Texas Instruments
electronic printing
calculator
TI-5015

OPERATING
MANUAL

TABLE OF CONTENTS

USE ONLY TEXAS INSTRUMENTS TP-20225 OR TP-27225 THERMAL
PRINTING PAPER. OTHER PAPER MAY DAMAGE CALCULATOR AND
VOID WARRANTY.

IMPORTANT: Dim or partial printing may be remedied with the PRINTHEAD
CLEANING procedure on page 26 of manual.

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.

TI-5015

| **Model No.** | **Serial No.** | **Purchase Date** |

Copyright © 1977, Texas Instruments Incorporated

INTRODUCTION

This electronic desk-top printing calculator provides a high degree of versatility and performance. Its unique construction is made possible by the whisper-quiet, electronic printer (no ribbon) and reliable integrated circuits pioneered by Texas Instruments. The convenience of the calculator is accented by its easy-to-use keyboard, independent add register, grand total register and many other features. Like all other products manufactured by Texas Instruments, this calculator has been designed and built to provide you with years of dependable service.

FEATURES

Independent Add Register — Addition and subtraction with the familiar entry sequence of standard business machines. Perform multiplication and division without affecting previous add/subtract entries.

Grand Total Register — Automatically accumulates totals from the add register. When the Grand Total is printed, this register is cleared and the grand total is placed in the entry register for further calculations. Serves as an accumulator for add/subtract totals.

Light Weight — Weighs less than 2½ pounds for convenient operation at work or at home.

Electronic Printer — Quiet, smooth-running electronic printer developed by Texas Instruments prints up to 10 digits plus audit trail.

Repeat Entry — Once a number has been keyed into the calculator, it can be entered as many times as you need by sequentially pressing an operation key $(+, -)$.

Add Mode — For easy entry of dollars and cents, select add mode for automatic decimal positioning at two places or select floating point for maximum accuracy.

Fixed Point Operation — A fixed decimal point (from 1 to 9 decimal places) is selectable via keyboard entry.

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

Percent Key — Permits easy calculation of percentages for add-on, taxes, discounts and other problems.

Automatic Constant — Multiplication and division by a constant number without reentering numbers.

Keyboard Buffering — Enter additional numbers and functions while calculator is still printing.

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

ELECTRONIC PRINTER OPERATION

The paper used by the electronic printer is a heat-sensitive (thermal) paper (Texas Instruments TP-20225 or TP-27225). The only mechanical part of the printer is a precision stepper motor which advances the paper past the electronic printhead that is stationary. When printing, small semiconductor (solid-state) elements are heated very quickly by electronic circuits and produce color spots on the thermal paper. 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 if a difficulty occurs.

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.

BASIC OPERATIONS

This desk-top printing calculator is quite simple to operate. You have probably already used most of the functions successfully. However, there are many valuable features of the calculator 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

The calculator should be connected to 115 Vac/60Hz electrical outlet before operating.

The power switch is located on the right side of the calculator. Push the switch toward the rear of the calculator to apply power. Each time the power switch is turned on, the calculator prints 0.T to indicate it is cleared and ready for operation.

A paper advance key ⌈↑⌉ allows you to run out extra paper to create space between problems or for tearing off the paper after completing a problem.

ADDITION AND SUBTRACTION

Numbers are keyed into the calculator in the same left-to-right sequence that you read them. Addition and subtraction entries are made with the same rapid-entry style as 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 is made possible by the independent add register. The grand total register accumulates totals from the add register and serves as a memory for add register totals. Detailed examples of these features are shown in *Mixed Calculations*.

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

Add Key ⌈+⌉ — Adds the last entered number or the last printed result to the independent add register. A "+" symbol is printed to the right of the number added.

Subtract Key ⌈−⌉ — Subtracts the last entered number or the last printed result from the independent add register. A "−" symbol is printed to the right of the number subtracted.

Non-add/Subtotal Key ⌈#/S⌉ — When used immediately following a number entry, the entered number is printed with the "#" symbol printed to the left of the number. These numbers are for labeling only and are not entered into the independent add register or the grand total register and do not affect the calculation in progress. When the key is used immediately following a function key, the present subtotal of the independent add register is printed with an "S" symbol printed to the right of this subtotal. The contents of the independent add register and grand total register are not affected by the ⌈#/S⌉ key.

Total or Grand Total Key [T/GT] — A single press of this key prints the total of the independent add register with the "T" symbol printed to the right of the total. This total is also placed in the entry register and the grand total register. The [T/GT] key also clears the independent add register so that the calculator is ready for new addition and subtraction entries. A second consecutive press of the [T/GT] key prints the accumulated sum of all *totals* from the independent add register with a "G" symbol on the right, clears the grand total register and places the grand total (GT) in the entry register for further use if needed. The GT register accumulates totals from the independent add register only when the [T/GT] key is pressed. (See *Operations with Grand Total Register* for example.

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 or the grand total register. Note that this key will not clear the independent add register or the grand total register. Pressing [T/GT] once, automatically clears the independent add register after the total is printed. Pressing [T/GT] a second time will cause the contents of the grand total (GT) register to be printed and the GT register to be cleared. See *Multiplication and Division* for further explanation of the [C/CE] key.

The decimal point key is used wherever it appears in a number. When the decimal is not entered, the calculator automatically prints the decimal point to the right of the last number entered when [+] or [−] is pressed.

Example: $5.67 + 6 = 11.67$

Enter	Press	Print
Set power switch to ON		0.T
5.67	[+]	5.67+
6	[+]	6.+
	[T/GT]	11.67T

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

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	Print
8	[−]	8.−
3.21	[+]	3.21+
4.6	[−]	4.6−
	[T/GT]	−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	Print
4.59	+	4.59+
	+	4.59+
	+	4.59+
6	−	6.−
	−	6.−
	T/GT	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	Print
1.064	+	1.064+
.018	−	0.018−
	#/S	1.046S
1.19	+	1.19+
	T/GT	2.236T

When used immediately following a number entry, the #/S key will cause the number to be printed 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	Print
1	#/S	#1.
17	+	17.+
4	#/S	#4.
76	+	76+
6	#/S	#6.
34	+	34.+
	T/GT	127.T

Occasionally, you may catch yourself entering an incorrect number or even 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	Print	Comments
49.01	[+]	49.01+	
16.555	[C/CE]		Remove incorrect entry
16.55	[+]	16.55+	Enter correct value
4.9	[+]	4.9+	
	[T/GT]	70.46T	Total

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	Print	Comments
49.01	[+]	49.01+	
16.555	[+]	16.555+	Faulty value entered
	[−]	16.555−	Faulty value removed
16.55	[+]	16.55+	Correct value entered
4.9	[+]	4.9+	
	[T/GT]	70.46T	Total

If you accidentally use [T/GT] when you intended to use [#/S], the total is easily reentered into the independent add register with the [+] key. However, remember that each total "T" is summed to the grand total register.

Example: 156 + 65 + 320 = 541

Enter	Press	Print
156	[+]	156.+
65	[+]	65.+
	[T/GT]	221.T
	[+]	221.+
320	[+]	320.+
	[T/GT]	541.T

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.

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 and print ERROR. However, if the 12th, 13th, etc., digits have been entered, they are accepted as part of the new entry. When this occurs, press 1 C/CE and you can reenter a number that has 10 or less digits without affecting previous entries.

Example: 123456.7899 + 555765.4321 = 679222.222

Enter	Press	Print	Comments
123456.7899	+	123456.7899+	
5555765.4321		ERROR	11 digits entered
1	C/CE		Clear for new value
555765.4321	+	555765.4321+	Correct value entered
	T/GT	679222.222T	Total

A register overflow will also cause ERROR to be printed. If the accumulated contents of the add registers are larger than 9999999999 (10 digits) or −999999999 (9 digits for negative results), ERROR T is printed and the contents of that register are automatically cleared.

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

Enter	Press	Print
9999999999	+	9999999999.+
1	+	1.+
		ERROR T

If grand total overflow occurs, the calculator prints ERROR G, skips a line and clears the grand total register. The independent add register and entry register are also cleared for a new problem to be entered.

Enter	Press	Print
3333333333	+	3333333333.+
	T/GT	3333333333.T
4444444444	+	4444444444.+
	T/GT	4444444444.T
5555555555	+	5555555555.+
	T/GT	5555555555.T
		ERROR G

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 keyboard, the multiplication and division at the top of the keyboard will 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 $\boxed{\times}$, $\boxed{\div}$ and $\boxed{=}$ can be performed without affecting the summing operation. See *Mixed Calculations* for further explanation and examples.

The four basic keys concerned with multiplication and division are:
Multiply Key $\boxed{\times}$ — Causes the last entered number or last printed result to be printed as the multiplicand with a "×" symbol printed to the right of the number.

Divide Key $\boxed{\div}$ — Causes the last entered number or the last printed result to be printed as the dividend with a "÷" symbol printed to the right of the number. Division by zero is invalid and will cause ERROR to be printed.

Equals Key $\boxed{=}$ — Completes multiplication or division. When used following multiplication or division, the last entered or printed number is printed as the multiplier or divisor with an "=" symbol printed to the right of the number. Then the result is printed with no symbol to the right.

Clear/Clear-Entry Key $\boxed{\text{C/CE}}$ — 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 $\boxed{\times}$ or $\boxed{\div}$ 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. In mixed calculations, this key will not clear the independent add register or grand total register.

Multiplication and division problems are quite simple to solve since most problems may be entered in the same order they are written.
Example: $24.3 \times 15 = 364.5$

Enter	Press	Print
24.3	$\boxed{\times}$	24.3×
15	$\boxed{=}$	15.=
		364.5

Example: $130 \div 6.5 = 20$

Enter	Press	Print
130	$\boxed{\div}$	130÷
6.5	$\boxed{=}$	6.5=
		20.

Notice that it is not necessary to press $\boxed{\text{C/CE}}$ after a problem before starting a new problem when the $\boxed{=}$ key is used.

8

Example: $120 \times 50 \div 30 = 200$

Enter	Press	Print
120	$\boxed{\times}$	120.×
50	$\boxed{\div}$	50.÷
30	$\boxed{=}$	30.=
		200.

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

Example: $120 \times 50 = 6000 \quad 6000 \div 30 = 200$

Enter	Press	Print
120	$\boxed{\times}$	120.×
50	$\boxed{=}$	50.=
		6000.
	$\boxed{\div}$	6000.÷
30	$\boxed{=}$	30.=
		200.

When an erroneous number entry is made, the $\boxed{\text{C/CE}}$ key may be used to clear that entry in the same manner shown for addition and subtraction.

Example: $16 \div 5 \times 32 = 102.4$

Enter	Press	Print	Comments
16	$\boxed{\div}$	16.÷	
6	$\boxed{\text{C/CE}}$		Remove incorrect entry
5	$\boxed{\times}$	5.×	Enter correct value
32	$\boxed{=}$	32.=	
		102.4	

The $\boxed{\text{C/CE}}$ key will also 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 $\boxed{\text{C/CE}}$ once (or twice after a number entry) and the calculator will print a "C" symbol indicating it is ready to start a new problem. The $\boxed{\text{C/CE}}$ key *does not* affect the contents of the independent add register or grand total register used for addition and subtraction.

Example: $5.9 \times 13.6 \div$ (start new problem)
$39 \div 12.5 = 3.12$

Enter	Press	Print
5.9	$\boxed{\times}$	5.9.×
13.6	$\boxed{\div}$	13.6÷
	$\boxed{\text{C/CE}}$	C
39	$\boxed{\div}$	39.÷
12.5	$\boxed{=}$	12.5=
		3.12

If you decide to start a new problem immediately after a number entry, the C/CE key must be pressed twice. The first C/CE clears the number entry only and a second C/CE clears the pending calculation.

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

Enter	Press	Print	Comments
5.9	☒	5.9×	
13.6	C/CE		Clears number 13.6
	C/CE	C	Clears pending 5.9×
39	÷	39.÷	
12.5	☰	12.5=	
		3.12	New problem total

Another method to terminate a multiplication or 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. A negative number can contain as many as 9 digits before overflow will occur.

Example: 11.32 × (−6) × (−5.04) = 342.3168

Enter	Press	Print	Comments
11.32	☒	11.32×	1st Multiplier
6	−	6.−	
	T/GT	−6.T	
	☒	−6.×	2nd Multiplier
5.04	−	5.04−	
	T/GT	−5.04T	
	☰	−5.04=	3rd Multiplier
		342.3168	

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 in the same manner.

Example: 5 ÷ 3 = 1.6666666666......

Enter	Press	Print
5	÷	5.÷
3	=	3.=
		1.666666667

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

Example: 125 × 125 = 15625

Enter	Press	Print
125	×	125.×
	=	125.=
		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 and the calculator to be automatically reset for entry of a new problem. An entry overflow will also cause ERROR to be printed and the sequence ⎡1⎤ ⎡C/CE⎤ should be used to continue without affecting previous entries. As in addition and subtraction, a negative result cannot be larger than −999999999. (9 digits).

MIXED CALCULATIONS

The previous descriptions have not considered problems that require a combination of addition, subtraction, multiplication and division. 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. 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.

Examples: 12 + 15 = 27, 12 × 15 = 180

Enter	Press	Print	Comments
12	+	12.+	1st Add entry
	×	12.×	1st Multiply entry
15	+	15.+	2nd Add entry
	=	15.=	2nd Multiply entry
		180.	Multiplication result
	T/GT	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 a memory to store intermediate results if the calculator did not have this independent processing capability.

Sum of Products

Example: $4 \times 11.99 = 47.96$
$6 \times 2.97 = 17.82$
$12 \times 0.98 = \underline{11.76}$
Total 77.54

Enter	Press	Print
4	☒	4.×
11.99	☐=	11.99=
		47.96
	☐+	47.96+
6	☒	6.×
2.97	☐=	2.97=
		17.82
	☐+	17.82+
12	☒	12.×
.98	☐=	0.98=
		11.76
	☐+	11.76+
	T/GT	77.54T

Sum of Quotients

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

Enter	Press	Print
1.98	☐÷	1.98÷
4	☐=	4.=
		0.495
	☐+	0.495+
4.98	☐÷	4.98÷
8	☐=	8.=
		0.6225
	☐−	0.6225−
	T/GT	−0.1275T

Product of Sums

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

Enter	Press	Print
2	+	2.+
3	+	3.+
	T/GT	5.T
	×	5.×
4	+	4.+
5	+	5.+
	T/GT	9.T
	=	9.=
		45.

Product/Quotient of Sums

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

Enter	Press	Print
7	+	7.+
5	+	5.+
	T/GT	12.T
	×	12.×
6	+	6.+
4	−	4.−
	T/GT	2.T
	÷	2.÷
3	+	3.+
12	−	12.−
	T/GT	−9.T
	=	−9.=
		−2.66666667

OPERATIONS WITH GRAND TOTAL REGISTER

The independent add register allows you to perform mixed calculations as discussed in the preceding section. The grand total (GT) register serves as a memory for add/subtract totals. A single press of the T/GT key causes the calculator to print the total of all add/subtract entries with a "T" symbol printed to the right of the total and places this total in the GT register. A second consecutive press of the T/GT key prints the accumulated sum of all *totals* from the independent add register. The symbol "G" is printed to the right of this grand total and it is placed in the entry register for possible further calculations. A third press prints 0.T.

Remember to press T/GT until "G" is printed before starting a problem set using the grand total register.

Example: $12.3 + 4.56 =$ 16.86
$21.34 + 17.1 + 0.12 + 1.234 =$ 39.794
$12.34 + 12.34 + 12.34 + 12.34 =$ 49.36
          Grand Total $= 106.014$

Enter	Press	Print	Comments
	T/GT	112.3725G	Previous grand total
	T/GT *	O.T	Add register cleared
	T/GT *	O.G	Grand total cleared
12.3	+	12.3+	Simple addition
4.56	+	4.56+	
	T/GT	16.86T	First total
21.34	+	21.34+	
17.1	+	17.1+	
.12	+	0.12+	
1.234	+	1.234+	
	T/GT	39.794T	Second total
12.34	+	12.34+	
	+	12.34+	
	+	12.34+	
	+	12.34+	
	T/GT	49.36T	Third total
	T/GT	106.014G	Grand total

*Additional key entries for illustration only, calculator is ready for new add/subtract grand total problems when "G" is printed.

The T/GT key allows you to find the grand total of all add/subtract entries after you have completed a series of mixed calculations. When you finally press the T/GT key twice, the calculator prints the grand total of all *totals* from the independent add register. Only two simple facts must be kept in mind to implement mixed calculations:
  1) The add register is affected only by the +, −, and T/GT function keys. (Pressing the T/GT key clears the add register to zero.)
  2) The contents of the add register are always available as an entry after a subtotal or total operation by simply pressing one of the function keys +, −, ×, or ÷.

For example, if you key in the previous example problems entitled *Sum of Products* and *Sum of Quotients* exactly as shown, then press T/GT, the total of both problems will be printed: $77.54 + (-0.1275) = 77.4125G$.

14

SPECIAL FUNCTIONS

ADD MODE CALCULATIONS

All operations up to this point have been in the floating mode where the decimal point "floats" to its proper position. The add mode feature of the calculator rounds all entries to two decimal places. It is convenient when calculations involve dollars and cents.

Floating/Add Mode Key [F/A] — Each use of this key alternately selects the add mode and floating mode. The calculator is in the floating mode when the power switch is turned on and pressing the [F/A] key one time selects add mode. Pressing [F/A] again, returns the calculator to the floating mode.

In the add mode, number entries followed by [+] , [−] , are automatically entered with the decimal point positioned two places to the left of the last digit of each number 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	Print
	[F/A]	
523	[+]	5.23+
1700	[+]	17.00+
75	[−]	0.75−
	[T/GT]	21.48T

If you do not know which mode has been selected, press [T/GT] . If 0.00T is printed, the calculator is in the add mode. If 0.T is printed, the calculator is in the floating (normal) 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	Print	Comments
	[T/GT]	21.48G	Previous grand total
	[T/GT]	0.00T	Check for add mode
3.133	[+]	3.13+	3.133 truncated to 3.13
.005	[+]	0.01+	.005 rounded to .01
456	[+]	4.56+	Normal entry
	[T/GT]	7.70T	Add mode total

Multiplication and division entries are not affected by add mode, but results are always rounded to two decimal places.

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

Enter	Press	Print
	T/GT	7.70G
	T/GT	0.00T
1.556	✕	1.556✕
3.21	÷	3.21÷
56.113	=	56.113=
		0.09

FIXED POINT CALCULATIONS

Another feature of the F/A key allows you to select any number of decimal places (from 0 to 9) to print when working a problem. Pressing the following sequence of keys puts the calculator in the Selected Decimal Mode, where "N" is the desired number of decimal places:

$$F/A \longrightarrow N \longrightarrow T/GT$$

To return to floating mode simply press F/A, just as you would to change from the add mode to floating mode. The following is an example of various calculations in the selected decimal mode.

Enter	Press	Print	Comments
	F/A		Calculator powers up in floating mode.
1	T/GT	0.0	Fixed point 1
5	+	5.0+	
12	+	12.0+	
	T/GT	17.0T	Total
	✕	17.✕	The previous total can be used for further calculations by pressing the desired function key.
2	÷	2.÷	
3	=	3.=	
		11.3	Rounded to 1 decimal place
13.25	+	13.3+	The number entered is rounded to 1 decimal place.
	÷	13.3÷	
5	=	5.=	
		2.7	Rounded to 1 decimal place.
	F/A		Return to floating mode
1.15	+	1.15+	
	T/GT	14.45T	Total

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. Once the constant is stored, 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, 5 × 4 = 20, 5 × 0.95 = 4.75

Enter	Press	Print	Comments
5	⊠	5.×	5 × stored as constant
3	⚌	3.=	
		15.	5 × 3 evaluated
4	⚌	4.=	
		20.	5 × 4 evaluated
.95	⚌	0.95=	
		4.75	5 × .95 evaluated

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

Enter	Press	Print	Comments
100	÷	100.÷	
3	⚌	3.=	÷ 3 stored as constant
		33.33333333	100 ÷ 3 evaluated
18	⚌	18.=	
		6.	18 ÷ 3 evaluated
4.7	⚌	4.7=	
		1.566666667	4.7 ÷ 3 evaluated

Since the divisor in division becomes the constant, the division constant can be read directly from the paper tape. However, in multiplication the constant number may actually be an intermediate result that has not been printed. The key sequence $\boxed{1}$ $\boxed{=}$ will cause the multiplication constant value to be printed.

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

$$36 \times 4.5 \div 12 \times 6 = 81$$

Enter	Press	Print
36	$\boxed{\times}$	36.×
4.5	$\boxed{\div}$	4.5÷
12	$\boxed{\times}$	12.×
6	$\boxed{=}$	6.=
		81.
1	$\boxed{=}$	1.=
		13.5

The constant value is the composite result of the first three entries:
$36 \times 4.5 \div 12 = 13.5$.

The automatic constant allows an entry or result to be divided into one (a reciprocal) without reentering numbers. The key sequence to calculate the reciprocal of an entered number or the last printed result is $\boxed{\div}$ $\boxed{=}$ $\boxed{=}$.

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

Enter	Press	Print	Comments
	$\boxed{\text{T/GT}}$	0.T	
8	$\boxed{+}$	8.+	
12	$\boxed{+}$	12.+	
	$\boxed{\text{T/GT}}$	20.T	$8 + 12$ evaluated
	$\boxed{\div}$	20.÷	
	$\boxed{=}$	20.=	$\div$ 20 stored as constant
		1.	$20 \div 20$ evaluated
	$\boxed{=}$	1.=	
		0.05	$1 \div 20$ evaluated

18

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

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

Enter	Press	Print		Comments
1.5	$\boxed{\times}$	1.5×		
3	$\boxed{=}$	3.=		
		4.5		3×5 evaluated
	$\boxed{\div}$	4.5÷		
	$\boxed{=}$	4.5=		÷ 4.5 stored as constant
		1.		4.5 ÷ 4.5 evaluated
6	$\boxed{=}$	6.=		Replace 1 with 6
		1.333333333		

The 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: $\dfrac{1}{45} = .0222222222$

$$\dfrac{1}{.0222222222} = 45.00000005$$

Enter	Press	Print
45	$\boxed{\div}$	45.÷
	$\boxed{=}$	45.=
		1.
	$\boxed{=}$	1.=
		.0222222222
	$\boxed{\div}$	.0222222222÷
	$\boxed{=}$	.0222222222=
		1.
	$\boxed{=}$	1.=
		45.00000005

PERCENT CALCULATION

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

Percent Key $\boxed{\%}$ —When following multiplication, this key causes the last number entered or the last printed number to be used by the calculator as a percent value and prints a "%" symbol to the right of the number and immediately prints the percentage result. When following division, this key completes the division, automatically multiplies the result by 100 and prints the result with a "%" to the right.

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

Percent Discount $\boxed{\%}$ $\boxed{-}$ — When used following multiplication, the percentage is calculated and printed followed by the difference between the percentage and the principal amount printed with a "D" symbol to the right.

Percentages

Example: 4% of 453 = 18.12

Enter	Press	Print
453	$\boxed{\times}$	453.×
4	$\boxed{\%}$	4.%
		18.12

Example: $(17 + 32 - 8) \times 15\% = 6.15$

Enter	Press	Print
17	$\boxed{+}$	17.+
32	$\boxed{+}$	32.+
8	$\boxed{-}$	8.−
	$\boxed{\text{T/GT}}$	41.T
	$\boxed{\times}$	41.×
15	$\boxed{\%}$	15.%
		6.15

The automatic constant can also be used with percentage calculations.

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

Enter	Press	Print
495	$\boxed{\times}$	495.×
2	$\boxed{\%}$	2.%
		9.9
15	$\boxed{\%}$	15.%
		74.25
25	$\boxed{\%}$	25.%
		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	Print
1450	⌈ × ⌉	1450.×
15	⌈ % ⌉	15.%
		217.5
	⌈ + ⌉	1667.5A

Example: 69.95 − 10% discount = 62.955

Enter	Press	Print
69.95	⌈ × ⌉	69.95×
10	⌈ % ⌉	10.%
		6.995
	⌈ − ⌉	62.955D

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

Enter	Press	Print
129.95	⌈ × ⌉	129.95×
25	⌈ % ⌉	25.%
		32.4875
	⌈ − ⌉	97.4625D
	⌈ × ⌉	97.4625×
5	⌈ % ⌉	5.%
		4.873125
	⌈ + ⌉	102.335625A

For maximum accuracy, use the floating mode for percent, add-on and discount calculations. In the add mode, intermediate results are *rounded* and this rounded value is used for subsequent calculations. Any result can be rounded to two decimal places with the following key sequence:
[F/A] [X] 1 [=] [F/A]

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

Example: 750 is what percent of 1000?

Enter	Press	Print
750	[÷]	750.÷
1000	[%]	1000.=
		75%

Example: 29.5 is what percent of 25?

Enter	Press	Print
29.5	[÷]	29.5÷
25	[%]	25.=
		118.%

SERVICE INFORMATION

PRINTING PAPER REPLACEMENT

A roll of thermal printing paper was included with your TI-5015 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-5015, use only Texas Instruments TP-20225 or TP 27225 thermal printing paper. Other thermal papers may damage your calculator and void the warranty. New paper may be obtained at the store where your TI-5015 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.

STRIPE

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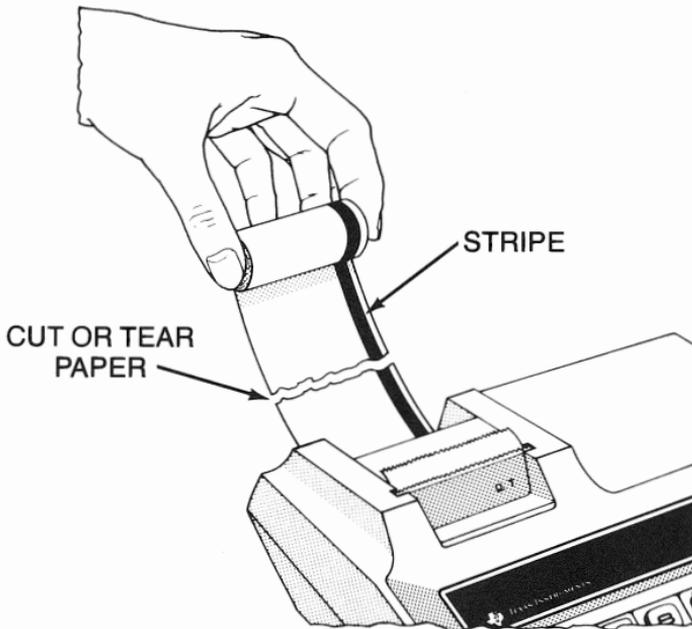
2. Place the new roll of paper behind the calculator so that the paper unrolls from the bottom of the spindle. If there is paper remaining in the printer, use this step to install paper and skip step 3. Otherwise, proceed with step 3.

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.

PAPER
SPINDLE
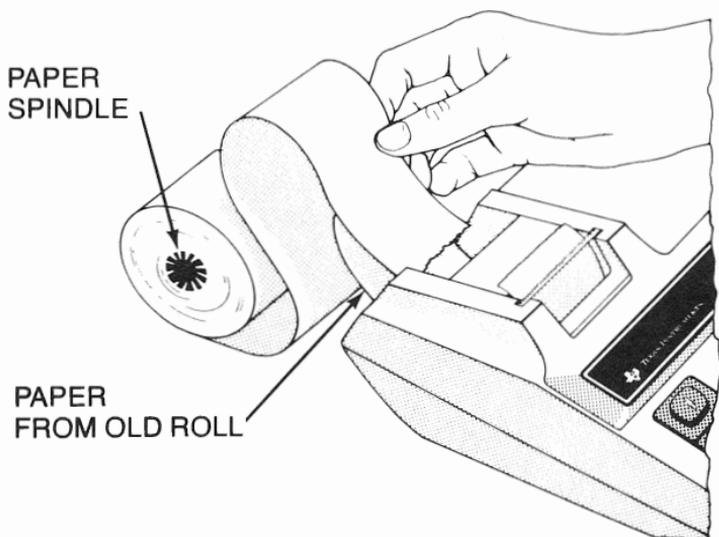
PAPER
FROM OLD ROLL

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.

25

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. *Do not use metal probes, sharp objects or lubricants as they may damage the printhead or rubber roller.*

The following procedure is recommended for cleaning the printhead when a printing difficulty occurs and before installing each new roll of printing paper.

Printhead Cleaning Procedure

1. Remove paper as directed on page 23.

2. Cut a 2-inch by 8-inch strip of standard bond typing paper or use the Head Cleaning Card furnished with the calculator.

3. Install the paper in the calculator the same way described for loading thermal paper.

4. 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 blue printing on the paper.

5. Reinstall the thermal paper as described in steps 2 or 3 on page 24 and proceed normally.

IN CASE OF DIFFICULTY

1. Check to be sure the power switch is in the ON position and that the power cord is plugged into an operating 115 Vac/60Hz electrical outlet.

2. Review the operating instructions to be certain calculations have been performed in the manner described in this book. Improper key sequences may result in incorrect calculations.

3. Set the power switch to OFF for 10 seconds then turn it on again. The calculator should print O.T. Try the calculation again.

4. If partial printing occurs or the printing becomes dim, foreign particles may be lodged between the printhead and the paper. Follow the Printhead Cleaning Procedure to remove these particles. Some instances may require repeating this procedure several 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 must 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 a service facility for repair, you may elect to exchange the calculator for a factory-rebuilt calculator 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.

IF YOU NEED SERVICE INFORMATION

If you need service information for your calculator, write Consumer Relations 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.)

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.

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

$$^\circ F = \frac{9}{5}(^\circ C) + 32$$

$$^\circ C = \frac{5}{9}(^\circ F - 32)$$

ONE-YEAR LIMITED WARRANTY

WARRANTEE
This Texas Instruments electronic calculator warranty extends to the original purchaser of the calculator.

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

WARRANTY COVERAGE
This Texas Instruments electronic calculator is warranted against defective materials or workmanship. **THIS WARRANTY IS VOID IF: (i) THE CALCULATOR 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 calculator will either be repaired or relaced with a reconditioned model of an equivalent quality (at TI's option) when the calculator 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 calculator 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 CALCULATOR 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:

Texas Instruments Consumer Service
3186 Airway Drive Bldg. J
Costa Mesa, California 92626
(714) 540-7190

Texas Instruments Consumer Service
10700 Southwest Beaverton Highway
Park Plaza West, Suite 11
Beaverton, Oregon 97005
(503) 643-6758

TEXAS INSTRUMENTS
INCORPORATED
DALLAS, TEXAS