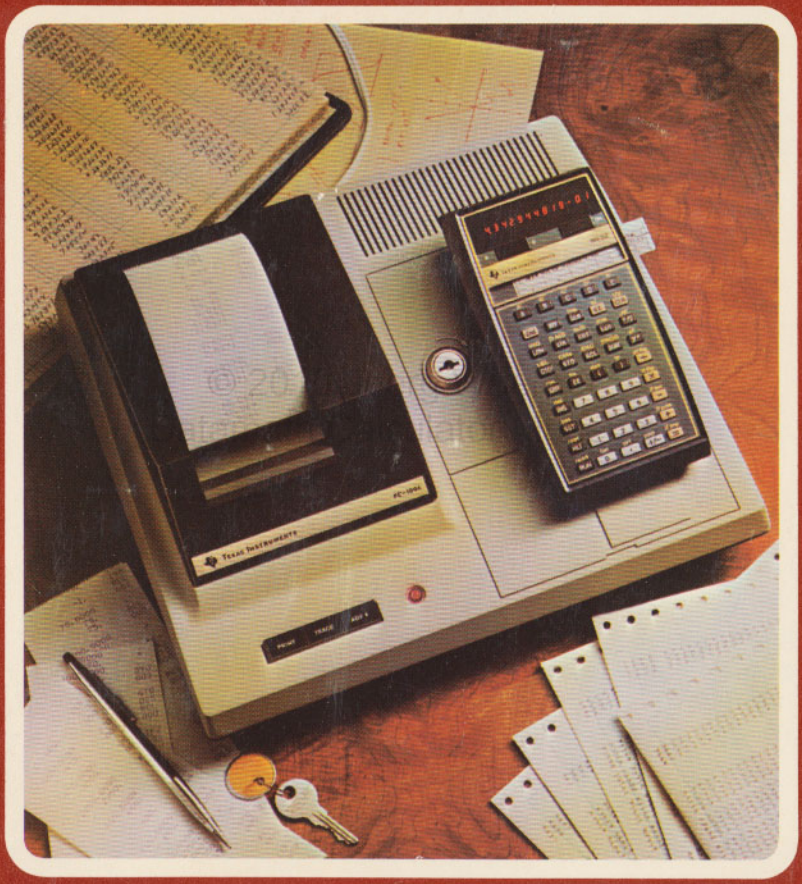
Texas Instruments
print/security cradle
PC-100A



OWNER'S
MANUAL

TABLE OF CONTENTS

INTRODUCTION 1

OPERATING INSTRUCTIONS 2
- Calculator Mounting 2
- Operation 3
- Audit Trail Symbols in the Trace Mode 5

MAINTENANCE AND SERVICE 7
- Printing Paper Installation 7
- Caring for the Printer 9
- In Case of Difficulty 11
- If You Need Service Information 12
- Exchange Centers 12

Toll-Free Telephone Assistance

For service information for your PC-100A, call one of the following toll-free numbers:

800-858-1802 (within all contiguous United States except Texas)
800-692-1353 (within Texas)

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IMPORTANT

Record the serial number from the bottom of the unit and purchase date in the space below. The serial number is identified by the words "SERIAL NO." on the bottom case. Always reference this information in any correspondence.

PC-100A		
Model No.	**Serial No.**	**Purchase Date**

NOTICE: The printing on thermal paper may fade if exposed to light or high temperatures for long periods of time. For permanent storage, always file printed tapes away from light and heat.

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INTRODUCTION

The PC-100A is a compact AC-powered desktop unit designed to provide complete printer capabilities for the SR-52 and SR-56 programmable calculators. You can perform a number of different printing functions. You can:

1. Print any results obtained in the calculate mode.
2. List your program code with a single command.
3. Insert print instructions in your program to print one or more results without halting program execution.
4. Perform paper spacing either manually or under program control in order to separate sets of results.
5. Operate the printer in the Trace mode to automatically keep a record of all calculations performed both manually and by program control. This trace includes a record of the operations performed as well as the results.
6. Leave your desk without having to lock your calculator away. The PC-100A provides security as well as power for your calculator.

The quiet, smooth-running electronic printer provides a permanent record of your calculations. The paper used by the printer is a heat-sensitive type of paper (thermal paper). The only mechanical part of the printer is a precision stepper motor which turns a rubber roller to move the paper past the stationary electronic printheads. When printing, the paper is driven past the printheads in tiny steps. Between each step, small semiconductor elements are heated very quickly by electronic circuits to produce color spots on the thermal paper. After several steps these spots form the numbers, letters and symbols you can read on the thermal paper.

Since the printer is basically an electronic device, paper replacement and printhead cleaning are the only maintenance items required. Please refer to the Maintenance and Service section for paper replacement instructions and for instructions about proper care of the printer.

An additional feature of the PC-100A provides for automatic battery pack charging. When placed in the battery compartment (figure 1) your SR-52 or SR-56 battery pack will be continuously charged. The battery pack charging capability is available when the power cord is connected to a 115 Vac/60 Hz electrical outlet. Charging will continue when the PC-100A is not in use and the power switch is in the "OFF" position.

OPERATING INSTRUCTIONS

CALCULATOR MOUNTING

Mechanical and electrical interface with the calculator is accomplished by the key-actuated mounting bracket/connector on the PC-100A which fits into the battery pack opening in the calculator. A cover is provided to protect the interface connector from dust and other contaminants when it is not in use. A convenient storage compartment for this cover and the battery pack is located under a hinged door at the lower right-hand corner. To mount the calculator, perform the following steps.

1. Remove the battery pack from the calculator and the protective cover from the mounting bracket on the PC-100A.
2. Before storing these items, check to see that the switch in the storage/charging compartment is set to the proper position for the calculator being used. The battery pack snaps into the storage/charging compartment the same way that it does in the calculator (figure 1).
3. The key in the lock must be turned fully counterclockwise before mounting the calculator.
4. Place the battery pack opening in the calculator over the mounting bracket and push the calculator down and toward the rear of the PC-100A to properly position it (figure 2). While holding the calculator down, turn the key one-half turn clockwise to lock the calculator in place. The key should turn freely if the calculator is properly positioned.
5. The calculator may be removed by turning the key counterclockwise. pulling the calculator toward you and lifting it vertically.

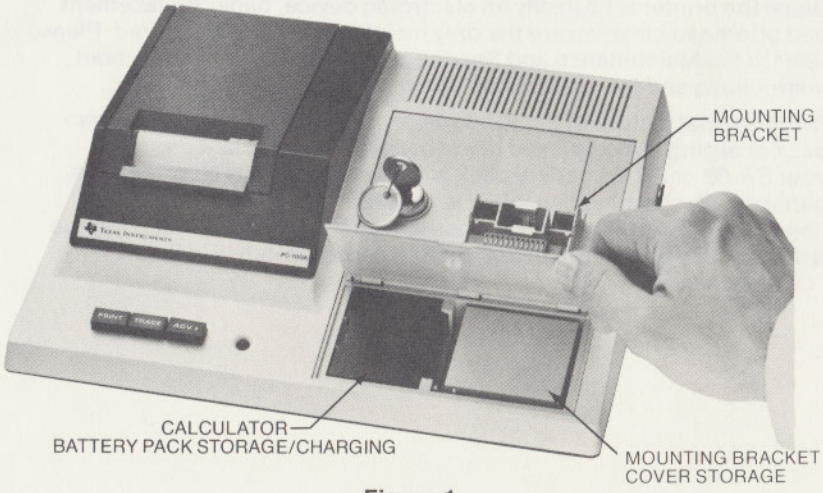

Figure 1
Storage Compartment

Figure 2
Calculator Mounting

OPERATION

Connect the power cord to a 115 Vac/60 Hz electrical outlet and slide the switch on the right side of the PC-100A away from you. A red VLED indicates when power is applied to the thermal printer electronics. Next set the power switch on the calculator to the ON position, press the calculator CLR key and check to see that the display is lighted. You are now ready to begin calculations. The calculator will operate normally, with the printer available as needed. Reverse this procedure when turning the calculator and PC-100A off. Three functional keys on the PC-100A provide manual control of the printer.

Print Key (PRINT) – The print key causes the contents of the display to be printed and PRT to be printed at the right edge of the paper.

Paper Advance Key (ADV ↑) – The paper advance key advances the paper without printing. If the key is pressed quickly, a single blank line is advanced. If the key is held down, the paper will continue to advance. Note: The paper advance key is not operative unless the power switch on the calculator is turned on.

Trace Key (TRACE) – The trace key is a latching switch which in the down position causes operation in the trace mode. In this mode every new function or result is automatically printed. Number entries do not cause a line to be printed. A number entry followed by a function will cause a line to be printed. Operation in the trace mode will continue until the trace key is pressed again to release it.

When in the trace mode of operation the printer provides a detailed record of numbers, function entries and results. Since the PC-100A must devote some amount of time to the printing process, it will ignore keyboard entries during the short printing periods following the function entries. Be careful not to make entries while the printer is operating.

Example: Use the trace mode to print out the following calculation.

Enter	Press	Display	Printout
	TRACE (PC-100A)		
	CLR	0	CLR
2.65	+	2.65	2.65 +
3.95	=	6.6	3.95 =
			6.6
	CLR	0	CLR
	TRACE (PC-100A)		

Three printer-control keys are available on the calculator. The print and paper advance keys on the calculator operate manually in much the same way as the keys on the PC-100A. However, the programmability of these functions offers an added dimension for programs used with the printer. With the addition of a few simple programming steps, you can have automatic problem solving and recording which is a particularly valuable feature for programs involving large amounts of input or output data.

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List, the third printer-control function on the calculator, operates manually to provide a simple method for making a record of the contents of the program memory, starting at any location.

To start listing at location 000 the key sequence is:

2nd rset 2nd list for SR-52

RST 2nd list for SR-56

To start listing at a specified location the sequence is:

GTO **nnn*** 2nd list

The list key used by itself will result in listing beginning with the current position of the program counter. With any of the key sequences listing will continue to the end of the program memory unless interrupted by pressing the HLT or R/S key for the SR-52 and SR-56, respectively. The key must be held down until listing stops.

Program instructions in a listing are designated by two-digit keycodes as defined in the respective calculator manuals.

*Only two digits required for SR-56.

AUDIT TRAIL SYMBOLS IN THE TRACE MODE

Most of the instruction sequences result in easily recognized audit trail symbols. The key sequences which produce symbols differing from the key designations are shown in Tables 1 and 2. If printing occurs while the display is flashing, a question mark will be printed in addition to the other numbers and symbols. For the SR-56, processing will immediately halt.

With the SR-52, the address of the first executable instruction is printed when a label is called. Directly called user-defined keys (not part of a transfer instruction) are not indicated in the audit trail.

Table 1
SR-52 Special Audit Trail Symbols

Key Sequence	Audit Trail
INV 2nd log	10^x
INV lnx	e^x
INV sin	ASIN
INV cos	ACOS
INV tan	ATAN
2nd st flg	STF
INV 2nd st flg	ISTF
2nd if flg	IFF
INV 2nd if flg	IIFF
2nd if err	IFE
INV 2nd if err	IIFE
2nd if pos	IF+
INV 2nd if pos	IIF+
2nd if zro	IFZ
INV 2nd if zro	IIFZ
INV SUM	ISUM
INV 2nd PROD	IPRD
INV 2nd dsz	IDSZ
INV 2nd fix	IFIX
2nd IND STO 01	STO I001
2nd IND RCL 01	RCL I001
2nd IND 2nd PROD 01	PRD I001
2nd IND INV 2nd PROD 01	IPRD I001
2nd IND SUM 01	SUM I001
2nd IND INV SUM 01	ISUM I001
2nd IND 2nd EXC	IEXC I001

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Table 2
SR-56 Special Audit Trail Symbols

Key Sequence	Audit Trail
2nd Ixl	ABS
2nd x = t	EQ.T
INV 2nd x = t	NE.T
2nd x ≧ t	GE.T
INV 2nd x ≧ t	LT.T
2nd PROD	PRD
INV 2nd PROD	IPRD
INV 2nd SUM	ISUM
INV 2nd Int	FRAC
INV 2nd fix	IFIX
INV 2nd dsz	IDSZ
INV sin	ASIN
INV cos	ACOS
INV tan	ATAN
2nd f(n) Σ+	Σ+
2nd f(n) Σ−	Σ−
2nd f(n) Mean	$\bar{x}$
2nd f(n) S.Dev.	SDV
2nd f(n) P→R	P/R
2nd f(n) R→P	R/P
R/S (execute mode)	HLT

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MAINTENANCE AND SERVICE

PRINTING PAPER INSTALLATION

If you are performing calculations or running programs with lengthy printouts, check that sufficient paper remains to complete your calculations. A stripe will appear on the last few feet of the paper tape. When the printheads are resting directly against the rubber roller (out of paper) a clicking noise may be heard when attempting to print or advance paper and the rubber roller will not turn. This is a normal action and will not harm the printer mechanism unless continued for an extended period of time. To ensure optimum printing performance, the printhead cleaning procedure (page 9) must be followed prior to installing each new roll of paper.

Follow these steps to install new paper:

1. Lift the top cover over the printer to access the paper compartment.
2. Grasp the paper roll and lift upward to remove from paper compartment.
3. If paper is engaged by the rubber roller and printheads, pull the paper-release lever to the released position as shown in figure 4. The paper may now be gently pulled from the printer.
4. Insert the paper spindle in the new roll of thermal printing paper and position over the paper compartment as shown in figure 3 (paper unrolls from bottom).

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Figure 3
Paper Installation

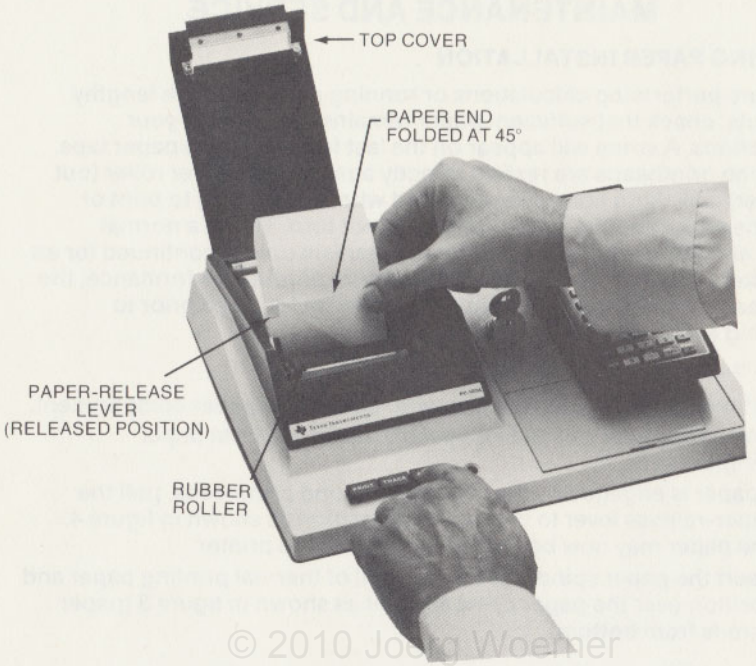

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Figure 4
Paper Installation

5. Lower the new roll of paper (with paper spindle inserted) into the paper compartment, guiding the ends of the paper spindle into the slots.
6. Fold the end of the paper tape to form a 45 degree angle as shown by figure 4.
7. Lift the paper-release lever to the released position and insert the point of the folded paper under the rubber roller.
8. Press the **ADV** ↟ key for the drive motor to pull the paper through the printer. When the point of the paper appears above the printheads, return the paper-release lever to the normal position. Hold the **ADV** ↟ key down until the folded portion of the paper is completely through the printer.

   NOTE: Calculator must be locked in position and its power switch turned on to activate the **ADV** ↟ key.
9. Hold the end of the paper slightly forward and guide it through the slot as the top cover is closed. Printer is now ready for normal operation.

CARING FOR THE PRINTER

Since the rubber roller is basically the only moving part, the printer requires a minimum amount of routine servicing except for paper replacement. Occasionally, foreign particles may collect on the printheads causing digits or portions of digits to be faded on the printout. This type of problem is evident by a continuous faded streak which appears in the same physical position on each printed line. The following steps for printhead cleaning will normally correct this problem:

1. Key in the appropriate program for your calculator as shown in figure 5. Check out the program and printer operation using thermal paper. The program for the SR-52 is run by pressing the **A** key and is stopped by pressing **HLT**. To run the SR-56 program, press **RST, R/S** and press **R/S** again to halt execution.

   NOTE: The PC-100A should not be in the trace mode.
2. Use the printhead cleaning card supplied with your PC-100A. A new card is furnished with each TP-30250 thermal paper pack, available from your retailer or nearest service facility. If you should lose or damage your card, you can substitute the card by cutting an eight-inch length of standard bond paper with a width of two and one-half inches.
3. Move the paper-release lever to the released position as indicated in figure 4 and gently pull the thermal printing paper out of the printer by manually turning the roll of paper.
4. Install the printhead cleaning card in place of the normal printing paper. Return the paper-release lever to the normal position.
5. Execute program described in step 1 until most of the card has passed through the printer. The abrasive action of the card cleans the printheads as should be evident by the faint printing trailing to blank card.
6. Remove the card from the printer and reinstall the thermal printing paper as prescribed at the beginning of this section.
7. Run the program again and examine printout for improved printing.

CAUTION

Use only TP-30250 thermal printing paper. Other papers may damage the printheads. Contact your retailer or nearest service facility.

SR-52

Loc.	Key
000	*LBL
001	A
002	1
003	0
004	STO
005	0
006	0
007	3
008	*1/x
009	+/–
010	*prt
011	×
012	1
013	0
014	=
015	*dsz
016	0
017	1
018	0
019	CLR
020	Inx
021	EE
022	+/–
023	*prt
024	GTO
025	0
026	2
027	3

SR-56

Loc.	Key
00	1
01	0
02	STO
03	0
04	3
05	*1/x
06	+/–
07	*prt
08	×
09	1
10	0
11	=
12	*dsz
13	0
14	7
15	8
16	8
17	*fix
18	8
19	+/–
20	EE
21	+/–
22	8
23	9
24	*prt
25	GTO
26	2
27	4

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Figure 5
Head Cleaning Program

IN CASE OF DIFFICULTY

In the event that you have difficulty with your PC-100A, the following instructions will help you analyze the problem and you may be able to fix your printer without returning it to a service center. If the suggested remedies are not successful, contact the Consumer Relations Department by mail or telephone (refer to *If You Have Questions or Need Assistance*). Please describe in detail the symptoms of your PC-100A.

1. Check that the PC-100A power switch and the calculator power switch are on. Also check that the power cord is properly inserted in a working 115 Vac electrical outlet.
2. Check that only a ¼ amp AG "slow-blow" fuse is being used and is properly installed. Check fuse by substituting with a known good fuse of the value specified above, then check PC-100A for proper operation.
3. Check that the calculator-select switch (page 2) is set to the proper position for the calculator being used.
4. If the calculator display "locks up" or does not appear, turn calculator power switch OFF and then ON. Press calculator CLR key. NOTE: Improper power-up sequence (page 3) can allow PC-100A and calculator to become susceptible to the inconvenience of display "lock-up", display does not appear, and/or erroneous printout.
5. Check that the calculator is locked firmly in position and the locking key is in the maximum clockwise position.
6. Check for foreign particles on the connector bracket and on the contacts in the battery compartment of the calculator. If the contacts are dirty, clean with a cotton swab moistened with alcohol. OTHER CLEANERS AND SOLVENTS CAN DAMAGE THE CALCULATOR OR PC-100A.
7. The rubber drum in the printer may not rotate and may chatter if paper is not installed. Refer to *Printing Paper Installation* in this manual.
8. If no digits appear when printing, the thermal printing paper may be installed with the wrong side of the paper against the printheads.
9. If printed numbers have a continuous faded streak which appears in the same physical position on each printed line, refer to *Caring for the Printer* in this manual.
10. Check the operating procedures for the PC-100A in this manual and in the calculator owner's manual. Improper key sequences can cause unexpected results to be printed.
11. Printer ceases operation and power cycles off and on. This may be caused by improper contact of calculator with the connector bracket. Remove calculator, perform step 6 above, and reinstall calculator.
12. Remove the calculator and reinstall the battery pack. If a calculator difficulty disappears, the difficulty is most likely confined to the PC-100A. If the calculator difficulty is still present, refer to *In Case of Difficulty* in the calculator owner's manual.

If you need to return the printer to a Texas Instruments Service Facility, please include information on the difficulty experienced with the PC-100A and include any printout samples related to the difficulty. **Be sure the key is enclosed.** Also include your name, address, city, state and zip code. Shipments must be sent prepaid and insured and should be carefully packaged in the original carton or in another suitable carton with at least two inches of packing material between all sides of the PC-100A and the carton for adequate protection against shock and rough handling. Texas Instruments cannot assume any responsibility for loss of or damage to uninsured shipments.

NOTE: The P.O. Box number listed for the Lubbock Service Facility on the back cover of this manual is for United States parcel post shipments only. If you use another carrier, the street address is:

Texas Instruments Incorporated
2305 University Ave.
Lubbock, Texas 79415

IF YOU NEED SERVICE INFORMATION

If you need service information for your PC-100A, write the Consumer Relations Department at:

Texas Instruments Incorporated
P.O. Box 53
Lubbock, Texas 79408

or call Consumer Relations at 800-858-1802 (toll-free within all contiguous United States except Texas) or 800-692-1353 (toll-free within Texas). If outside the contiguous United States, call 806-747-3841 (We regret that we cannot accept collect calls at this number.)

EXCHANGE CENTERS

If your PC-100A requires service, instead of returning the unit to a service facility for repair, you may elect to exchange it for a factory-rebuilt unit of the SAME MODEL at one of the exchange centers which have been established across the United States. A $3.00 charge will be made by the exchange center for in-warranty exchanges. Out-of-warranty exchanges will be charged at the rates in effect at the time of the exchange. Please call the Consumer Relations Department for further details and the location of the nearest exchange center.

IMPORTANT

THE WARRANTY IS VOID IF THE SERIAL NUMBER HAS BEEN ALTERED OR DEFACED.

Texas Instruments reserves the right to make changes in materials and specifications without notice.

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WARNING

Replace power cord only with another cord of same polarity.

ONE-YEAR LIMITED WARRANTY

WARRANTEE

This warranty for Texas Instruments electronic printers used with Texas Intruments programmable calculators extends to the original purchaser of the printer.

WARRANTY DURATION

This Texas Instruments electronic printer is warranted to the original purchaser for a period of one (1) year from the original purchase date.

WARRANTY COVERAGE

This Texas Instruments electronic printer is warranted against defective materials or workmanship. **THIS WARRANTY IS VOID IF: (i) THE PRINTER HAS BEEN DAMAGED BY ACCIDENT OR UNREASONABLE USE, NEGLECT, IMPROPER SERVICE OR OTHER CAUSES NOT ARISING OUT OF DEFECTS IN MATERIAL OR WORKMANSHIP, (ii) THE SERIAL NUMBER HAS BEEN ALTERED OR DEFACED.**

WARRANTY PERFORMANCE

During the above one (1) year warranty period your printer will either be repaired or replaced with a reconditioned model of an equivalent quality (at TI's option) when the printer is returned, postage prepaid and insured, to a Texas Instruments Service facility listed below. In the event of replacement with a reconditioned model, the replacement unit will continue the warranty of the original unit or 90 days, whichever is longer. Other than the postage and insurance requirement, no charge will be made for such repair, adjustment, and/or replacement.

WARRANTY DISCLAIMERS

ANY IMPLIED WARRANTIES ARISING OUT OF THIS SALE(INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO THE ABOVE ONE (1) YEAR PERIOD. TEXAS INSTRUMENTS SHALL NOT BE LIABLE FOR LOSS OF USE OF THE PRINTER OR OTHER INCIDENTAL OR CONSEQUENTIAL COSTS, EXPENSES, OR DAMAGES INCURRED BY THE PURCHASER.

Some states do not allow the exclusion or limitation of implied warranties or consequential damages, so the above limitations or exclusions may not apply to you.

LEGAL REMEDIES

This warranty gives you specific legal rights, and you may also have other rights that vary from state to state.

TEXAS INSTRUMENTS CONSUMER SERVICE FACILITIES

Texas Instruments Service Facility
P.O. Box 2500
Lubbock, Texas 79408

Texas Instruments Service Facility
41 Shelley Road
Richmond Hill, Ontario, Canada

Consumers in California and Oregon may contact the following Texas Instruments offices for additional assistance or information:

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Costa Mesa, California 92626
(714) 540-7190

Texas Instruments Consumer Service
10700 Southwest Beaverton Highway
Park Plaza West, Suite 111
Beaverton, Oregon 97005
(503) 643-6758

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