

Programmable^{TI} **58/59**

Leisure Library

Quick Reference Guide



CONTENTS

Calculating Notes	1
Conversions	2
Statistics	3
Special Control Operations	4
Alphanumeric Print Codes	5
Programming Notes	6
Memory Partitioning	7
Program Key Codes	8
Magnetic Cards (TI-59 Only)	9-10
Library User Instructions	11-

CALCULATING NOTES

Low Battery Indication

If the display flashes erratically, fades out, gives incorrect results or is inconsistent in any way, recharge the battery. Calculator operation can be resumed after several minutes of recharging.

Algebraic Hierarchy

Operations and functions are performed automatically in following order.

1. Math Functions (x^2 , cos, etc.)
2. Exponentiation (y^x) and Roots ($\sqrt[x]{y}$)
3. Multiplication, Division
4. Addition, Subtraction
5. Equals

Order applies to each set of parentheses. You can use up to 8 pending operations and 9 open parentheses, except where noted.

Flashing Display

A display flashing off and on indicates that an invalid key sequence has taken place or that the limits of the display have been exceeded. See Appendix B in *Personal Programming* for possible causes.

CONVERSIONS

Angle Formats

[2nd] [D.MS] — DEGREES, MINUTES, SECONDS TO DECIMAL DEGREES — Converts an angle measured in degrees, minutes and seconds to its decimal degrees equivalent. **[INV] [2nd] [D.MS]** reverses this conversion. Also used for time conversions. **Operates on display value only.** Submit 2 digits each for minutes and seconds. Entry and display format is DD.MMSSsss where DD is degrees, MM is minutes, SS is whole seconds and sss is fractional seconds.

Polar to Rectangular

R [x:t] Θ [2nd] [P \rightarrow R] \rightarrow y; [x:t] \rightarrow x

Rectangular to Polar

x [x:t] y [INV] [2nd] [P \rightarrow R] \rightarrow Θ ; [x:t] R

Only 4 pending operations are available for other uses when using D.MS or Polar/Rectangular conversions.

Angular Conversions

FROM TO	Degrees	Radians	Grads
Degrees		$\times \frac{\pi}{180}$	$\div 0.9$
Radians	$\times \frac{180}{\pi}$		$\times \frac{200}{\pi}$
Grads	$\times 0.9$	$\times \frac{\pi}{200}$	

STATISTICS

Initialize: 2^{nd} $\text{F} \rightarrow 1$ SBR CLR

Data Entry: x_i $\text{x}\rightarrow\text{t}$ y_i 2^{nd} $\Sigma+$

Data Entry Removal: x_i $\text{x}\rightarrow\text{t}$ y_i INV 2^{nd} $\Sigma+$

Trendline Data Entry: x_1 $\text{x}\rightarrow\text{t}$, y_1 2^{nd} $\Sigma+$, y_2 2^{nd} $\Sigma+$, etc.

Trendline Point Removal: $\text{x}\rightarrow\text{t}$ $-$ 1 $=$ $\text{x}\rightarrow\text{t}$ y_i INV 2^{nd} $\Sigma+$

Calculations

Key Sequence

Mean of y-array then x-array	2^{nd} \bar{x} $\text{x}\rightarrow\text{t}$
Standard Deviation (N - 1 Weighting) of y-array then x-array (N Weighting) of y-array then x-array	INV 2^{nd} \bar{s} $\text{x}\rightarrow\text{t}$ 2^{nd} 11 \sqrt{x} $\text{x}\rightarrow\text{t}$ \sqrt{x}
Variance (N Weighting) of y-array then x-array (N - 1 Weighting) of y-array then x-array	2^{nd} 11 $\text{x}\rightarrow\text{t}$ INV 2^{nd} \bar{x} x^2 $\text{x}\rightarrow\text{t}$ x^2
Y-Intercept	2^{nd} 12
Slope after y-intercept	$\text{x}\rightarrow\text{t}$
Correlation Coefficient	2^{nd} 13
y' for new x	2^{nd} 14
x' for new y	2^{nd} 15

SPECIAL CONTROL OPERATIONS

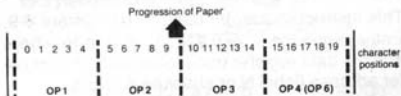
Each special control operation is called by pressing **2nd** **Op** **nn** where **nn** is the 2-digit code assigned to each operation (short form addressing can be used here). These operations use up to 4 pending operations and 1 sub-routine level.

Code nn	Function
00*	Initialize print register.
01*	Alphanumerics for far left quarter of print column.
02*	Alphanumerics for inside left quarter of print column.
03*	Alphanumerics for inside right quarter of print column.
04*	Alphanumerics for far right quarter of print column.
05*	Print the contents of the print register.
06*	Print last 4 characters of OP 04 with current display.
07*	Plot \div in column 0-19 as specified by the display.
08*	List the labels currently used in program memory.
09	Bring specified library program into program memory.
10	Apply signum function to display register value.
11	Calculate variances.
12	Calculate slope and intercept.
13	Calculate correlation coefficient.
14	Calculate new y prime (y') for an x in the display.
15	Calculate new x prime (x') for a y in the display.
16	Display current partition of memory storage area.
17	Repartition memory storage area.
18	If no error condition exists in a program, set flag 7.
19	If an error condition exists in a program, set flag 7.
20-29	Increment a data register 0-9 by 1.
30-39	Decrement a data register 0-9 by 1.

*Designed specifically for use with optional PC-100A Print Cradle

ALPHANUMERIC PRINT CODES

The first seven control operations allow you to create and print out alphanumeric messages. Twenty characters can be printed on each line. They are assembled and stored in groups of 5 characters at a time as shown below.



Each printed character is represented by a two-digit, row-column address code according to the following table:

	0	1	2	3	4	5	6	7
0		0	1	2	3	4	5	6
1	7	8	9	A	B	C	D	E
2	-	F	G	H	I	J	K	L
3	M	N	O	P	Q	R	S	T
4	.	U	V	W	X	Y	Z	+
5	x	*	√	π	e	()	,
6	↑	%	↓	/	=	'	x	̄
7	z	?	÷	!	II	^	Π	Σ

For instance, A is code 13 and + is code 47

PROGRAMMING NOTES

Labels

Any key on the keyboard can be used as a label except **2nd**, **LRN**, **Ins**, **Del**, **SST**, **BST**, **Ind** and the numbers 0-9.

DSZ

This instruction can be used with registers 0-9. Entry sequence is **2nd** **Dsz** **X**, **N** or **nnn** where **X** is the data register used followed by the transfer address (label **N** or absolute address **nnn**).

Flags

Ten flags are available (0-9). Entry sequence for setting, resetting or testing flags is the flag instruction, flag number, then transfer address (testing only).

MEMORY PARTITIONING

Memory area is partitioned in sets of 10 registers where each register can hold a data value or 8 program instructions. To check placement of current partition, press **2nd** **Op** **16**. To repartition, enter number of sets (N) of 10 data registers needed and press **2nd** **Op** **17**.

N	Program/Data	
	TI-58	TI-59
N < 0 = N		
0	479/00	959/00
1	399/09	879/09
2	319/19	799/19
3	239/29*	719/29
4	159/39	639/39
5	079/49	559/49
6	000/59	479/59*
7	Flashing	399/69
8	Flashing	319/79
9	Flashing	239/89
10	Flashing	159/99
N > 10	Flashing	159/99

*Partition when calculator is turned on.

PROGRAM KEY CODES

Key Code	Key	Key Code	Key	Key Code	Key
00	0	39	cas	72*	STO Ind
↓	↓	40	Ind	73*	RCL Ind
09	9	42	STO	74*	SUM Ind
10	E	43	RCL	75	-
11	A	44	SUM	76	lbl
12	B	45	γ^*	77	$\times \div$
13	C	47	CMs	78	$\Sigma +$
14	D	48	Exc	79	\bar{x}
15	E	49	Prd	80	Grad
16	A'	50	lxl	81	RST
17	B'	52	EE	83*	GTO Ind
18	C'	53	(84*	Op Ind
19	D'	54)	85	+
20	CLR	55	\div	86	St flg
22	INV	57	Eng	87	If flg
23	Inx	58	Fix	88	DMS
24	CE	59	Int	89	π
25	CLR	60	Deg	90	List
27	INV	61	GTO	91	R/S
28	log	62*	Pgm Ind	92*	INV SBR
29	CP	63*	Exc Ind	93	.
30	tan	64*	Prd Ind	94	+/-
32	$\times \div$	65	X	95	=
33	x^2	66	Pause	96	Write
34	\sqrt{x}	67	$\times \div$	97	Dsr
35	$1/x$	68	Nop	98	Adv
36	Pgm	69	Op	99	Prt
37	P=B	70	Rad		
38	sin	71	SBR		

*Merged codes

RECORDING MAGNETIC CARDS (TI-59 Only)

Display When Write Pressed, Card Entered	Calculator Response
1, 2, 3, 4	Writes a card side with this number from the bank of this number (program and/or data) and records current partition on card.
-1, -2, -3, -4	Writes and protects card side with this number from the bank with this number. Also records current partition on card.
Any other number	Card is passed but not recorded. Rightmost two integer digits of display are flashed.

If the display is flashing any value when trying to read or record a card, the card is passed but not read or recorded and the rightmost two integers in the display are flashed.

The calculator should be in standard display format when reading or recording cards.

Only the integer portion of the display is recognized, i.e., 1.234 = 1.

**READING MAGNETIC CARDS
(TI-59 Only)**

Display When Card Entered	Calculator Response
0	Reads information into bank number listed on card if current partition matches that on card. If partition incorrect, card is passed, but not read — display flashes card side passed.
1, 2, 3, 4	Expects card with this side number to be read — displays that side number. If another side is entered or if partition is incorrect, card is passed but not read — display flashes card side passed.
-1, -2, -3, -4	Forces side to be read into this bank number regardless of the partition or the number on the card. A protected program cannot be forced into any bank or alternate partition.
Any other number	Card is passed but not read — rightmost two integers in display flash.

LIBRARY USER INSTRUCTIONS

The remainder of this booklet contains the User Instructions for each program of the library.

REMOVING AND INSTALLING MODULES.

The library module can easily be removed or replaced with another. It is a good idea to leave the module in place in the calculator except when replacing it with another module. Be sure to follow these instructions when you need to remove or replace a module.

CAUTION

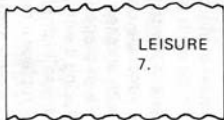
Be sure to touch some metal object before handling a module to prevent possible damage by static electricity.

1. Turn the calculator OFF. Loading or unloading the module with the calculator ON may cause the keyboard or display to lock out. Also, shorting the contacts can damage the module or calculator.
2. Slide out the small panel covering the module compartment at the bottom of the back of the calculator.
3. Remove the module. You may turn the calculator over and let the module fall out into your hand.
4. Insert the module, notched end first with the labeled side up into the compartment. The module should slip into place effortlessly.
5. Replace the cover panel, securing the module against the contacts.

Diagnostic/Library Module Check

This routine checks the operation of your calculator and most of its functions, including conversion and statistics functions that are preprogrammed in the calculator, trigonometric functions, data register operations, program transfers, and comparisons. It also uses other Leisure Library programs to verify that the module is connected and operating correctly. Press [2nd] [Pgm] 01 [SBR] [=] to run the diagnostic. If this diagnostic routine runs successfully, in approximately 15 seconds the number 7. will be displayed. If the calculator is attached to a PC-100A print cradle, the following will be printed:

If there is a malfunction in the calculator or the *Solid State Software* module, a flashing number will be displayed. Refer to Appendix A of the Owner's Manual for an explanation of the various procedures to be followed when you have difficulties.



When you simply want to know which of your *Solid State Software* modules is in the calculator without physically looking at it, you can call the Library Module check portion of the routine directly by pressing [2nd] [Pgm] 01 [SBR] [2nd] [R/S]. If the Leisure Library

Module is in the calculator, the number 7. will be displayed. This number is unique to the Leisure Library (other optional libraries use other identifying digits).

Linear Regression Initialization

The sequence [2nd] [Pgm] 01 [SBR] [CLR] initializes the calculator for linear regression by clearing data registers R_{01} through R_{06} and the T-register. It should be used whenever linear regression or other built-in statistics functions are to be started. You can also use the routine at any time to clear these registers selectively without disturbing any other registers.

PHOTO I: EXPOSURE COMPENSATION

LE-02

INSTRUCTIONS (Display Only)

1. Press [2nd] [Pgm] 02 [SBR] [CLR] to initialize program; 0. will be displayed.
2. Enter focal length of first lens, f_1 .
Press [A] if f_1 is in millimeters.
Press [2nd] [A'] if f_1 is in inches.
Focal length in millimeters is displayed.
3. Enter first negative-to-image distance, D_1 .
Press [B] if D_1 is in millimeters.
Press [2nd] [B'] if D_1 is in inches.
 $-D_1$ in millimeters is displayed.
4. Enter first exposure time, t_1 , and press [C].
5. Enter focal length of second lens, f_2 . Follow procedure of Step 2. This step may be omitted if $f_2 = f_1$.
6. Enter second negative-to-image distance, D_2 . Follow procedure of Step 3.
7. Press [C] to find second exposure time.
8. Press [D] to find magnification

NOTES:

1. This program works only for magnifications greater than 1:1. Therefore, the negative-to-image distance entered in Step 3(6) must be at least 4 times the focal length entered in Step 2(5).
2. For proper determination of t_2 at Step 7, a negative number must be in the display. This occurs automatically provided Step 7 follows Step 6 directly.

PHOTO II: FILL-IN FLASH**LE-03****INSTRUCTIONS (Display Only)**

1. Press [2nd] [Pgm] 03 [SBR] [CLR] to initialize the program; 0. will be displayed.
2. Enter the number of f-stops, N_1 , subject is underexposed without fill in and press [A]. Lighting ratio, 2^{N_1} , is displayed. N_1 must be greater than N_2 .
3. Enter desired lighting ratio, 2^{N_2} , and press [B]. Desired lighting ratio is displayed.
4.
 - a. For automatic flash, enter the auto f-setting and press [C]. The required f-number is displayed.
 - b. For nonautomatic flash, enter the guide number and press [C]. Then go to Step 5.
5.
 - a. To solve for working distance, enter the desired f-number and press [D].
 - b. To solve for f-number, enter the desired working distance and press [D].
 - c. Repeat Step 5a or 5b as desired.

FOOTBALL PREDICTOR**LE-04****INSTRUCTIONS (Display Only)**

1. Press [2nd] [Pgm] 04 [SBR] [CLR] to initialize; 0. is displayed.
2. For each game the home team has played:
 - a. Enter points scored by the home team and press [B].
 - b. Enter points scored against the home team and press [R/S].
3. For each game the opposing team has played:
 - a. Enter points scored by the opposing team and press [2nd] [D'].
 - b. Enter points scored against the opposing team and press [R/S].
4. Make prediction by pressing [E]. Predicted score is displayed in the following format:

Home Team Score . Opposing Team Score

BOWLING SCOREKEEPER

LE-05

INSTRUCTIONS (Display and Printer)

1. Press [2nd] [Pgm] 05 [SBR] [CLR] to initialize program. Displayed value is not affected.
2. Enter number of bowlers and press [2nd] [A'].
Note: If the number of bowlers is greater than 50 (20 for the TI-58), the partitioning of your calculator will have to be changed. The number of data registers required is the number of bowlers plus 10. See your Owner's Manual for instructions on partitioning your calculator's memory.
3. Enter number of bowler and press [A].
A flashing 10. indicates that the bowler is entering the tenth frame — press [CE] and continue.
4. Enter number of pins knocked down by first ball in a frame and press [B].
5. Enter number of pins knocked down by second ball in a frame and press [C].
(Do not enter 0 if first ball was a strike.)

6. If a third ball is bowled in the tenth frame, enter the number of pins knocked down and press [D].
7. Repeat Steps 3 through 6 until scoring is complete.
8. You may recall a bowler's score by entering his number and pressing [E]. The score is displayed in the form:

Score . BF

where

F is the number of the last frame completed by the bowler.

B is the number of balls pending in that frame.

This information will be printed if the PC-100A is being used.

9. With the PC-100A printer, you can obtain a complete listing of the current scores of all bowlers by pressing [SBR] [2nd] [Prt].
10. For a new game, press [SBR] [CLR] and go to Step 2.

INSTRUCTIONS (Display and Printer)

1. Press [2nd] [Pgm] 07 [SBR] [CLR] to initialize program; 0. will be displayed. Press 4 [2nd] [Op] 17 to reset partition for TI-58.
2. Enter number of rounds for handicap calculation, press [2nd] [A']. The number of rounds and differentials used in handicap will be printed, the number of differentials will be displayed.
3. Enter the adjusted score and course rating for each round using the following format: AS,CR, press [A]. The adjusted score, course rating and differential will be printed. The differential will be displayed (example, AS = 82, CR = 71.2, enter 82.712, press [A], 87.712, 10.8 will be printed, 10.8 will be displayed). Repeat Step 3 until all rounds are entered. To edit a previous entry at any time before Step 4, enter number of round miskeyed, press [E]. Number of round will be displayed. Enter correct data and press [A]. Continue entering additional data.
4. Calculate handicap by pressing [B]. The lowest differential used in handicap will be printed and displayed approximately every 7 seconds. The sum, average, and 96 percent of the average for the differentials will be printed and displayed along with the rounded handicap.

NOTES

The TI-59 allows golfers to enter the data in Step 2 by using mag cards. The following procedure can be used with the TI-59 to update a golfer's handicap based on his most recent 20 rounds.

1. After Step 3, enter 4, press [2nd] [Write], insert card (printed side up) into the lower slot in the right side of the calculator. 4 will be displayed after the 20 current differentials are recorded. Perform Step 4.
2. If the data is recorded on a magnetic card, handicap calculations may be performed by pressing [2nd] [Pgm] 07 [SBR] [CLR] and completing the following:
 - a. Read card containing previous 20 differentials by loading card into the lower slot in the right hand side of the calculator. 4 will be displayed.
 - b. Enter latest adjusted score and course rating, press [2nd] [B']. Adjusted score, course rating and differential are printed. The differential is displayed.
 - c. Enter 4, press [2nd] [Write] and record current 20 differentials on mag card.
 - d. Enter number of rounds for handicap calculation and press [2nd] [A'] as in Step 2. Press [B] to calculate handicap as in Step 4.

BRIDGE SCORER

LE-08

INSTRUCTIONS (Display Only)

1. Press [2nd] [Pgm] 08 [SBR] [CLR] for initialization; 0. will be displayed.
2. Enter value of first trick (enter 20 if diamonds or clubs, 30 if spades or hearts, 40 if no trump). Press [A]. Value of first trick will be displayed.
3. Enter number of tricks bid. Press [B]. Number of tricks bid is displayed.
4. If vulnerable press [C], number of tricks bid is displayed. (If not vulnerable, omit this step.)
5. If doubled, press [D], 2 is displayed. (If not doubled, omit this step.)
6. If redoubled, press [D], 4 is displayed. (If not redoubled, omit this step.)
7. Find value of contract if made. Press [E]. Value, if made, is displayed.
8. Enter number of overtricks, press [2nd] [D'], total points with overtricks is displayed. (If no overtricks, omit this step.)

9. Enter number of tricks down. Press [2nd] [E']. Penalty (net minus) resulting is displayed. (If no tricks down, omit this step.)

Repeat Steps 2 through 9 for subsequent deals.

CODEBREAKER

LE-09

INSTRUCTIONS (Display) (Printer prints displayed results except Step 2)

1. Press [2nd] [Pgm] 09 [SBR] [CLR] to initialize program. Displayed number will not change.
2. Key in a number (0 to 199017) and press [E]. In about 15 seconds 0. will be displayed.
3. Key in a 4-digit trial number and press [A]. "N.R" will be displayed where N is the number of correct digits correctly placed and R is the number of correct digits that are in the wrong locations.*
4. Repeat Step 3 until 4.0 is displayed. Remember to carefully evaluate the results of each trial, and to combine the results of successive trials as you select the next trial number. Your proficiency as a codebreaker is measured by the number of trials required to reach 4.0.
5. For a new code, press [RCL] 09 [E] and start with Step 3.

*If a digit is entered more than once in a single trial, an incorrect score may result. For example, if the code is 1234 and 1111 is guessed, 1.3 will be displayed.

INSTRUCTIONS (Printer Only)

1. Press [2nd] [Pgm] 10 [SBR] [CLR] to initialize program; 20. is displayed.
Press [2nd] [Fix] 9 to remove a fixed-decimal format.
2. A telephone-pad entry is used to enter all characters one at a time.

STU	VWX	YZ-
7	8	9
JKL	MNO	PQR
4	5	6
ABC	DEF	GHI
1	2	3
..?		
0		

For characters other than numbers, find the character on the above chart and enter the number beneath it into the display. Then press an appropriate user-defined key as explained below.

- Press [A] if the character is to the left of the number
- Press [B] if the character is centered above the number.
- Press [C] if the character is to the right of the number.

For numbers, enter single-digit integers into the display and press [D].

To skip a space or leave a blank, simply press [E].

3. After a character is entered a number appears in the display indicating the number of entries that may still be made before filling the line. Once the line is filled it is automatically printed and a new line is begun. If you wish to begin a new line before filling the old one, or if your message is completed, simply press [2nd] [A'].
4. Once your message is entered you may record it on magnetic cards following the instructions found in your Owner's Manual if you own a TI Programmable 59. (See Notes to determine which registers to record on magnetic cards.)

(continued)

5. To print a message after it has been entered into the calculator manually or from magnetic card, press [2nd] [Pgm] 10 [2nd] [B'].

NOTES

1. Four data registers are used to store each line of your message beginning with R_4 . If your message is k lines long, registers 0 through $4k + 3$ must be left available for program use. Check the partitioning of your calculator to ensure that the needed registers are available. Repartitioning is necessary if you plan to enter more than 14 lines (6 for the TI-58). (See your Owner's Manual.)
2. If you want the calculator to begin storing your message in a higher register you may enter a line number, k , and press [2nd] [C']. This causes the calculator to leave lines 1 through $k - 1$ blank and begin storing the message in register $4k$. R_0 through R_3 , as well as the T-Register, must be left available for program use.
3. Pressing [2nd] [B'] prints the entire message stored in the calculator. However, if you wish to print a selected line, enter the line number and press [2nd] [D'].
4. If you make an error while entering a line, simply enter the number of the line in which the error was made and press [2nd] [C']. Then reenter the entire line.
5. If you discover an error after the line is entered, press [2nd] [C'] and reenter the entire line **including blanks at the end of the line**. Then enter $k + 1$, where k is the number of the last completed line, and press [2nd] [C'] again before continuing.
6. Under normal circumstances your message is printed as you fill up each line. However, if you don't want your message printed as you enter it, simply press [2nd] [St flg] 1 after initialization.

RULES

Point values of cards: face cards (Jack, Queen, King) count as 10; numbered cards count as their face value; an Ace may count as either 1 or 11. Cards are printed and displayed by the calculator as numbers 1 through 13 for Ace through King, respectively. Therefore, a displayed 1 may count as 1 or 11 points, and a displayed 11, 12, or 13 counts as 10 points.

You and the dealer are each dealt two cards. The dealer's second card is turned face up so you may see it. You may choose to stop with the two cards or you may take more cards. Each card is dealt to you face up and you may continue to take cards as long as your total remains less than 21. (The dealer doesn't see your first or "hole" card.)

When you have finished playing and if you have not broken 21 (and therefore lost) the dealer takes more cards, if needed, until his total is greater than 16 or the total number of points accumulated by your "show" cards.

You win if your total is greater than the dealer's total if you did not break 21. You also win if the dealer's total goes over 21. Otherwise, you lose.

INSTRUCTIONS (Display and Printer)

1. Press [2nd] [Pgm] 11 [SBR] [CLR] to initialize program; 0. is displayed.
2. Key in a number (0 to 199017) and press [E]. The dealer's show card, your hole card, and your show card are briefly displayed. These cards are printed if the PC-100A is used. Your total number of points is then displayed and printed.
3. Player Hits (Optional)
 - a. If you wish to be dealt additional cards, press [A] for each new card. The card is briefly displayed and printed, followed by your new total.
 - b. Each Ace dealt to you is automatically counted as 1 point. If you wish an Ace to be scored as 11 points, press [2nd] [A'] after you have taken all the cards you desire.
4. After taking all the cards you desire, press [B]. The dealer then reveals his hole card and takes other cards as needed. The cards are displayed and printed along with the dealer's total, in the same way as for the player.
5. Press [D] and go to Step 3 for a new hand. Cards are printed and displayed as described in Step 2.

INSTRUCTION (Display Only)

1. Press [2nd] [Pgm] 12 [SBR] [CLR] to initialize. A fix-2 display is selected.
2. Enter a seed number between 0 and 199017 and press [A]. Your initial bankroll of \$100 appears in the display.
3. Press [B] to generate the first random number.
4. Press [C] to generate the second random number.
5. Press [E] to calculate odds.
6. Enter your bet and press [2nd] [A']. If you win, the amount of your winnings appears in the display. If you lose, the negative amount of your bet appears in the display.
7. To see the number generated in Step 6, press [2nd] [B'].
8. To display the value of your bankroll, press [2nd] [C'].

9. To continue playing, return to Step 3 or 6.

NOTE: Results may sometimes appear to be inaccurate due to rounding of the display. For example, if .214 is the lower of the two numbers and .213 is the third number, you lose even though both numbers are displayed as .21.

INSTRUCTIONS (Display and Printer)

1. Press [2nd] [Pgm] 13 [SBR] [CLR] to initialize program. Displayed number will not change.
2. Press [.], then key in any number and press [E]. "100.00" will be displayed and printed.
3. Key in your bet and press [C]. This number will be displayed and printed. If you enter a bet larger than your bankroll, the display will flash 9's. You may press [CE] and enter a correct amount to continue. Entering a negative bet will cause the same effect.
4. Press [A] for your first roll which will be displayed unless you roll 2, 3, 12, 7, or 11 causing only your updated bankroll to be displayed. You may see what the roll was by pressing [D]. Both the roll and updated bankroll are printed after pressing [A]. If you won or lost on the first roll, start again with Step 3. Otherwise, continue with Step 5 and try to make your point.
5. Press [A] for your next roll, which will be displayed unless it is 7 or your point. In either of these cases, your updated bankroll will be displayed. You may see the winning or losing roll by pressing [D]. With the printer, both the roll and the revised bankroll are printed. If you win or lose, start again with Step 3.
6. Repeat Step 5 until you win or lose.
7. Continue until your \$100 is depleted. To start over, go to Step 2.

INSTRUCTIONS (Display and Printer)

1. Press [2nd] [Pgm] 14 [SBR] [CLR] to initialize program. Display value will not change.
2. Press [E], -487.2603 will be displayed and printed as the initial status of velocity and altitude (Vel.Alt).
3. Key in amount of burn (0 to 75), press [A], the revised status will be displayed and printed. With the printout, the amount of fuel burned precedes the status.
4. Repeat Step 3 until you land (or crash). A perfect landing will be displayed and printed as 0. A number flashing in the display or printed with a question mark is the velocity at which you crashed.
5. Start a new landing by pressing [E].

NOTES

1. You may check your fuel supply by pressing [B].
2. Press [C] to display your current status (Vel.Alt).

INSTRUCTIONS (Display and Printer)

1. Press [2nd] [Pgm] 15 [SBR] [CLR] to initialize program; 0. is displayed.
2. Enter the "probability of truth" as a number between 0 and 100 and press [A].
3. Enter a seed number, 0 to 199017, and press [B]. The program then generates an integer between 0 and 100.
4. Enter your guess (0 to 100) and press [E]. If your guess is too high, 1 is displayed; too low, -1 is displayed. If your guess is correct, the correct number is flashed in the display. (Your guess and the program's answer are printed.)
5. Press [D] to determine how many guesses you have taken. (First press [CE] if display is flashing.)
6. To play another game, press [SBR] [CLR] and go to Step 2.

INSTRUCTIONS (Printer Only)

1. Press [2nd] [Pgm] 16 [SBR] [CLR] to initialize; 0. is displayed. If the calculator has fixed-decimal display format, press [2nd] [Fix] 9 and continue.
2. A telephone pad entry is used to enter all characters one at a time.

STU	VWX	YZ (Space)
7	8	9
JKL	MNO	PQR
4	5	6
ABC	DEF	GHI
1	2	3

To enter a character (or space), find the character on the above chart and enter the number beneath it into the display. Then press an appropriate user-defined key as explained below:

- Press [A] if the character is to the left of the number.
 - Press [B] if the character is centered above the number.
 - Press [C] if the character is to the right of the number.
3. After a character is entered a number appears in the display indicating the number of entries that may still be made before filling the line. Once you have finished entering your word(s), press [D]. ([D] need not be pressed if 20 characters are entered as this sequence is automatically called.) The PC-100A then prints dashes indicating the positions of the entered characters. Note: 10 to 20 seconds are required for computation in this step and in Step 4.
 4. To guess a letter simply enter the letter as in Step 2. If the letter is correct it is placed in the correct position(s) and printed along with the previously guessed letters and remaining blanks. If it is wrong the number of wrong guesses is printed along with the incorrect letter. Note that entering a correct letter more than once may cause erroneous symbols to be printed.
 5. To guess the complete word press [E] and enter the word as in Steps 2 and 3. If the word is correct it is printed; if not, the number of wrong guesses is printed.
 6. After 7 wrong guesses, you are officially "hung". However, you may continue playing if you wish.

INSTRUCTIONS (Display Only)

1. Press [2nd] [Pgm] 17 [SBR] [CLR] to initialize program; 0. is displayed.
2. Enter the number of chips you wish to use and press [R/S]. If you use more than 54 chips (24 for the TI-58), the calculator must be repartitioned. The number of chips plus 6 equals the number of registers needed for program use. See your Owner's Manual for instructions on partitioning your calculator's memory.
3. If you wish to make the first move, press [A] and go to Step 5. The number of chips in the pile is displayed.
4. If you want the calculator to make the first move, press [B]. The calculator then makes its move and displays the number of chips remaining in the pile.
5. Enter the number of chips you wish to take and press [R/S]. The calculator then makes its move and returns the number of chips remaining after its move. Repeat this step until the display flashes. If 0 is flashed, you win. If π (3.141592654) is flashed, the calculator wins.
6. For a new game, press [CE] [E] and return to Step 2. (The number of chips used in the last game is displayed.)

INSTRUCTIONS (Printer Only)

1. Press [2nd] [Pgm] 18 [SBR] [CLR] to initialize; 0. will be displayed.
2. Decide which player will be on offense first (coin toss).
3. To start a game, press [·], then key in any number and press [E]. The number of yards to go for a touchdown will be printed.
4. The quarterback selects one of the following:
Press [1] [A] for a run play, or
Press [2] [A] for a short pass, or
Press [3] [A] for a long pass.
5. Yards to go for a touchdown is printed after each play:
 - a. The number is printed twice if a first down has been made.
 - b. If the number is printed once, the display will indicate the yards to go for a first down.
 - c. Change of possession is indicated by a paper advance followed by printing of the yards to go for the new offensive team.
 - d. Scoring is indicated by a yards-to-go figure, either less than zero (a touchdown) or greater than 100 (a safety). Touchdowns count as 6 or 7 points and safeties count as 2 points. After a score is printed, a new yards-to-go number is printed, and play transfers to the other team.
6. Play continues until the calculator signals the end of a game with a paper advance and the scores for teams 1 and 2, respectively. A game consists of 60 to 70 plays. The exact number is set by the calculator depending upon the number entered in Step 3.

INSTRUCTIONS (Printer Only)

- Press [2nd] [Pgm] 19 [SBR] [CLR] to initialize; 0. is displayed. If the calculator has fixed-decimal display format, press [2nd] [Fix] 9 and continue.
- Select the pattern you desire and note its number.

Pattern	No.	Pattern	No.	Pattern	No.	Pattern	No.
* 	1	* * 	9	* * * 	17	* * * * 	25
* * 	2	* * * 	10	* * * * 	18	* * * * * 	26
* * * 	3	* * * * 	11	* * * * * 	19	* * * * * * 	27
* * * * 	4	* * * * * 	12	* * * * * * 	20	* * * * * * * 	28
* * * * * 	5	* * * * * * 	13	* * * * * * * 	21	* * * * * * * * 	29
* * * * * * 	6	* * * * * * * 	14	* * * * * * * * 	22	* * * * * * * * * 	30
* * * * * * * 	7	* * * * * * * * 	15	* * * * * * * * * 	23	* * * * * * * * * * 	31
* * * * * * * * 	8	* * * * * * * * * 	16	* * * * * * * * * * 	24		

Note: Vertical dashed line indicates right-hand edge of column.

- Choose a character from the following chart and determine its code number:

Each printed character is represented by a two-digit, row-column address code according to the following table. For instance, A is code 13 and + is code 47.

		UNITS DIGIT							
		0	1	2	3	4	5	6	7
TENS DIGIT	0	blank	0	1	2	3	4	5	6
	1	7	8	9	A	B	C	D	E
	2	-	F	G	H	I	J	K	L
	3	M	N	O	P	Q	R	S	T
	4	.	U	V	W	X	Y	Z	+
	5	<	*	Γ	∞	∞	∞	∞	∞
	6	∞	∞	∞	∞	∞	∞	∞	∞
	7	∞	∞	∞	∞	∞	∞	∞	∞

- Enter the information from Steps 2 and 3 into the display in the form **Pattern #.Symbol #.**

(continued)

5. Select the quarter of the tape you wish to use by pressing the appropriate user-defined key.

[A] – First Quarter

[B] – Second Quarter

[C] – Third Quarter

[D] – Fourth Quarter

6. Repeat Steps 1-5 for each quarter as desired, then press [E] to print the entire line.
7. Repeat Steps 1-6 for each line.

Note: If you need more than one type of character in a specific quarter of the tape, you can fill the print buffer directly by using the special operation codes described in your Owner's Manual. Pressing [E] will print the contents of the print buffer.

SEA BATTLE

LE-20

INSTRUCTIONS (Display Only)

1. Press [2nd] [Pgm] 20 [SBR] [CLR] to initialize program. Displayed value will not change.
2. To start the game press [2nd] [E']. The display will show 15000.15 which indicates a range of 15000 yards and 15 missiles remaining.
3. Key in estimated range in yards and press [A]. Remember the 1 minute interval between the range report and the missile firing. The sub will move during this time.
4. Key in estimated bearing in degrees (0 to 360°, positive or negative) and press [B]. Remember to account for movement of the sub since the last report.
5. Range and bearing can be entered in either order. Changes can be made after entry if made before firing. You may elect not to fire a missile by keying in 0, pressing [A] and then [E]. This preserves your missile supply but brings the sub closer.
6. Press [E] to fire a missile at range and bearing selected. Display depends on miss distance. Sub takes action as noted in the Intelligence Report. Display will be of following types:

Display	Miss Distance	Remarks
0.NN	Over 5000	No range information, only number of missiles left.
XXXX.NN	5000 and under	Missile transmits miss distance, sub comes straight at you.
XXX.NN	500 and under	See Intelligence Report for sub's action.
"XX.NN" (flashing)	50 and under	Sub has been sunk. Last missile number is preserved.
"XXX.NN" (flashing)		Sub came within 500 yards. You have been sunk.
"XXX.00" (flashing)		All missiles have been fired. In case you sink sub with last missile, the calculator will preserve the missile number to avoid confusion.

(continued)

(continued)

7. For a new game, start over with Step 2. Each game after the first does not necessarily start with 15,000 yards (but it will be within 500 yards of this) and will appear from a new bearing angle.

NOTES:

1. Previous range and bearing values can be recalled to help you determine new values.
 - a. Pressing 1 [C] recalls your previous range setting.
 - b. Pressing 2 [C] recalls your previous bearing angle.
2. Pressing [D] recalls display at the end of last shot.

Miss Distance (yds)**Intelligence Report**

Over 500

No damage to sub. Sub comes straight at you after a miss of this distance.

500 and under

1. Sub suffers damage which decreases speed 6 knots per close hit until speed has decreased to 6 knots. No further decrease.
2. Sub takes evasive action making 45° turn away from missile impact area.
3. Repeated close hits cause the sub to continue on this 45° line if the miss is in the same direction or to veer 90° if the next miss is on the opposite side of the sub.
4. A miss distance greater than 500 yards after a near miss causes the sub to come straight at you again.

50 and under

Sinks sub.

INSTRUCTIONS

Biorhythm Chart (Printer Only)

1. Press [2nd] [Pgm] 21 [SBR] [CLR] to initialize program; 0. appears in display.
2. Key in birth date (MMDD.YYYY) and press [A].
3. Key in test date (MMDD.YYYY) and press [B]. The number in the display indicates the day of the week of the test date where 0 = Saturday, 1 = Sunday, 2 = Monday . . . , 6 = Friday.
4. Press [2nd] [E'] to chart your biorhythm cycles. The numbers down the center of the tape locate the critical points and correspond to the days of the week as described in Step 3. "P" is plotted for the physical cycle, "E" for emotional and "I" for intellectual. An "X" is printed where two cycles share the same point. Press [RST] to stop the program. Start with Step 1 for a new chart.

Biorhythm Cycles (Display Only)

1. Press [2nd] [Pgm] 21 [SBR] [CLR] to initialize program; 0. appears in display.
2. Key in birth date (MMDD.YYYY) and press [A].
3. Key in test date and press [B]. (Day of the week is displayed as in Step 3.)
4.
 - a. Press [C] to determine amplitude of physical cycle.
 - b. Press [D] to determine amplitude of emotional cycle.
 - c. Press [E] to determine amplitude of intellectual cycle.

Biorhythm Compatibility (Display Only)

1. Press [2nd] [Pgm] 21 [SBR] [CLR] to initialize program; 0. appears in display.
2. Key in earlier birth date (MMDD.YYYY) and press [A].
3. Key in later birth date (MMDD.YYYY) and press [B]. Day of the week of later birth date is displayed as in Step 3.
4. Press [2nd] [C'] to determine biorhythm compatibility.

TEXAS INSTRUMENTS
INCORPORATED

DALLAS, TEXAS

Printed in U.S.A.

1015755-7