TO THE CONSUMER

FULL ONE YEAR WARRANTY

∃PF mark 23

Handheld
Slide Rule Calculator
with Memory

Owner's Manual

INTRODUCTION

Modern electronic technology has provided a new tool for use in home, office or school.

Your Electronic Calculator will perform standard Addition, Subtraction, Multiplication and Division in chain or mixed calculations. The addition of a MEMORY register, with full capability to Add to or Subtract from the MEMORY, has made possible calculations of complex problems. In addition to such added features as Automatic Percentage calculations your calculator will automatically store a Constant for all four functions of Addition, Subtraction, Multiplication and Division. Also included are such Algebraic features as $1/x$, $\sqrt{x}$, x^2.

You may work from an internal battery source or, by means of a charger/A.C. adaptor, from any convenient 110-120 volts A.C. outlet.

To simplify operation, your calculator is programmed for "THINK AND TOUCH"—"THINK" the mathematical sequence and "TOUCH" the appropriate keys as you think—the correct answer instantly appears on the bright, clear eight-digit display. The decimal point automatically moves to the correct position.

Please review the instructions in this booklet. Work through the examples illustrated, and within a very short time you will become proficient in using your new calculator.

SUGGESTED USES
Home
Budgets • Unit Pricing • Stock & Bond Investments
Interest Rate • Check Book Balancing
Clothing Invoices • Grocery Bills • Taxes
Business
Expense Report • Percentage Profit • Cost Analysis
Compound Interest • Payroll • Taxes • Invoicing
School
Check Basic Arithmetic Away From Home
Budget • School • Tuition
Slide Rule Calculations

Convenient, rapid, accurate. You'll find many uses for your Electronic Calculator.

PORTABLE BATTERY OR A.C. OPERATION

- Your Compact Portable Electronic Calculator is made with a sealed Rechargeable battery pack. Under normal use you can expect about 6 to 8 hours of calculation time for a fully charged battery.

- When the battery is almost discharged a low battery warning signal will appear in the left side of the display as L. To prevent improper calculations the battery should be recharged as soon as possible.

Battery Charging
1. Turn the Power Switch to the OFF position.
2. Connect the Charger/Adaptor into a convenient source of 110-120 volts A.C.
3. Firmly push the Charger/Adaptor plug into the rear socket of the calculator.
4. A full charge will take about 14 hours and is best done overnight.

- Caution—To prevent damage to the battery pack and calculator, do not use any charger/adapter other than Model 415.

AC Operation:
Turn the power switch to the OFF position. Connect the charger/adapter to a source of 110-120 Volts A.C. and connect the battery plug to the rear socket of the calculator. Then simply turn the power switch on.

NOTE: When disconnecting the charger/adapter, always disconnect the plug from the calculator first.

● Shift Function Indicator
Ⴑ Overflow Indicator
L Low Battery Indicator
I Memory Indicator
– Minus Sign

DISPLAY

Ⴑ 12345678

7	8	9	MC	F
			ce/c	
4	5	6	M+	$\sqrt{x}$
			+	%
1	2	3	M−	$1/x$
			−	÷
0	•	X∠M	MR	x^2
		X∠Y	=/k	X

4

KEYS AND SWITCHES

POWER SWITCH—Turns the calculator "ON" or "OFF". A red dot will be visible when the switch is in the "ON" position.

NUMERIC KEYS—Standard 1 to 9 keyboard is provided as well as [0] and decimal point [.].

In order to give your portable calculator maximum capability in a minimum size, 8 keys incorporate a SHIFT FUNCTION SYSTEM similar to a typewriter. THE CALCULATOR RESPONDS TO THE FUNCTION IMPRINTED ON THE KEYS IN THE UNSHIFTED MODE, AND THE FUNCTIONS ABOVE THE KEYS IN THE SHIFTED MODE.

[F] - This is the calculator's SHIFT FUNCTION KEY. Touching the [F] key enables the dual function keys to respond to the shifted mode. The unshifted mode may be reestablished by touching any key, including the [F] key.

NOTE: Use of any shifted function must be preceded by touching the [F] key.

[CE/C] CLEAR ENTRY/CLEAR KEY—This is a multifunction key which will clear the display of the last entry or result on the first push, and clear the calculator of all previous calculations on the second push. During overflow, touching [CE/C] once will clear the overflow symbol and allow further calculations. See also DISPLAY BLANKING on page 7. NOTE: MEMORY CLEAR MUST BE DONE SEPARATELY.

[+] [−] [×] [÷] OPERATE KEYS—These keys will perform any previous operation as well as instruct the calculator as to the next operation to be performed.

[=/K] RESULT KEY—At the conclusion of calculation, touching this key will immediately place the answer on the display. In addition this key operates the AUTOMATIC CONSTANT (K). (See section under calculations with a constant).

[%] PERCENT KEY—This is a special purpose key used to simplify calculations involving Percentage (mark-up, discount). See example page 12.

[X∠Y] EXCHANGE KEY—This is a special purpose key used to exchange the contents of the Display Register and the Constant Register. See example page 15.

5

SHIFTED FUNCTIONS

NOTE: These Functions Must Be Preceded By Depressing the [F] Key

[MC] or [F] [CE/C] MEMORY CLEAR—Clears the memory of all previous entries.

[MR] or [F] [=/k] MEMORY RECALL—Recalls the contents of the memory to the display and leaves the contents of the memory unchanged.

[M+] or [F] [+] MEMORY PLUS—Adds the number on the display to the memory.

[M−] or [F] [−] MEMORY MINUS—Subtracts the number on the display from the memory.

[X∕M] or [F] [X∕Y]—Exchanges the contents of the display and memory.

[1/x] or [F] [÷]—Computes the reciprocal of the displayed number.

[√x] or [F] [%]—Computes the square root of the displayed number.

[x^2] or [F] [x]—Computes the square of the displayed number.

DISPLAY INDICATORS

[•] Indicates shifted function mode.

[−] MINUS SIGN—The minus sign will appear to the left of the most significant digit and will shift in position with additional numbers.

[I] MEMORY INDICATOR—The memory in use indicator will light when any number except zero is in the memory.

[L] LOW BATTERY INDICATOR—A warning indicator is provided to advise when the battery should be charged. After the indicator goes on there is approximately 1 hour of calculating time remaining.

DISPLAY BLANKING/BATTERY POWER SAVER—
—Approximately 40 seconds after the last entry the display will blank out, except for a bar [−] in the center of digit 5. All previous calculations will be retained. To bring back the displayed numbers simply go on with your calculations or press the CE/C Key once.

DECIMAL POINT—Decimal point in the result is always floating, with a maximum of 7 places.

OVERFLOW INDICATOR—⌈—When the result of a calculation exceeds 8 digits (99999999), the capacity of the Calculator has been reached. This is indicated by the appearance of ⌈ on the left side of the display. NOTE THAT THE CORRECT POSITION OF THE DECIMAL POINT IS NOW 8 PLACES TO THE RIGHT. Appearance of the overflow indicator inhibits further calculations until the indicator is removed by depressing the [CE/C] key just once.

A NEGATIVE OVERFLOW is indicated by the combination of the overflow and minus sign [E].

BASIC OPERATING INSTRUCTIONS

A. Slide power switch to the left to turn on calculator, and touch [CE/C] twice.

B. To enter a number "touch" the numeric keys in sequence.

EXAMPLE: to enter 123.45	Display
Touch [1] [2] [3] [.] [4] [5]	123.45

C. To clear an incorrect entry use the [CE/C]key.

EXAMPLE: Your calculation is 12x7=

You have entered [1] [2] [x]	12.
In ERROR you touch [8]	8.
"MISTAKE" "MISTAKE"	
To correct the mistake touch [CE/C] key once	12.
Enter correct number [7]	7.
Touch result key [=/K]	Answer 84.

NOTE: After clearing an entry, do not duplicate the operate function.

6

7

EXAMPLES OF BASIC FUNCTIONS

NOTE: Touch [CE/C] twice before beginning a calculation.

ADDITION

Example No. 1: to calculate 13.35 + 4.56 = ?

				Display
A.	Enter	13.35		13.35
B.	Touch	[+]		13.35
C.	Enter	4.56		4.56
D.	Touch	[=/K]	answer	17.91

Example No. 2: to calculate 9 + 17 + 32.5 = ?

				Display
A.	Enter	9		9.
B.	Touch	[+]		9.
C.	Enter	17		17.
D.	Touch	[+]		26.
E.	Enter	32.5		32.5
F.	Touch	[=/k]	answer	58.5

NOTE: Each time an operation key [+, −, X, ÷, %] is touched, the result of the previous calculation is displayed.

SUBTRACTION

Example No. 1: to calculate 436.14 − 103.9 = ?

				Display
A.	Enter	436.14		436.14
B.	Touch	[−]		436.14
C.	Enter	103.9		103.9
D.	Touch	[=/k]	answer	332.24

Example No. 2: to calculate 183.70 − 341.60 = ?

				Display
A.	Enter	183.70		183.70
B.	Touch	[−]		183.70
C.	Enter	341.60		341.60
D.	Touch	[=/k]	answer	−157.90

NOTE: The answer is a negative number (credit balance).

MULTIPLICATION

Example No. 1: to calculate 31.62 x 58.6 = ?

				Display
A.	Enter	31.62		31.62
B.	Touch	[X]		31.62
C.	Enter	58.6		58.6
D.	Touch	[=/k]	answer	1852.932

Example No. 2: to calculate 3 x 4 x 1.05 = ?

				Display
A.	Enter	3		3.
B.	Touch	[x]		3.
C.	Enter	4		4.
D.	Touch	[x]		12.
E.	Enter	1.05		1.05
F.	Touch	[=/k]	answer	12.6

DIVISION

Example No. 1: to calculate 196 ÷ 7 = ?

				Display
A.	Enter	196		196.
B.	Touch	[÷]		196.
C.	Enter	7		7.
D.	Touch	[=/k]	answer	28.

CHAIN CALCULATIONS

Example No. 1: to calculate 15.3 x 13.7 ÷ 4 + 19 − 11 = ?

				Display
A.	Enter	15.3		15.3
B.	Touch	[X]		15.3
C.	Enter	13.7		13.7
D.	Touch	[÷]		209.61
E.	Enter	4		4.
F.	Touch	[+]		52.4025
G.	Enter	19		19.
H.	Touch	[−]		71.4025
I.	Enter	11		11.
J.	Touch	[=/k]	answer	60.4025

CALCULATIONS USING A CONSTANT
CONSTANT MULTIPLICATION

For multiplication the FIRST number entered is the Constant

example	operation	display
3.72 is a constant		
3.72 X 15	3.72 [X] 15 [=/k]	55.8
3.72 X 30	30 [=/k]	111.6
3.72 X 215	215 [=/k]	799.8

CONSTANT DIVISION

For division the SECOND number entered is the Constant

example	operation	display
12 is a constant		
48 ÷ 12	48 [÷] 12 [=/k]	4.
180 ÷ 12	180 [=/k]	15.
756 ÷ 12	756 [=/k]	63.

CONSTANT ADDITION

For addition the SECOND number entered is the Constant

example	operation	display
17 is a constant		
15 + 17	15 [+] 17 [=/k]	32.
27.5 + 17	27.5 [=/k]	44.5
92.8 + 17	92.8 [=/k]	109.8

CONSTANT SUBTRACTION

For subtraction the SECOND number entered is the Constant

example	operation	display
25.5 is a constant		
57 − 25.5	57 [−] 25.5 [=/k]	31.5
32 − 25.5	32 [=/k]	6.5
12 − 25.5	12 [=/k]	− 13.5

NOTE: Since the constant operation is automatic do not push the [=/k] key more than once for any operation.

10

REPEAT ADDITION OR SUBTRACTION

If during a calculation, you require adding or subtracting a number repeatedly, simply press the [=/K] key the desired number of times after entering the number.
Example: To calculate 2+4+4+4−3−3=?

	KEY SEQUENCE		DISPLAY
Touch	[CE/C]	Twice	0
Enter	2		2.
Touch	[+]		2.
Enter	4		4.
Note: You wish to add the number 4 three times			
Touch	[=/K]	3 Times	14.
Touch	[−]		14.
Enter	3		3.
Touch	[=/K]	Twice Answer	8.

POWER CALCULATIONS

Example: 9^4=?

	KEY SEQUENCE		DISPLAY
touch	[CE/C]	Twice	0.
Enter	9		9.
Touch	[×]		9.
Touch	[=/K]	3 Times Answer	6561.

SIGN CHANGE

To change the sign of the displayed number (+ to − or − to +) simply touch [−] [=/K] [=/K], then continue your calculation.

11

PERCENTAGE CALCULATION %—The percent key is useful for dividing numbers by 100, and in markon-markdown problems, it reduces the number of steps required.

PERCENTAGE CALCULATIONS

YIELD: You borrow $5000. How much interest will you pay at 7.75%?

    7.75 [%] [X] 5000 [=/k]   387.5

MARK UP: Your cost is $323.00 and you wish to earn 16%.

    323 [+] 16 [%] [=/k]   374.68

MARK DOWN (DISCOUNT): Your normal selling price is $323.00 and you want to discount the item by 16%.

    323 [−] 16 [%] [=/k]   271.32

USE OF THE MEMORY

The Memory is a place to store a number for future use. All memory functions (M+, M−, MR, MC, X⤸M) are used in shifted mode.

PRODUCT OF SUM AND DIFFERENCE

NOTE: Before starting any calculation clear the Memory and the Display. F[CE/C] [CE/C] [CE/C]

Problem: (12 + 34) × (98 − 76) = ?

Key	Display	Memory
12	12.	0
[+]	12.	0
34	34.	0
[=/k]	46.	0
[F] [+]	46.	46
98	98.	46
[−]	98.	46
76	76.	46
[X]	22.	46
[F] [=/k]	46.	46
[=/k] answer	1012.	46

SAMPLE CALCULATION

To calculate expenses at a hotel for 3 days:

Expense		Key	Display	Memory
	Touch	[CE/C]		
		Twice	0.	
	Touch	[F] [CE/C]	0.	0.
Telephone Calls—$9.30	Enter	9.30	9.30	0.
	Touch	[F] [+]	9.30	9.30
Room—3 days @$14.00	Enter	3	3.	9.30
	Touch	[X]	3.	9.30
	Enter	14.00	14.00	9.30
	Touch	[=/K]	42.00	9.30
	Touch	[F] [+]	42.00	51.30
Laundry 3 Shirts @$.50	Enter	3	3.	51.30
	Touch	[X]	3.	51.30
	Enter	.50	0.50	51.30
	Touch	[=/K]	1.5	51.30
	Touch	[F] [+]	1.5	52.80
Meals $22.00 plus 15% Gratuities	Enter	22.	22.	52.80
	Touch	[+]	22.	52.80
	Enter	15	15.	52.80
	Touch	[%]	3.3	52.80
	Touch	[=/K]	25.3	52.80
	Touch	[F] [+]	25.3	78.10
Room Service 3 Days @$3.30/day	Enter	3	3.	78.10
	Touch	[X]	3.	78.10
	Enter	3.30	3.30	78.10
	Touch	[=/K]	9.90	78.10
	Touch	[F] [+]	9.90	88.00
Courtesy Discount 7.5%	Touch	[F] [=/K]	88.00	88.00
	Touch	[X]	88.00	88.00
	Enter	7.5	7.5	88.00
	Touch	[%]	6.6	88.00
	Touch	[F] [−]	6.6	81.40
Taxes 5%	Touch	[F] [X⤸Y]	81.40	6.6
	Touch	[+]	81.40	6.6
	Enter	5	5.	6.6
	Touch	[%]	4.07	6.6
	Touch	[=/K]	85.47	6.6
Answer				

EXAMPLE OF ALGEBRAIC FUNCTIONS $\sqrt{x}$, $1/x$, x^2,

To calculate: $\dfrac{1}{\sqrt{(6)(6)-11}+15} = ?$

				Display
A.	Touch	[CE/C]	Twice	0.
B.	Enter	6		6.
C.	Touch	[F] [X]		36.
D.	Touch	[−]		36.
E.	Enter	11		11.
F.	Touch	[=/K]		25.
G.	Touch	[F] [%]		5.
H.	Touch	[+]		5.
I.	Enter	15		15.
J.	Touch	[=/K]		20.
K.	Touch	[F] [÷]	Answer	0.05

EXAMPLE OF OVERFLOW

$4266 \times 53125 \times 1862 = ?$

				Display
A.	Touch	[CE/C]	Twice	0.
B.	Enter	4266		4266.
C.	Touch	[X]		4266.
D.	Enter	53125		53125.
E.	Touch	[X]		⌐ 2.2663125

NOTE: The overflow indicator is lit and the decimal point is shifted 8 places to the LEFT. The correct answer is 226631250.

To continue

				Display
F.	Touch	[CE/C]		2.2663125
G.	Enter	1862		1862.
H.	Touch	[=/K]		4219.8738

Correct answer is $4219.8738 \times 10^8 = 421987380000.$

14

EXAMPLE OF $x \angle y$ KEY OPERATION

To Calculate $\dfrac{230}{10 \times 69} = ?$

Calculate the denominator first.

				Display
A.	Enter	10		10.
B.	Touch	[X]		10.
C.	Enter	69		69.
D.	Touch	[÷]		690.
E.	Enter	230		230.
F.	Touch	[x∠y]		690.
G.	Touch	[=/K]	Answer	0.3333333

METRIC CONVERSION CONSTANTS

FROM	MULTIPLY BY	TO
Millimeters	.03937	Inches
Meters	39.37	Inches
Cubic centimeter (cc)	.061025	Cubic inches
Kilometers	.621377	Miles
Liters	.26418	Gallons
Grams	.03527	Ounces
Kilograms	2.2046	Pounds

For reciprocal constants (such as inches to millimeter) use reciprocal of constant as multiplier (1 divided by .03937 = 25.4)

CONVERSIONS OF TEMPERATURE

Fahrenheit/Centigrade

Temp°F [−] 32 [X] 5 [÷] 9 = Temp.°C.

Temp°C [X] 9 [÷] 5 + 32 = Temp.°F.

Example: How many inches is 60 millimeters?

KEY SEQUENCE				DISPLAY
Touch	[CE/C]	Twice		0.
Enter	60			60.
Touch	[×]			60.
Enter	.03937			0.03937
Touch	[=/K]		Answer	2.3622

15