MITS

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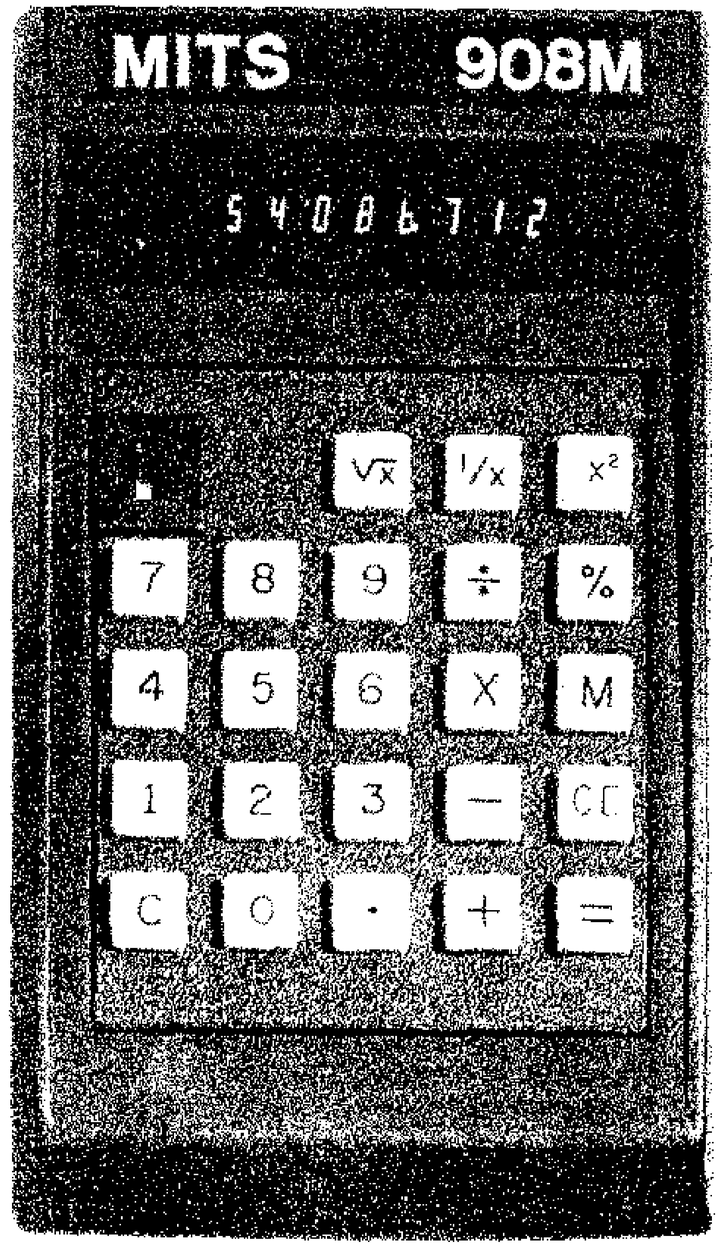

908M HANDHELD CALCULATOR INSTRUCTION MANUAL

The MITS 908M (formerly 150) adds versatility to the convenience of a hand-held calculator and the result is an eight function machine that fits in a pocket or a brief case. Reliability and accuracy are not sacrificed for size in the 908M. There are two decimal modes, fixed and floating, and leading and trailing zeroes are blanked. It employs light-emitting diodes to display an eight-digit readout with sign and error indications. The latest integrated circuitry makes available the four arithmetic functions plus square, square root, reciprocal and percentage in a single key stroke.

If you need more, there's a memory and a simple algebraic entry system. Six AA pen cell batteries provide many hours of calculating time and new ones are easily installed. An extra feature, the battery circuit override, gives you time to think about that problem without using up battery time. The display blanks shortly after the last entry, is stored, then returns intact when the [=] key or another function key is pressed.

OPERATING NOTES

Fixed Decimal Point

The calculator operates initially with a floating decimal point but a fixed point can be entered by using the key sequence [.] [=] [N]

Any digit from 0 to 7 can be used for N. For example, a five-place decimal would be entered as follows:

[.] [=] [5]

This value can be changed at any time by repeating this key sequence and using another digit. When the machine is in the fixed point mode, results are rounded off prior to being displayed. Note that only results are displayed in fixed point; entries continue to be displayed in floating point.

The location of the fixed point will be ignored if the result to be displayed contains more significant integer digits than would be allowed by the fixed point. For example, the result 1234567.8 would be displayed even if the fixed point had been set for two or more decimal places.

To return the machine to the floating point mode after a fixed point has been set, turn the power off, then on again. The fixed point must be reset if the machine is inadvertantly shut off.

Range/Entry

Any positive or negative number within the range of 10^{8} to 10^{-7} may be entered and displayed. Any number resulting from a calculation must also fall within this range. If the capacity of the calculator is exceeded, underflow or overflow will occur.

Entry Overflow occurs when more than eight integer or seven fractional digits are entered. The entry overflow indication is an E displayed at the far left of the display. Any digits entered after the occurrence of this overflow condition are ignored, but it is possible to proceed with the calculation. The entry overflow indication can be reset by pressing [C] or [CE] or by turning the power off, then on again.

Result Overflow occurs when the result of a calculation exceeds eight significant digits to the left of the decimal point. The eight most significant digits of the result will be displayed along with an overflow indication at the far left of the display. The decimal point will be displayed in a position so that if it were moved eight places to the right, the most significant digits of the correct answer would be the result. After a result overflow occurs, the keyboard is locked and further calculation is impossible until either the [C] key is pressed or the power is turned off, then on again.

Intermediate or final results with fractional values less than 10^{-7} will be stored and displayed as a zero value. No indication of underflow is provided and no interruption to further calculation occurs.

Memory

The memory register can be used to store intermediate results while you work an involved problem or to store a constant number required frequently in the execution of a series of problems. If an intermediate result is to be stored, press the [M] key immediately after the [=] key depression which brings the result of the calculation to the display. If the result of square or reciprocal is to be entered in the memory, you must press the [=] key before pressing the [M] key. A square root result is automatically entered in the memory. When working a chain calculation with a stored constant or intermediate result, make sure you do not press the [M] key immediately after [=] unless you intend to change the contents of the memory.

A constant is stored by using the following sequence: [C] [N] [=] [M] . For example, [C] [3] [=] [M] causes the constant 3 to be stored in memory. A typical chain operation follows:

[C] [4] [+] [M] [X] [M] [=] 21.

Data stored in memory may be recalled by pressing the [M] key at any point in a calculation where an operand entry is appropriate or after [C] is pressed.

The memory register can be cleared in two ways: turning the power off, then on again or by using the value of zero (0) in the key sequence used to store a constant. Pressing the [C] or [CE] keys does not affect the memory register. A special note here . . . execution of the square root function will replace the contents of the memory with the result of the square root calculation.

Keys/Functions/Display

ON-OFF switch — Turns the calculator on and off.

[CE] key — Clears the previous entry from the display and replaces it with 0. at the far right of the display.

[C] key — Clears the calculator of all data except the memory and a pre-set fixed decimal point. Any number in the display is replaced with 0. at the far right of the display.

[0] – [9] keys

Enter the digits of a number into the calculator.

[·] key — *When pressed during an entry* operation, defines the location of the decimal point within the entry.

When pressed in *the sequence* [C] [·] [=] [N]

N is stored as the value of the fixed point and the fixed point mode is activated.

[+] key — Enters an add command and *in a chain calculation causes* the execution of the preceding function.

[–] key — Enters a subtract command and in a chain calculation causes the execution of the *preceding function. Also used* to designate a negative number; must be entered before the digit in this negative function.

[X] key — Enters a multiply command and in a chain calculation causes the execution of the preceding function.

[÷] key — Enters a divide command and in a chain calculation causes the execution of the preceding function.

[≈] key — Causes the execution of the preceding function and the display of the result.

NOTE: A calculation is automatically terminated and a new calculation begun if a number key or the decimal point key is pressed after the [=] key has been pressed.

[%] key — Enters a percentage command and in a chain calculation causes the execution of the preceding function.

[√X] key — Enters a square root command and causes the immediate display of the result. In a chain calculation causes the execution of the preceding function.

[X2] key — *Enters a square command and* causes the immediate display of the result. In a chain calculation causes the execution of *the preceding function.*

[1/X] key — Enters a reciprocal command and causes the immediate display of the result. In a chain calculation causes the execution of the preceding function.

[M] — When pressed after the [=] key, causes the data being displayed to be stored in the memory register. When depressed in lieu of a number or function, causes the stored data to be displayed.

Negative Result Indication — A minus sign appears at the left of the display.

−	123.45

Entry Overflow — An E appears at the left of the display; No other digits may be entered but it is possible to proceed with the calculation.

E 12345678.

Result Overflow — A small square appears at the left of the display (eight most significant digits of the result). The decimal point is displayed in a position so that if it is moved eight places to the right, the result displayed will be correct in its most significant eight position.

□	152.412531

Math Error — Division by zero and square root of a negative number constitute math errors and cause the display of the overflow indication at the left of the display *and a zero (0) to the* right.

□	0.

Low Battery Indication — When the batteries are low enough to cause erroneous results, an "L" appears at the far left of the display. New batteries should be installed as soon as possible to ensure accurate calculations.

Battery Over-ride Indication

A few seconds after the last entry, the display will blank and the middle segment of the fifth digit LED will be lighted. To return the display without error, press the [=] key or any of the function keys. DO NOT use any digit keys as they may alter the actual display.

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PRELIMINARY INSTRUCTIONS

(The decimal point is floating unless otherwise indicated.) All numbers are entered in sign/magnitude format. An algebraic entry system allows digits and functions to be entered in the same manner as the problem is stated.

1. Clear the calculator by pressing [C] This should be done at the beginning of each new calculation.

DISPLAY WILL BE

0.

2. Enter the number 123.45 by pressing the digit and decimal point keys one at a time.

[1] [2] [3]
[.] [4] [5]

123.45

SAMPLE CALCULATIONS:

Addition:

DO THESE STEPS	DISPLAY WILL BE
1. 2.375 + .4182 =	
Press [C]	0.
Enter 2.375	2.375
Press [+]	2.375
Enter .4182	0.4182
Press [=]	2.7932
2. (–4) + (–3) =	
Press [C]	0.
Press [–]	– 0.
Enter 4	– 4.
Press [+]	– 4.
Press [–]	– 0.
Enter 3	– 3.
Press [=]	– 7.

Subtraction:

1. 2.375 − .068 =

	DISPLAY WILL BE
Press C	0.
Enter 2.375	2.375
Press −	2.375
Enter .068	0.068
Press =	2.307

2. (−4) − (−3) =

	DISPLAY WILL BE
Press C	0.
Press −	− 0.
Enter 4	− 4.
Press −	− 4.
Press −	− 0.
Enter 3	− 3.
Press =	− 1.

Multiplication:

1. 2.375 X 6.8

	DISPLAY WILL BE
Press C	0.
Enter 2.375	2.375
Press X	2.375
Enter 6.8	6.8
Press =	16.15

2. −4 X 32 X 16 =

	DISPLAY WILL BE
Press C	0.
Press −	− 0.
Enter 4	− 4.
Press X	− 4.
Enter 32	32.
Press X	− 128.
Enter 16	16.
Press =	− 2048.

Division:

1. 2.375 ÷ 5 =

	DISPLAY WILL BE
Press C	0.
Enter 2.375	2.375
Press ÷	2.375
Enter 5	5.
Press =	0.475

2. −9 ÷ 3 =

	DISPLAY WILL BE
Press C	0.
Press −	− 0.

	DISPLAY WILL BE
Enter 9	– 9.
Press ÷	– 9.
Enter 3	3.
Press =	– 3.

Percentage:

1. 6% of 220 =

	DISPLAY WILL BE
Press C	0.
Enter 6	6.
Press %	6.
Enter 220	220.
Press =	13.2

2. 4% of $7,263.15

(Set fixed decimal point for two places)

	DISPLAY WILL BE
Press C	0.
Press . = 2	0.
Enter 4	4.
Press %	4.
Enter 7,263.15	7263.15
Press =	290.53

(Turn power off, then on again)

Square Root:

$\sqrt{169}$ =

	DISPLAY WILL BE
Press C	0.
Enter 169	169.
Press $\sqrt{x}$	13.

Square:

15^2 =

	DISPLAY WILL BE
Press C	0.
Enter 15	15.
Press x^2	225.

Reciprocal:

1/4 =

	DISPLAY WILL BE
Press C	0.
Enter 4	4.
Press 1/X	0.25

Chain Calculation:

1. $\frac{(-3 + 4 - 13)\ 12}{8} - 7 =$

	DISPLAY WILL BE
Press C	0.
Press −	− 0.
Enter 3	− 3.
Press +	− 3.
Enter 4	4.
Press −	1.
Enter 13	13.
Press X	− 12.
Enter 12	12.
Press ÷	− 144.
Enter 8	8.
Press −	− 18.
Enter 7	7.
Press =	− 25.

2. $\frac{1}{\sqrt{3^2 + 16}} =$

	DISPLAY WILL BE
Press C	0.
Enter 3	3.
Press X2	9.
Press +	9.
Enter 16	16.
Press √X	5.
Press 1/X	0.2

3. $\frac{1}{\left(\frac{\sqrt{19 + 17}}{2}\right)^2} - 5$

	DISPLAY WILL BE
Press C	0.
Enter 19	19.
Press +	19.
Enter 17	17.
Press √X	6.
Press ÷	6.
Enter 2	2.
Press X2	9.
Press −	9.
Enter 5	5.
Press 1/X	0.25

Memory:

Enter constant 4 . . .

	DISPLAY WILL BE
Press C	0.
Enter 4	4.
Press =	4.
Press M	4.

Display constant . . .

	DISPLAY WILL BE
Press C	0.
Press M	4.

Calculations using memory:

1. M + 6

	DISPLAY WILL BE
Press C	0.
Press M	4.
Press +	4.
Enter 6	6.
Press =	10.

2. M − 17 =

	DISPLAY WILL BE
Press C	0.
Press M	4.
Press −	4.
Enter 17	17.
Press =	− 13.

3. M^3

	DISPLAY WILL BE
Press C	0.
Press M	4.
Press X	4.
Press M	4.
Press X	16.
Press M	4.
Press =	64.

Chain Calculations using memory:

1. $\frac{12 + 3}{9 - 4}$ =

	DISPLAY WILL BE
Press C	0.
Enter 9	9.
Press −	9.
Enter 4	4.

	DISPLAY WILL BE
Press =	5.
Press M	5.
(Stores 5 for use later)	
Enter 12	12.
Press +	12.
Enter 3	3.
Press ÷	15.
Press M	5.
Press =	3.

2. $\frac{M/3 + 7}{M^2}$ = (M=9)

Press C	0.
Enter 9	9.
Press =	9.
Press M	9.
Press ÷	9.
Enter 3	3.
Press +	3.
Enter 7	7.
Press ÷	10.

	DISPLAY WILL BE
Press M	9.
Press ÷	1.1111111
Press M	9.
Press =	0.1234567

Chain calculation with a constant:

1. Add 3 items ($10.95, $17.00, $42.69)
2. Enter total in memory
3. Find 10% of total
4. Enter 10% tax
5. Find sale + tax

(Set fixed decimal for two places)

Press ·	
Press =	
Enter 2	
Enter 10.95	10.95
Press +	10.95
Enter 17.00	17.00
Press +	27.95
Enter 42.69	42.69

Press =	70.64
Press M	70.64
Enter 10	10.
Press %	10.
Press M	70.64
Press =	7.06
Press +	7.06
Press M	70.64
Press =	77.70

TO CHANGE THE BATTERIES:

Disconnect the optional AC adapter if your calculator has one.

CAUTION: You will void the warranty if you install the batteries backwards.

The case top has wires running to battery clips in the case bottom, so you must take care not to widely separate the two parts. Remove four screws from the base of the case. Carefully remove the calculator base from the top. Do not put any tension on the wires connecting the main body of the calculator to the batteries in the case bottom. The calculator will not operate if these wires are damaged in any way.

Six batteries are installed by snapping them into the small spring clips which hold them in place in the base of the case. Note that the positive and negative polarities are marked plus (+) and minus (–), respectively. The markings on the batteries should match the ones in the case. The flat end of the battery should be inserted into the clip first.

When all six batteries are installed, replace the plastic shield which separates the batteries from the circuit board. After ensuring that the wires are out of the way, return the top to the base of the calculator and fasten with the four screws removed at the first.

SERVICE:

Should you have a problem with your calculator, it can be returned to MITS for repair. If the calculator is still under warranty, any defective part will be replaced free of charge. The purchaser is responsible for all postage.

Since MITS calculators are completely American-made, you can be assured of a rapid turnaround on all machines sent to us for repair.

NOTE: Before returning a calculator for repair, you must REMOVE BATTERIES (or warranty is voided) from the unit. Pack it in a sturdy cardboard container and surround it on all sides with a layer of packing material. You may use

shredded newspaper, soft foamed plastic, or excelsior. The packed carton should be neatly sealed with gummed tape and tied with a stout cord. Be sure to tape a letter containing your name and address, a description of the malfunction, and the original invoice (if the calculator is still under warranty) to the outside of the carton.

Mail the carton by parcel post or UPS – for extra fast service, ship by air parcel post. Be sure and insure the package.

SHIP TO:

MITS
6324 Linn Ave. N.E.
Albuquerque, New Mexico 87108

REMEMBER to include a brief accurate description of the problem so our technicians can provide the best service possible.

All warranties are void if any changes have been made to the basic design of the machine or if the internal workings have been tampered with in any way.