Memory not used as file space is equally divided into program steps and data registers.

Parameter	Effect of New Batteries* (Default Condition)	Effect of RESET or OFF ON	Effect of CLEAR	Effect of HELP <YES>
Angle mode	degrees	no effect	no effect	degrees
Alpha mode	reset	reset	no effect	reset
Alpha registers	TI-95 PROCALC	TI-95 PROCALC	no effect	no effect
Uppercase/lowercase lock	uppercase	uppercase	no effect	no effect
Learn mode	reset	reset	no effect	no effect
Printer device number	set to 12	* usually no effect	no effect	no effect
Print width	set to 24	** usually no effect	no effect	no effect
Word break	off	no effect	no effect	no effect
Trace	off	off	no effect	no effect
User flags	reset	reset	no effect	resets flag 15 (Halt On Error) only
System memory	protected	protected	no effect	protected
Halt on error	off	off	no effect	off

\* Set to 12 if PC-324 printer is attached

\*\* Set to 24 if original device was not 12, but PC-324 is attached now

The following lists show the functions assigned to the **[F1]-[F5]** keys when certain other keys are pressed. Many of these redefined keys also have inverse functions. Although they do not appear in the menu, they are shown here. Detailed information on how to use these system menus is contained in sections of this manual and in the *TI-95 Programming Guide*.

ALPHA	DEL: delete alpha character	
	INS: insert alpha characters	
	COL: move cursor to column	
	MRG: merge with alpha register	
	RCA: recall to alpha register	
	STA: store from alpha register	
	CHR: enter a character code	
	LC: set/reset lowercase lock	
		F-C: Fahrenheit to Celsius
		INV F-C: Celsius to Fahrenheit
		G-L: gallons to liters
		INV G-L: liters to gallons
	MET: metric conversions	#-K: pounds to kilograms
		INV #-K: kilograms to pounds
		i-m: inches to millimeters
		INV i-m: millimeters to inches
		f-M: feet to meters
		INV f-M: meters to feet
		DMS: degrees/minutes/seconds to decimal degrees
		INV DMS: decimal degrees to degrees/minutes/seconds
CONV conversions		D-R: degrees to radians
		INV D-R: radians to degrees
	ANG: degrees/radians/grads	D-G: degrees to grads
		INV D-G: grads to degrees
		R-G: radians to grads
		INV R-G: grads to radians
	P-R: polar to rectangular	
	INV P-R: rectangular to polar	
		DEC: decimal mode
		HEX: hexadecimal mode
	BAS: number base	OCT: octal mode
		2sC: two's complement mode
		INV 2sC: signed mode
		UNF: unformatted mode

STAT statistics	CLR: clear statistics registers	CS1: 1-variable statistics
	FRQ: frequency for entry	CS2: 2-variable statistics
	MN: mean	
	s: sample standard deviation	
	INV s: population standard deviation	(1-VARIABLE)
	m-b: slope-intercept	n: number of points
	r: correlation coefficient	Sx: sum of x's
	y': predicted y value	Sxx: sum of x <sup>2</sup> 's
	INV y': predicted x value	Lfr: last frequency
	SHW: show statistics values	Lx: last x entered
		(2-VARIABLE)
		n: number of points
		Sy: sum of y's
		Syy: sum of y <sup>2</sup> 's
		Ly: last y entered
		Sxy: sum of xy's
		Sx: sum of x's
		Sxx: sum of x <sup>2</sup> 's
		Lfr: last frequency
NUM numeric functions	INT: integer	
	FRC: fraction	
	R#: random number	
	INV R#: random number generator seed	
	RND: round internal value	
	SGN: signum	
	LCM: least common multiple/greatest common divisor	
	PF: prime factors	
	ABS: absolute value	
	REG: list registers	1st: start at first step
	LIST PGM: list program	PC: start at current step
	LBL: list program labels	1st: start search at first step
	ST: list calculator status	PC: start search at current step

(continued)

	GET: load program or data from files
	INV GET: load program or data from RAM cartridge (program only)
	PUT: save program or data in files
	INV PUT: save program or data in RAM cartridge (program only)
FILES	DF: delete specified file
	INV DF: delete specified file in RAM cartridge (program only)
	CAT: show catalog of directory
	INV CAT: show catalog of RAM cartridge (program only)
	CD: clear all files in directory
	INV CD: clear all files in RAM cartridge (program only)
	NAM: rename a RAM cartridge
I/O	TAP: tape storage functions
	PRT: printer setup
	CIO: call I/O subroutine KW: key wait
TESTS conditional tests	RD: read from tape
	WRT: write to tape
	VFY: verify tape
	DEV: set printer device #
	WID: set print width
	WB: word break on
	INV WB: word break off
	IF>: if greater than
INV IF>: if less than or equal	
IF<: if less than	
INV IF<: if greater than or equal	
IF=: if equal	
INV IF=: if not equal	
DSZ: decrement and skip if zero	
INV DSZ: decrement and skip if not zero	
Y/N: yes/no input test	

RUN	PGM: run program in program memory
	MEM: run program from file space
	MTH, STA, or NEW: run program in named cartridge* ESC: escape
LEARN	1st: show first step
	PC: show current step
	END: show last step
	ESC: escape
PART	PS: specify program steps
	REG: specify registers
	FIL: specify file space
	SET: accept current setting
	ESC: escape
HELP	YES: set all defaults
	NO: set selected defaults
	ESC: escape
FLAGS	CLR: clear flags
	SF: set flag
	RF: reset flag
	TF: test for flag set
	INV TF: test for flag reset
FUNC extended functions	QAD: quadratic equations
	CUB: cubic equations
	SYS: system functions
	STB: store byte
	RCB: recall byte
	SBA: call assembly language subroutine

\* The name may be the name of a library cartridge or a name assigned to a Constant Memory™ cartridge.

## Accuracy Information

The calculator maintains values internally to greater accuracy than the values it displays. Occasionally, the difference between a displayed number and its internal value can produce unexpected results.

### Numeric Accuracy

Any displayed number is a rounded representation of an internally stored 13-digit value. This internal value, not the displayed number, is used during calculations.

The additional digits kept internally are referred to as “guard digits.” Although you can usually disregard these digits, they can be important in interpreting unexpected results.

As an example of the effect of guard digits, it is possible for an expression equal to zero to produce a nonzero result (for example  $1 \div 3 \times 3 - 1$ ).

Press	Display
$1 \div 3 \times 3$	.333333333
$3 - 1 =$	-1. -13

Differences in guard digits are especially important if you write a program that compares two values for equality.

If you suspect these differences are responsible for an unexpected result of a comparison, use the ROUND numeric function before making the comparison. This sets the internal value of the number to the value shown in the display.

### Internal Values

The 13 digits of the mantissa are displayed when you use the **2nd** **13d** key sequence.

All the digits of the internal value are shown in the unformatted mode (a selection of **CONV** <BAS>). An unformatted number has three parts:

- ▶ The left 13 digits are the base 10 mantissa with the decimal implied after the first digit.
- ▶ The 14th digit conveys the sign of both the mantissa and the exponent. (Because the signs are indicated by a digit, the **+/-** key has no effect in this mode.)

Mantissa Sign	Exponent Sign	Sign Digit
+	+	0
-	+	4
+	-	8
-	-	C

- ▶ The last two digits are the exponent of scientific notation.

The main use of the unformatted mode is the entry of hexadecimal values for CIO (call I/O) instead of numeric calculations.

The range of numbers that can be displayed depends on the display format in use. This table lists the allowable range of numbers for each format.

Display Format	Allowable Range
Standard notation	-9999999999 to -0.000000001 zero 0.000000001 to 9999999999
Scientific or engineering notation	$-9.999999 \times 10^{99}$ to $-1 \times 10^{-99}$ zero $1 \times 10^{-99}$ to $9.999999 \times 10^{99}$
Hexadecimal	-FFFFFFFF to FFFFFFFFFF
Octal	-7777777777 to 7777777777

Use this list of items to find a topic of reference. Also see the Key Index inside the front cover.

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