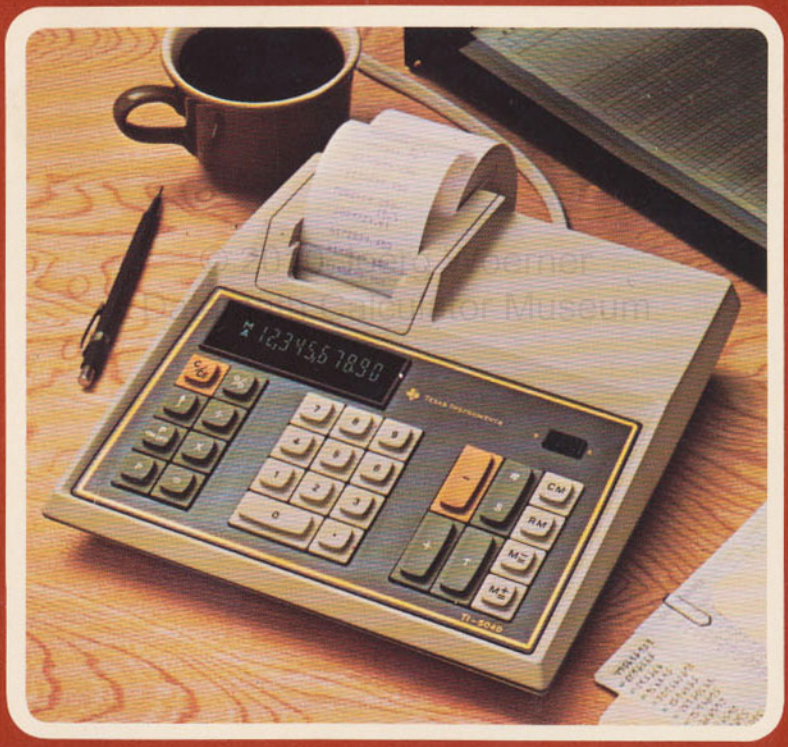
Texas Instruments

electronic printing calculator with display and memory

TI-5040



OPERATING MANUAL

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IMPORTANT: Dim or partial printing may be remedied with the PRINTHEAD CLEANING procedure on page 30.

IMPORTANT

Record the serial number from the bottom of the calculator 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.

Model No.	Serial No.	Purchase Date
TI-5040		

INTRODUCTION

The TI-5040 printing and display calculator provides you with the versatility of a paper tape for permanent records and a large display for checking entries and performing quick calculations without printing. The reliable integrated circuits and solid-state printer pioneered by Texas Instruments and the modern low-profile case make the TI-5040 virtually ageless in performance and styling. The lightweight durable construction permits convenient operation in your home, office or anyplace standard electrical outlets are available.

FEATURES

Full memory – Four memory operations... sum to, subtract from, recall or clear the memory without affecting calculations in progress. Special symbols are printed and displayed to indicate memory operations.

Independent Add Register – Addition and subtraction with the familiar entry sequence of standard business machines. Perform multiplication and division without affecting previous add/subtract operations in progress... operates as if it has a second memory.

Electronic Printer – Quiet, smooth electronic printer developed by Texas Instruments prints up to 10 digits plus audit trail. Keyboard control to turn printer off and print only selected number entries and results.

Large Bright Display – Easy to read blue-green display shows entries and results with up to 10 digits. Convenient comma punctuation and special symbols to indicate when the independent add register and memory are in use.

Keyboard Buffering – Enter additional numbers and functions while printer is operating.

Two-Key Roll-Over – Lets you press a second key even before the previously pressed key is released.

Add Mode – F/A switch selects full floating decimal or automatic two-place decimal (add mode) for convenient calculation of dollars and cents figures.

Non-Add Operation – Prints reference numbers without affecting calculations.

Automatic Constant – Multiplication or division by a constant number without reentering numbers.

Percent Key – Permits easy calculation of percentages, taxes, discounts and other problems.

ELECTRONIC PRINTER OPERATION

The paper used by the electronic printer is a heat-sensitive paper (TP-27225 or TP-20225 thermal paper). The only mechanical part of the printer is a precision stepper motor which turns the rubber roller to move the thermal paper past the stationary electronic printhead. When printing, the paper is driven past the printhead in tiny steps. Between each step, small semiconductor (solid-state) elements are heated very quickly by electronic circuits and produce color spots on the thermal paper. After several steps, these spots form the numbers and symbols you can read on the thermal paper.

Since the printer is basically an electronic device, it *does not require* special ink ribbons or special maintenance. Using metal probes, sharp objects or lubricants may damage the printhead or rubber roller. Please refer to *Service Information* section of this manual for paper replacement instructions and actions to take when a difficulty occurs.

NOTICE

THERMAL PAPER STORAGE—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.

APPLICATION OF ADHESIVE CELLOPHANE TAPE DIRECTLY ON PRINTING MAY ALSO CAUSE FADING.

CALCULATOR OPERATION—IN NORMAL OPERATION YOUR CALCULATOR'S DISPLAY WILL GO BLANK WHILE PRINTING OR PERFORMING CALCULATIONS. THIS DOES NOT AFFECT CALCULATOR OPERATION NOR DOES IT REQUIRE ENTRIES TO BE MADE AT A SLOWER RATE.

BASIC OPERATIONS

The TI-5040 printing calculator is quite simple to operate and you have probably already used most of the functions successfully. However, there are many valuable features of the TI-5040 which are not obvious when looking at the keyboard. The following descriptions and examples will assist you in learning the detailed operation of your calculator.

INITIAL OPERATION

Connect the power cord to an appropriate 117 Vac/60 Hz electrical outlet. Be sure that the thermal paper (TP-27225 or TP-20225) is properly installed in the calculator as described in the Service Information section of this manual.

The power switch is located on the right side of the calculator. Each time the calculator is turned on, it prints "0.T" ("0.00T" in add mode) and displays "0." ("0.00" in add mode) to indicate it is ready for operation.

PRINTER CONTROL

The printer operation is controlled with three keys located on the left side of the keyboard.

Printer On/Off – Each operation of [P ON OFF] alternately turns the printer off and on. The printer is automatically on when the calculator power switch is turned on.

Single-Line Print – When the printer is off, each operation of [P] causes the displayed number to be printed with associated audit symbol.

Paper Advance – Pressing [↑] allows you to run out extra paper to provide space between problems or to tear off the paper after completing a problem.

ADDITION AND SUBTRACTION

The TI-5040 allows you to key in numbers in the same left-to-right sequence that you read them. Addition and subtraction entries are made with the same rapid-entry style of most standard business machines. A unique feature of the calculator is that addition and subtraction entries are kept separate from multiplication and division entries within the calculator. This feature in the TI-5040 is referred to as the independent add register. The independent add register permits solution of complex problems without using the memory for intermediate results. Detailed examples of this feature are shown in *Independent Add Register use in Mixed Calculations.*

The following keys are used to perform simple addition and subtraction:

Add Key [+] —Adds the displayed number to the independent add register. A "+" symbol is printed to the right of the number added. The display shows an "A" symbol when the independent add register contains a non-zero quantity.

Subtract Key [−] —Subtracts the displayed number from the independent add register. A "−" symbol is printed to the right of the number subtracted. The display shows an "A" symbol when the independent add register contains a non-zero quantity.

Non-add/Subtotal Key [S/#] —When used immediately following a number entry, the entered number is printed with the "#" symbol printed to the right of the number. Numbers printed with the "#" symbol are not entered into the independent add register and do not affect the calculation in progress. When the key is used immediately following use of the [+] or [−] key, the present subtotal of the independent add register is displayed and printed with an "S" symbol printed to the right of the subtotal. The contents of the independent add register are not affected by the [S/#] key.

Total Key [T] —Prints and displays the total of the independent add register with the "T" symbol printed to the right of the total. The [T] key also clears the independent add register (turns "A" symbol off) such that the calculator is ready for new addition and subtraction entries.

Clear/Clear Entry Key [C/CE] —When used immediately following a number entry, this key will clear the entered number and allow another number to be entered in its place without affecting the independent add register. **Note that this key will not clear the independent add register.** Pressing [T] automatically clears the independent add register after the total is printed. Pressing [T] a second time will cause 0.T (0.00T in add mode) to be printed. See *Multiplication and Division* for further explanation of the [C/CE] key.

The following example problems assume that the **F/A** switch is set to the **F** or *Floating* position which is considered the normal calculating mode. With the switch in the **F** position, all results are displayed and printed with the full accuracy of the calculator. If you frequently perform calculations involving dollars and cents, you may wish to use the convenient add-mode feature of the calculator described later in this manual.

The decimal point key is used wherever it appears in a number. When the decimal is not entered, the calculator automatically prints and displays the decimal point to the right of the last number entered before [+] or [−] is pressed. Refer to *Add-Mode Calculations* for decimal positioning when the **F/A** switch is in the **A** position.

Example: 5.67 + 6 = 11.67

Enter	Press	Display	Print
Set power switch on		0.	0.T
5.67	[+]	A 5.67	5.67+
6	[+]	A 6.	6.+
	[T]	11.67	11.67T

After the [T] key is used, a new problem can be entered without manually clearing the independent add register or display.

When a total is negative, a minus sign appears to the left of the total.

Example: −8 + 3.21 − 4.6 = −9.39

Enter	Press	Display	Print
8	[−]	A 8.	8.−
3.21	[+]	A 3.21	3.21+
4.6	[−]	A 4.6	4.6−
	[T]	−9.39	−9.39T

The repeat add/subtract feature of the calculator allows you to repetitively add or subtract the same number without reentering the number.

Example: 4.59 + 4.59 + 4.59 − 6 − 6 = 1.77

Enter	Press	Display	Print
4.59	[+]	A 4.59	4.59+
	[+]	A 4.59	4.59+
	[+]	A 4.59	4.59+
6	[−]	A 6.	6.−
	[−]	A 6.	6.−
	[T]	1.77	1.77T

A subtotal is desirable when you wish to obtain intermediate and final results.

Example: 1.064 − .018 = 1.046
1.064 − .018 + 1.19 = 2.236

Enter	Press	Display	Print
1.064	[+]	A 1.064	1.064+
.018	[−]	A 0.018	0.018−
	[S/#]	A 1.046	1.046S
1.19	[+]	A 1.19	1.19+
	[T]	2.236	2.236T

When used immediately following a keyboard number entry, the [S/#] key will cause the number to be printed and displayed without affecting the calculation.

Example: A listing shows a certain rating number for six different items. Find the total rating of item number 1, 4 and 6.

Item No.	Rating No.	Item No.	Rating No.
1	17	4	76
2	8.5	5	14.5
3	45	6	34

Enter	Press	Display	Print
1	[S/#]	1.	1.#
17	[+]	A 17.	17.+
4	[S/#]	A 4.	4.#
76	[+]	A 76.	76.+
6	[S/#]	A 6.	6.#
34	[+]	A 34.	34.+
	[T]	127.	127.T

Occasionally, you may catch yourself entering an incorrect number or decide the number you keyed in is not wanted. When this happens, the [C/CE] key can be used to clear the unwanted entry.

Example: 49.01 + 16.55 + 4.9 = 70.46

Enter	Press	Display	Print
49.01	[+]	A 49.01	49.01+
16.555*	[C/CE]	A 0.	
16.55	[+]	A 16.55	16.55+
4.9	[+]	A 4.9	4.9+
	[T]	70.46	70.46T

*An extra 5 was accidentally entered.

Unwanted entries can also be effectively eliminated from the total value after the [+] or [−] operation by simply using the opposite operation to cancel the effect of the unwanted entry.

Example: 49.01 + 16.55 + 4.9 = 70.46

Enter	Press	Display	Print
49.01	[+]	A 49.01	49.01+
16.555	[+]	A 16.555	16.555+
	[−]	A 16.555	16.555−
16.55	[+]	A 16.55	16.55+
4.9	[+]	A 4.9	4.9+
	[T]	70.46	70.46T

If you accidentally use [T] when you intended to use [S/#], the total is easily reentered into the independent add register with the [+] key.

Example: 156 + 65 + 320 = 541

Enter	Press	Display	Print
156	[+]	A 156.	156.+
65	[+]	A 65.	65.+
	[T]	221.	221.T
	[+]	A 221.	221.+
320	[+]	A 320.	320.+
	[T]	541.	541.T

ERROR/OVERFLOW CONDITIONS

You can enter up to 10 digits into the calculator. If you enter 11 or more digits, an entry overflow occurs which causes the calculator to clear the first 11 digits entered, display "Error" and print "ERROR." When this occurs, you can reenter a number that has 10 or less digits without affecting previous entries.

Example: 123,456.7899 + 555,765.4322 = 679,222.2221

Enter	Press	Display	Print
123456.7899	[+]	A 123,456.7899	123456.7899+
5555765.4322*		A Error	ERROR
555765.4322	[+]	A 555,765.4322	555765.4322+
	[T]	679,222.2221	679222.2221T

*An extra 5 was accidentally entered causing entry overflow.

If more than 11 digits had been entered, the calculator would print "ERROR", however, the 12th, 13th, etc., digits would be displayed as a new entry. Use [C/CE] to clear the display when this occurs. It is important to remember that an entry overflow does not affect the independent add register, therefore the "A" symbol remains in the display. Press [T] if you wish to start a new add/subtract problem after an entry overflow.

Another overflow condition which will cause "Error" to be displayed and printed is a result overflow. If the accumulated internal total or result is larger than 9999999999 (10 digits) or −999999999 (9 digits for negative results), "Error" is displayed, "ERROR" is printed and the overflow is automatically cleared for a new problem to be entered.

Example: 9,999,999,999 + 1 = Overflow

Enter	Press	Display	Print
9999999999	[+]	A 9,999,999,999.	9999999999.+
1	[+]	A 1.	1.+
		Error	ERROR

Note that the calculator uses 5/4 round off for 10-digit positive or 9-digit negative results. This means that an internal result of −999999999.4 will round off to −999999999. However, −999999999.5 will round up causing an overflow. In addition, the round off operation occurs with each entry. If the value 0.4 is added to 5555555555, the internal result is rounded off immediately to 5555555555 again as if the 0.4 were never entered.

MULTIPLICATION AND DIVISION

Now that you are familiar with the addition and subtraction keys on the right side of the keyboard, the multiplication and division keys on the left side of the keyboard will now be described.

Keep in mind that multiplication and division operations are independent of addition and subtraction. The summing of a column of numbers can be in progress **and** an intermediate calculation involving [×], [÷] and [=] can be performed without affecting the summing operation. See *Independent Add Register use in Mixed Calculations* for further explanation and examples.

The four basic keys concerned with multiplication and division are:

Multiply Key [×] —Causes the last entered number or last result to be printed as the multiplicand with a "×" symbol printed to the right of the number. Also completes any previous [×] or [÷] entry and displays intermediate result.

Divide Key [÷] – Causes the last entered number or the last result to be printed as the dividend with a "÷" symbol printed to the right of the number. Also completes any previous [×] or [÷] entry and displays intermediate result. Division by zero is invalid and will cause ERROR to be printed and displayed.

Equals Key [=] – Completes multiplication or division. When used following multiplication or division, the last entered or displayed number is printed as the multiplier or divisor with an "=" symbol printed to the right of the number. Then the result is displayed and printed with no symbol to the right.

Clear/Clear Entry Key [C/CE] – When used immediately following a number entry, this key will clear the entered number and allow another number to be entered in its place without affecting previous entries. When used following a [×] or [÷] entry, or pressed twice after a number entry, a "C" symbol is printed to indicate that the multiplication or division problem has been cleared and the calculator is ready for entry of a new problem.

Multiplication and division problems are quite simple to solve since most problems may be entered in the same order they are written.

Example: 24.3 × 15 = 364.5

Enter	Press	Display	Print
24.3	[×]	24.3	24.3×
15	[=]	15.	15.=
		364.5	364.5

Example: 130 ÷ 6.5 = 20

Enter	Press	Display	Print
130	[÷]	130.	130.÷
6.5	[=]	6.5	6.5=
		20.	20.

Notice that it is not necessary to press [C/CE] after a problem before starting a new problem when the [=] key is used.

The following example illustrates that intermediate results are displayed but not printed when solving chain calculations in multiplication and division.

Example: 120 × 50 ÷ 30 = 200

Enter	Press	Display	Print
120	×	120.	120.×
50	÷	6,000.	50.÷
30	=	30.	30.=
		200.	200.

If an intermediate displayed result needs to be printed, press P.

Example: 120 × 50 = 6000, 6000 ÷ 30 = 200

Enter	Press	Display	Print
120	×	120.	120.×
50	÷	6,000.	50.÷
	P	6,000.	6000.÷
30	=	30.	30.=
		200.	200.

The result of one problem can easily be picked up as entry to another problem without reentering the result.

Example: 120 × 50 = 6000 6000 ÷ 30 = 200

Enter	Press	Display	Print
120	×	120.	120.×
50	=	50.	50.=
		6,000.	6000.
	÷	6,000.	6000.÷
30	=	30.	30.=
		200.	200.

When an erroneous entry is made, the C/CE key may be used to clear an entry in the same manner shown for addition and subtraction.

Example: 16 ÷ 5 × 12 = 38.4

Enter	Press	Display	Print
16	÷	16.	16.÷
6*	C/CE	0.	
5	×	3.2	5.×
12	=	12.	12.=
		38.4	38.4

*A 6 was accidentally entered.

Besides the clear-entry function, the [C/CE] key will act as a clear key for multiplication and division problems. If at some point in a problem you decide to reenter the problem or even start a new problem, simply press [C/CE] once or twice and the calculator will display "0." and print a "C" symbol indicating it is ready to start a new multiplication and division problem. The [C/CE] key *does not* affect the contents of the independent add register used for addition and subtraction.

Example: 5.9 × 13.6 ÷ (start new problem)
39 ÷ 12.5 = 3.12

Enter	Press	Display	Print
5.9	[×]	5.9	5.9×
13.6	[÷]	80.24	13.6÷
	[C/CE]	0.	C
39	[÷]	39.	39.÷
12.5	[=]	12.5	12.5=
		3.12	3.12

If the [C/CE] key had been used immediately following a number entry, the first [C/CE] would clear the number entry only and a second [C/CE] would be required before a new problem is entered.

Example: 5.9 × 13.6 (start new problem)
39 ÷ 12.5 = 3.12

Enter	Press	Display	Print
5.9	[×]	5.9	5.9×
13.6	[C/CE]	0.	
	[C/CE]	0.	C
39	[÷]	39.	39.÷
12.5	[=]	12.5	12.5=
		3.12	3.12

Another method to terminate a multiplication and division problem is to press [=] and begin the new problem. While this method is simple, if the printed paper tape is saved for reference purposes, there is no clear indication that the problem was not completely entered.

Negative numbers cannot be directly keyed into the calculator in multiplication and division problems. A number can be assigned a negative value as an entry to or result of the independent add register. However, a negative number cannot contain more than 9 digits.

Example: $11.32 \times (-6) \times (-5.04) = 342.3168$

Enter	Press		Display	Print	Comments
11.32	[×]		11.32	11.32×	1st Multiplier
6	[−]	A	6.	6.−	See note
	[T]		−6.	−6.T	
	[×]		−67.92	−6.×	2nd Multiplier
5.04	[−]	A	5.04	5.04−	See note
	[T]		−5.04	−5.04T	
	[=]		−5.04	−5.04=	3rd Multiplier
			342.3168	342.3168	Result

NOTE: The independent add register is used only to obtain negative multiplication or division entries with the [−] [T] key sequence.

Decimal-fraction results (results with digits to the right of the decimal point) that exceed 10 digits are automatically rounded up one if the 11th digit is 5 or larger. Negative results are rounded to 9 digits.

Example: $5 \div 3 = 1.6666666666.....$

Enter	Press	Display	Print
5	[÷]	5.	5.÷
3	[=]	3.	3.=
		1.666666667	1.666666667

An entered number or result can easily be squared without reentering the number.

Example: $125 \times 125 = 15625$

Enter	Press	Display	Print
125	[×]	125.	125.×
	[=]	125.	125.=
		15,625	15625.

Multiplication and division overflow conditions are similar to the addition and subtraction overflow conditions in that more than 10 digits in an intermediate or final result will cause "ERROR" to be printed, "Error" to be displayed and the calculator to be automatically reset for entry of a new problem. As in addition and subtraction, a negative result cannot be larger than −999999999 (9 digits). An entry overflow is also the same in multiplication and division as for addition and subtraction. However, if [C/CE] is used when "Error" is displayed, "C" is printed and previous multiplication and division entries are lost.

Note that a multiplication/division result overflow does not affect the independent add register. Likewise, an addition/subtraction overflow does not affect previous multiplication/division entries.

INDEPENDENT ADD REGISTER USE IN MIXED CALCULATIONS

The previous descriptions have not considered problems that require a combination of addition, subtraction, multiplication and division. The reason is that the method of entering addition and subtraction problems differs from entering multiplication and division problems. In fact, the only key described thus far that is common to both groups of calculations is the [C/CE] key.

Besides the differences in entry methods, it is very important to remember that the calculator internally keeps the results of multiplication and division entries separate from addition and subtraction entries as if there are two calculators in one. To emphasize this point, the first example illustrates an addition and a multiplication problem which uses the same numbers without a number being entered twice. Notice that the calculator provides two results as if two different problems were entered separately.

Example: 12 + 15 = 27, 12 × 15 = 180

Enter	Press	Display	Print	Comments
12	[+]	A 12.	12.+	1st Add entry
	[×]	A 12.	12.×	1st Multiply entry
15	[+]	A 15.	15.+	2nd Add entry
	[=]	A 15.	15.=	2nd Multiply entry
		A 180.	180.	Multiplication result
	[T]	27.	27.T	Addition result

The value of the independent operations can be realized when you begin solving mixed or complex calculations. Many of the following examples would require the memory to be used to store intermediate results if the calculator did not have the independent processing capability. Thus, the memory can be saved for more difficult problems.

Sum of Products

Example:
$$\begin{aligned} 4 \times 11.99 &= 47.96 \\ 6 \times 2.97 &= 17.82 \\ 12 \times 0.98 &= \underline{11.76} \\ \text{Total} &\quad 77.54 \end{aligned}$$

Enter	Press	Display	Print
4	×	4.	4.×
11.99	=	11.99	11.99=
		47.96	47.96
	+	A 47.96	47.96+
6	×	A 6.	6.×
2.97	=	A 2.97	2.97=
		A 17.82	17.82
	+	A 17.82	17.82+
12	×	A 12.	12.×
.98	=	A 0.98	0.98=
		A 11.76	11.76
	+	A 11.76	11.76+
	T	77.54	77.54T

Sum of Quotients

Example: $\frac{1.98}{4} - \frac{4.98}{8} = -0.1275$

Enter	Press	Display	Print
1.98	÷	1.98	1.98÷
4	=	4.	4.=
		0.495	0.495
	+	A 0.495	0.495+
4.98	÷	A 4.98	4.98÷
8	=	A 8.	8.=
		A 0.6225	0.6225
	−	A 0.6225	0.6225−
	T	−0.1275	−0.1275T

Product of Sums

Example: $(2 + 3) \times (4 + 5) = 45$

Enter	Press		Display	Print
2	[+]	A	2.	2.+
3	[+]	A	3.	3.+
	[T]		5.	5.T
	[×]		5.	5.×
4	[+]	A	4.	4.+
5	[+]	A	5.	5.+
	[T]		9.	9.T
	[=]		9.	9.=
			45.	45.

Product/Quotient of Sums

Example: $\frac{(7 + 5) \times (6 - 4)}{3 - 12} = -2.66666667$

Enter	Press		Display	Print
7	[+]	A	7.	7.+
5	[+]	A	5.	5.+
	[T]		12.	12.T
	[×]		12.	12.×
6	[+]	A	6.	6.+
4	[−]	A	4.	4.−
	[T]		2.	2.T
	[÷]		24.	2.÷
3	[+]	A	3.	3.+
12	[−]	A	12.	12.−
	[T]		−9.	−9.T
	[=]		−9.	−9.=
			−2.66666667	−2.66666667

SPECIAL FUNCTIONS

MEMORY OPERATIONS

The TI-5040 has an independent live memory that is accessed by using the M+, M−, RM and CM keys to sum to or subtract from the memory, recall memory or clear memory. Also, multiplication and division can be completed with the result directly summed to or subtracted from the memory by using the M+ or M− key.

Sum to Memory M+ —Sums the displayed number into the memory and prints the number summed to memory with "M+" to the right of the number. The symbol "M" appears on the left side of the display to indicate the memory contains a non-zero quantity. If an incomplete multiplication or division problem is in the calculator, the M+ key completes the multiplication or division and then sums the result into memory. This key does not affect the independent add register.

Subtract from Memory M− —Subtracts the displayed number from the memory and prints the number subtracted from memory with "M−" to the right of the number. The symbol "M" appears on the left side of the display to indicate the memory contains a non-zero quantity. If an incomplete multiplication or division problem is in the calculator, the M− key completes the multiplication or division and subtracts the result from memory. This key does not affect the independent add register.

Recall Memory Total RM —Causes the total stored in memory to be displayed and printed with "M" to the right of the total. The total recalled from memory may be treated the same as any result. Use the recalled number by pressing a function key or enter a new number in its place. The RM key does not affect the total in memory.

Clear Memory CM —Clears only the memory, turns off "M" symbol in display and prints "M". This key may be used at any time.

The overflow conditions for the memory are the same as specified for the independent add register in addition and subtraction.

Important: Remember that M+ or M− adds to or subtracts from memory. It is a good practice to press CM or check that the "M" symbol is not displayed when beginning a new problem which will use the memory.

Example: Perform the following calculation without affecting the content of the independent add register.

$88 + 16 + 16 - 32 = 88$

Enter	Press	Display	Print
	CM	See note	M C
88	M±	M 88.	88. M+
16	M±	M 16.	16. M+
	M±	M 16.	16. M+
32	M=	M 32.	32. M=
	RM	M 88.	88. M=

NOTE: The number displayed prior to CM remains in the display after CM is pressed.

Example: Perform the following calculation without affecting the content of the independent add register.

$(3.2 \times 6) + 15 - (9 \div 2.5) = 30.6$

Enter	Press	Display	Print
	CM		M C
3.2	×	3.2	3.2×
6	M±	6.	6.=
		M 19.2	19.2
15	M±	M 15.	15. M+
9	÷	M 9.	9.÷
2.5	M=	M 2.5	2.5=
		M 3.6	3.6 M−
	RM	M 30.6	30.6 M=

Besides the ability to store a number for later recall, the memory permits the versatility to solve several parts of a problem in a straightforward manner. The following example illustrates how the memory and independent add register can be used to solve three problems without reentering numbers or intermediate results.

Example: Assume you have three groups of items with each group having separate cost per item and you need to calculate the 1) total cost for each group, 2) the total cost of all groups and 3) the average cost per item of all groups.

Group 1
Number of items = 36
Cost per item = $1.95

Group 2
Number of items = 150
Cost per item = $.75

Group 3
Number of items = 16
Cost per item = $1.29

Enter	Press	Display	Print	Comments
	CM		M C	
36	+	A 36.	36.+	
	×	A 36.	36.×	
1.95	M±	A 1.95	1.95=	
		M A 70.2	70.2 M+	Group 1 cost
150	+	M A 150.	150.+	
	×	M A 150.	150.×	
.75	M±	M A 0.75	.75=	
		M A 112.5	112.5 M+	Group 2 cost
16	+	M A 16.	16.+	
	×	M A 16.	16.×	
1.29	M±	M A 1.29	1.29=	
		M A 20.64	20.64 M+	Group 3 cost
	RM	M A 203.34	203.34 M=	Total group cost from memory
	÷	M A 203.34	203.34÷	
	T	M 202.	202.T	Total number of items from add register
	=	M 202.	202.=	
		M 1.006633663	1.006633663	Average cost per item

ADD-MODE CALCULATIONS

The add-mode feature of the calculator is convenient when addition/subtraction calculations involve dollars and cents or accuracy of multiplication/division results is required to two decimal places.

Floating/Add-Mode (F/A) Switch – This switch may be set to **F** for the floating mode for maximum accuracy or set to **A** for add mode.

In the add mode, number entries followed by [+], [−], [M±] or [M=] are automatically entered with the decimal point positioned two places to the left of the last entry. Therefore, dollars and cents may be entered without using the decimal point key.

Example: $5.23 + $17.00 − $0.75 = $21.48

Enter	Press	Display	Print
	F/A→A [T]	0.00*	0.00T
523	[+]	A 5.23	5.23+
1700	[+]	A 17.00	17.00+
75	[−]	A 0.75	0.75−
	[T]	21.48	21.48T

Note that when the **F/A** switch is set to **A**, the [T] key causes "0.00T" to be printed and "0.00" to be displayed in place of the single zero in the floating mode.

The decimal point key may be used to override the add mode for individual entries. If more than two digits are entered after the decimal point entry, the number is rounded to two decimal places when summed or subtracted.

Example: $3.133 + $0.005 + $4.56 = $7.698 = $7.70

Enter	Press	Display	Print
	F/A→A		
3.133	[+]	A 3.13	3.13+
.005	[+]	A 0.01	0.01+
456	[+]	A 4.56	4.56+
	[T]	7.70	7.70T

*If an "M" appears in the display from the last problem, press [CM] and continue.

Multiplication and division entries are not affected by add mode but results are always rounded to two decimal places when the equal key is pressed. Also, any displayed number may be rounded to two places in the add mode by pressing [P].

Example: 1.556 × 3.21 ÷ 56.113 = .0890125283 = .09

Enter	Press F/A→A	Display	Print
1.556	[×]	1.556	1.556×
3.21	[÷]	4.99476	3.21÷
56.113	[=]	56.113	56.113=
		0.09	0.09

MULTIPLICATION AND DIVISION BY A CONSTANT

The calculator has an automatic constant register which will retain the last [×] or [÷] entry and the composite multiplicand for multiplication or the divisor for division. The constant register has no effect on normal calculations as described thus far in the manual. The calculator is designed to look for the sequence of a number entry followed by equals. When this sequence is used, the calculator uses the number and function in the constant register to complete the calculation. The constant number is automatically replaced when a new problem is entered or when [C/CE] is used to clear the problem (a "C" is printed).

For simple calculations, the first entry is the constant number in multiplication and the second entry is the constant number in division.

Example: 5 × 3 = 15, 5 × 4 = 20, 5 × .95 = 4.75

Enter	Press	Display	Print
5	[×]	5.	5.×
3	[=]	3.	3.=
		15.*	15.*
4	[=]	4.	4.=
		20.	20.
.95	[=]	0.95	0.95=
		4.75	4.75

*If 15.00 appears, the calculator is in the add mode. Set the **F/A** switch to **F** and continue.

Example: 100 ÷ 3 = 33.33333333, 18 ÷ 3 = 6, 4.7 ÷ 3 = 1.566666667

Enter	Press	Display	Print
100	[÷]	100.	100.÷
3	[=]	3.	3.=
		33.33333333	33.33333333
18	[=]	18.	18.=
		6.	6.
4.7	[=]	4.7	4.7=
		1.566666667	1.566666667

Since the last divisor in division becomes the constant, the constant number can be read directly from the paper tape. However, in multiplication the constant number may actually be an intermediate result that was displayed when the [×] key was pressed but not printed. The key sequence [1] [=] will cause the **multiplication constant** value to be printed.

Example: Determine the constant value after solving the following problem.

36 × 4.5 ÷ 12 × 6 = 81

Enter	Press	Display	Print
36	[×]	36.	36.×
4.5	[÷]	162.	4.5÷
12	[×]	13.5	12.×
6	[=]	6.	6.=
		81.	81.
1	[=]	1.	1.=
		13.5	13.5*

*The constant value is the composite result of the first three entries: 36 × 4.5 ÷ 12 = 13.5

The automatic constant allows an entry or result to be divided into one without reentering numbers. The key sequence to calculate the reciprocal of a displayed number result is: [÷] [=] [=]

Example: $\frac{1}{8 + 12} = 0.05$

Enter	Press		Display	Print
8	[+]	A	8.	8.+
12	[+]	A	12.	12.+
	[T]		20.	20.T
	[÷]		20.	20.÷
	[=]		20.	20.=
			1.	1.
	[=]		1.	1.=
			0.05	0.05

The reciprocal sequence is such that you can also use it to divide a result into another number.

Example: $\frac{6}{1.5 \times 3} = 1.333333333$

Enter	Press	Display	Print
1.5	[×]	1.5	1.5×
3	[=]	3.	3.=
		4.5	4.5
	[÷]	4.5	4.5÷
	[=]	4.5	4.5=
		1.	1.*
6.	[=]	6.	6.=
		1.333333333	1.333333333

*The dividend of 1 is replaced by entering 6 before pressing equals the last time.

Note that repetitive use of the reciprocal key sequence to obtain the original entry may result in an error in the right-most digit. This is due to the normal rounding process in the calculator.

Example: $\frac{1}{45} = .0222222222$, $\frac{1}{.0222222222} = 45.00000005$

Enter	Press	Display	Print
45	÷	45.	45.÷
	=	45.	45.=
		1.	1.
	=	1.	1.=
		.0222222222	.0222222222
	÷	.0222222222	.0222222222÷
	=	.0222222222	.0222222222=
		1.	1.
	=	1.	1.=
		45.00000005	45.00000005

PERCENT CALCULATIONS

The percent key can be a time-saver when calculating percentages, add-ons, discounts or ratios.

Percent Key [%] —When following multiplication, this key causes the last number entered or the displayed number to be used by the calculator as a percent value, prints a "%" symbol to the right of the number and immediately prints and displays the percentage result. When following division, this key completes the division, automatically multiplies the result by 100 and then displays and prints the result with a "%" to the right.

Percent Add-on [%] [+] —When used following multiplication, the percentage is calculated, displayed and printed followed by the sum of the percentage and the principal amount displayed and printed with an "A" symbol to the right.

Percent Discount [%] [−] —When used following multiplication, the percentage is calculated, displayed and printed followed by the difference of the percentage and the principal amount printed with a "D" symbol to the right.

Percentages

Example: 4% of 453 = 18.12

Enter	Press	Display	Print
453	×	453.	453.×
4	%	4.	4.%
		18.12	18.12

Example: (17 + 32 − 8) × 15% = 6.15

Enter	Press	Display	Print
17	+	A 17.	17.+
32	+	A 32.	32.+
8	−	A 8.	8.−
	T	41.	41.T
	×	41.	41.×
15	%	15.	15.%
		6.15	6.15

The automatic constant can also be used with percentage calculations.

Example: Find 2%, 15% and 25% of 495.

Enter	Press	Display	Print
495	×	495.	495.×
2	%	2.	2.%
		9.9	9.9
15	%	15.	15.%
		74.25	74.25
25	%	25.	25.%
		123.75	123.75

Percentage Add-on or Discount

Following a percentage calculation with the [+] or [−] key automatically adds or subtracts the percentage from the principal amount. The principal amount is the entered number or intermediate result when the last [×] was pressed.

Example: 1450 + 15% add-on = 1667.5

Enter	Press	Display	Print
1450	[×]	1,450.	1450.×
15	[%]	15.	15.%
		217.5	217.5
	[+]	1,667.5	1667.5A

Example: 69.95 − 10% discount = 62.955

Enter	Press	Display	Print
69.95	[×]	69.95	69.95×
10	[%]	10.	10.%
		6.995	6.995
	[−]	62.955	62.955D

Example: 129.95 − 25% discount + 5% tax = 102.335625

Enter	Press	Display	Print
129.95	[×]	129.95	129.95×
25	[%]	25.	25.%
		32.4875	32.4875
	[−]	97.4625	97.4625D
	[×]	97.4625	97.4625×
5	[%]	5.	5.%
		4.873125	4.873125
	[+]	102.335625	102.335625A

If results are required with only two digits to the right of the decimal, the add mode may be used. However, the floating mode is suggested for maximum accuracy in add-on or discount problems. Any result can be rounded to two decimal places by setting the **F/A** switch to **A** and pressing [P].

Percentage Ratios

When the percent key is used to complete a division problem, the calculator automatically multiplies the result by 100 and prints and displays the result as a percent value.

Example: 750 is what percent of 1000?

Enter	Press	Display	Print
750	÷	750.	750.÷
1000	%	1,000.	1000.=
		75.	75.%

Example: 29.5 is what percent of 25?

Enter	Press	Display	Print
29.5	÷	29.5	29.5÷
25	%	25.	25.=
		118.	118.%

SERVICE INFORMATION

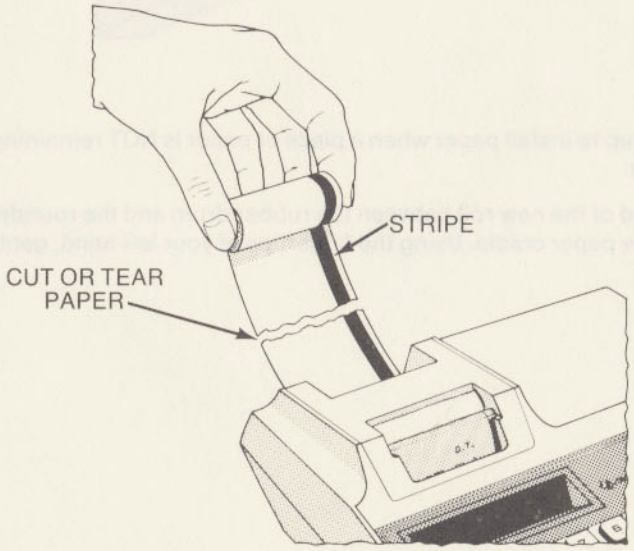
PRINTING PAPER REPLACEMENT

A roll of thermal printing paper was included with your TI-5040 calculator. When you near the end of the roll, a continuous stripe will appear to the right of the printout to indicate that there are approximately ten feet of paper left in the roll. As you continue operating the calculator, check to make sure that sufficient printing paper remains to complete your calculations.

When replacing the paper in your TI-5040, use only TP-27225 or TP-20225 thermal printing paper. Other thermal papers may damage your calculator and void warranty. The TP-20225 thermal paper rolls are smaller in diameter and suggested for use only when TP-27225 paper is not available. New paper may be obtained at the store where your TI-5040 was purchased. If your local store is temporarily out of paper, you may order it from Texas Instruments Service Facility, P.O. Box 53, Lubbock, Texas 79408.

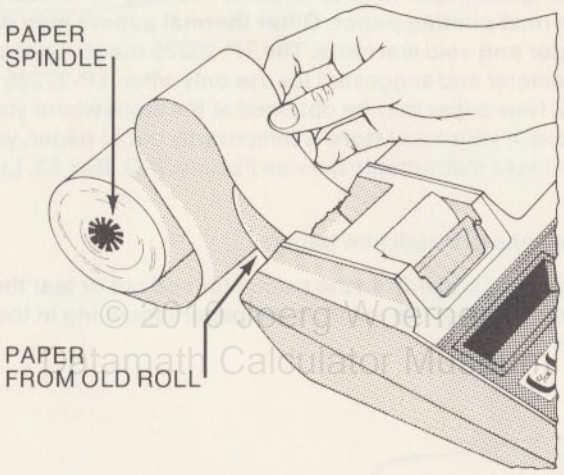
Follow these steps to install new paper:

1. Lift the old roll of paper from the calculator and cut or tear the paper to separate the end of the roll from the paper remaining in the printing mechanism.



2. Place the new roll of paper behind the calculator so that the paper unrolls from the bottom of the spindle. If there is paper remaining in the printer, use this step to install paper and skip step 3. Otherwise, proceed with step 3.

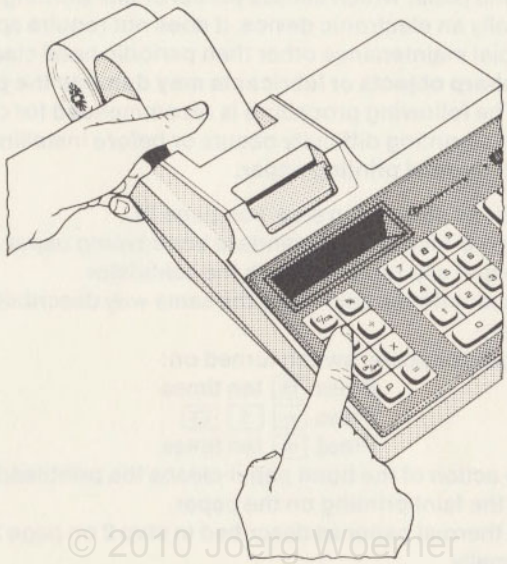
Insert the end of the new paper between the rubber drum and the remaining paper as shown. Press [↑] until the new paper is in position and the old piece of paper is completely out of the printer.



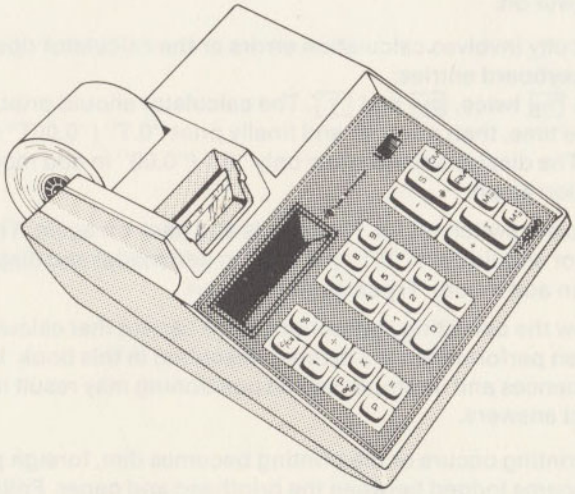
3. Use this step to install paper when a piece of paper is NOT remaining in the printer.

Insert the end of the new roll between the rubber drum and the rounded portion of the paper cradle. Using the fingertips of your left hand, gently

press the paper against the back of the rubber drum and press [↑] until paper is in position for printing.



4. Place the new roll of paper back into the paper cradle to complete paper installation.



PRINTHEAD CLEANING

Occasionally, foreign particles may become trapped between the printhead and the paper which causes partial or dim printing. Since the printer is basically an electronic device, it does not require special ink ribbons or special maintenance other than periodic head cleaning. **Using metal probes,sharp objects or lubricants may damage the printhead or rubber roller.** The following procedure is recommended for cleaning the printhead when a printing difficulty occurs or before installing each new roll of TP-27225 thermal printing paper.

a. Remove paper as directed in step 1 on page 27.
b. Cut a 2-inch by 8-inch strip of standard bond typing paper or use the instruction paper slip furnished with the calculator.
c. Install the paper into the calculator the same way described for thermal paper.
d. With the calculator power switch turned on:
   Press [8] ten times
   Press [÷] [1] [0]
   Press [=] ten times
   The abrasive action of the bond paper cleans the printhead as indicated by the faint printing on the paper.
e. Reinstall the thermal paper as described in step 2 on page 28 and proceed normally.

IN CASE OF DIFFICULTY

1. Be sure the calculator is plugged into an operating 115 Vac electrical outlet and the power switch is on. Presence of digits in the displays indicates power on.

2. If the difficulty involves calculation errors or the calculator does not respond to keyboard entries:

   a) Press [C/CE] twice, [CM] and [T]. The calculator should print "C" at least one time, then print "M" and finally print "0.T" ("0.00T" in add mode). The display should show only "0." ("0.00" in add mode). Try calculation again.

   b) Set power switch off for 10 seconds and back on again. The calculator should print "0.T" ("0.00T" in add mode) and display "0." ("0.00" in add mode). Try calculation again.

   c) Review the operating instructions to be certain that calculations have been performed in the manner described in this book. Improper key sequences and improper switch positioning may result in incorrect answers.

3. If partial printing occurs or the printing becomes dim, foreign particles may have become lodged between the printhead and paper. Follow the

PRINTHEAD CLEANING procedure to remove foreign particles. Some instances may require repeating the procedure two or three times.

If none of the above procedures corrects the difficulty, return the calculator PREPAID and INSURED to the applicable SERVICE FACILITY listed on the back cover.

NOTE: The P.O. box number listed for the Lubbock Service Facility is for United States parcel post shipments only. If you desire to use another carrier, the street address is:

Texas Instruments Incorporated
2305 University Ave.
Lubbock, Texas 79415

For your protection, the calculator should be sent insured; Texas Instruments cannot assume any responsibility for loss of or damage to uninsured shipments. Please include information on the difficulty experienced with the calculator, as well as return address information including name, address, city, state and zip code. The shipment should be carefully packaged and adequately protected against shock and rough handling.

CALCULATOR EXCHANGE CENTERS

If your calculator requires service, instead of returning the unit to your dealer or to a service facility for repair, you may select to exchange the calculator for a factory-reconditioned calculator of the SAME MODEL (or equivalent model specified by TI) at one of the exchange centers which have been established across the United States. No charge will be made for the exchange with proof-of-purchase during the first 90 days. The exchanged unit will be in warranty for the remainder of the original warranty period or for 6 months, whichever is longer. A HANDLING FEE WILL BE CHARGED FOR EXCHANGE AFTER 90 DAYS FROM THE DATE OF PURCHASE. Out-of-warranty exchanges will be charged at the rates in effect at the time of the exchange. Write or call the Consumer Relations Department for further details and the location of the nearest exchange center.

IF YOU NEED REPAIR ASSISTANCE

If you need repair assistance with your calculator, 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 contiguous United States call 806-747-3841. (We regret that we cannot accept collect calls at this number.)

APPENDIX

CONVERSION FACTORS

English to Metric Conversions

To Find	Multiply	By
microns	mils	**25.4**
centimeters	inches	**2.54**
meters	feet	**0.3048**
meters	yards	**0.9144**
kilometers	miles (stat.)	**1.609344**
grams	ounces (av)	28.34952313
kilograms	pounds (av)	**0.45359237**
liters	gallons (U.S.)	**3.785411784**
milliliters (cc)	fl. ounces (U.S.)	29.57352956
sq. centimeters	sq. inches	**6.4516**
sq. meters	sq. feet	**0.09290304**
sq. meters	sq. yards	**0.83612736**
milliliters (cc)	cu. inches	**16.387064**
cu. meters	cu. feet	0.0283168466
cu. meters	cu. yards	0.7645548580

Boldface numbers are exact; others are given to ten significant figures.

Temperature Conversions

$$°F = \frac{9}{5}(°C) + 32$$

$$°C = \frac{5}{9}(°F - 32)$$

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

ONE-YEAR LIMITED WARRANTY

THIS TEXAS INSTRUMENTS CONSUMER WARRANTY EXTENDS TO THE ORIGINAL CONSUMER PURCHASER OF THE PRODUCT.

WARRANTY DURATION

This Texas Instruments consumer product is warranted to the original consumer purchaser for a period of one year from the original purchase date.

WARRANTY COVERAGE

This Texas Instruments consumer product is warranted against defective materials or workmanship. **THIS WARRANTY IS VOID IF THE PRODUCT HAS BEEN DAMAGED BY ACCIDENT OR UNREASONABLE USE, NEGLECT, IMPROPER SERVICE OR OTHER CAUSES NOT ARISING OUT OF DEFECTS IN MATERIAL OR WORKMANSHIP.**

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 YEAR PERIOD. TEXAS INSTRUMENTS SHALL NOT BE LIABLE FOR LOSS OF USE OF THE PRODUCT OR OTHER INCIDENTAL OR CONSEQUENTIAL COSTS. EXPENSES, OR DAMAGES INCURRED BY THE CONSUMER OR ANY OTHER USER.

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.

WARRANTY PERFORMANCE

During the above one year warranty period your calculator will either be repaired or replaced with a reconditioned comparable model (at TI's option) when the calculator is returned, postage prepaid, to a Texas Instruments Service facility listed below.

The repaired or replacement calculator will continue the warranty of the original unit or six months, whichever is longer. Other than the postage requirement, no charge will be made for such repair or replacement of in-warranty calculators.

TI strongly recommends that you insure the product for value, prior to mailing.

TEXAS INSTRUMENTS CONSUMER SERVICE FACILITIES

U.S. Residents:
Texas Instruments Service Facility
P.O. Box 2500
Lubbock Texas 79408

Canadian Residents Only:
Geophysical Services Incorporated
41 Shelley Road
Richmond Hill, Ontario, Canada

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

Texas Instruments Consumer Service
831 South Douglas Street
El Segundo, California 90245
(213) 973-1803

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

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