

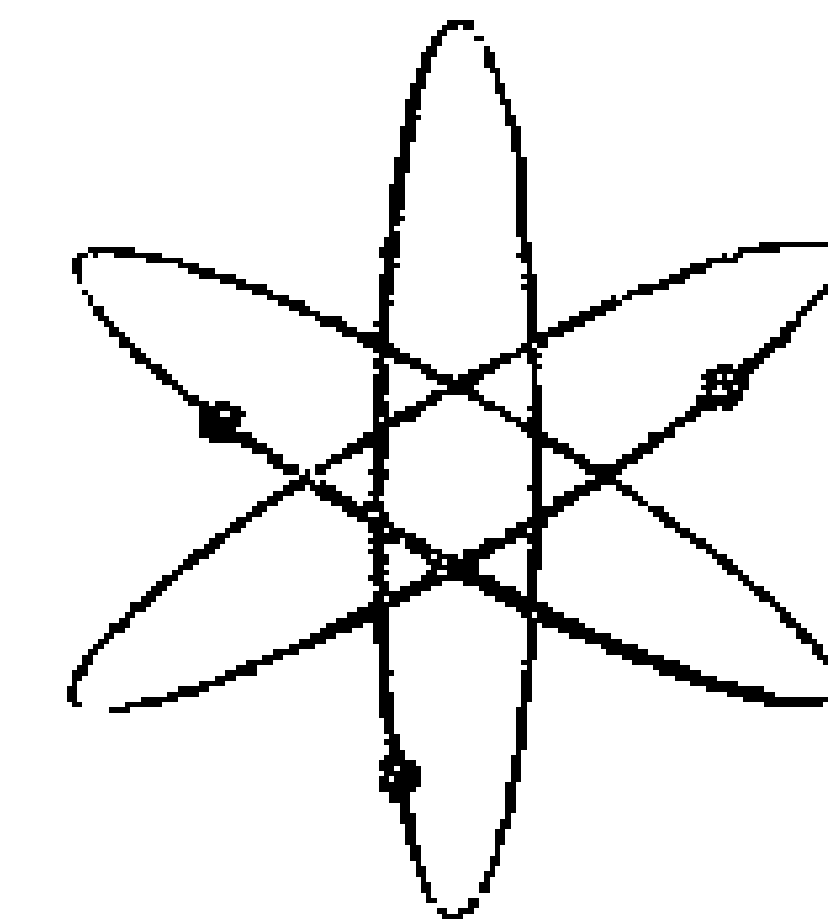
HEATH COMPANY
BENTON HARBOR, MICHIGAN

MODEL **IC-2009** Portable
Electronic Calculator

HEATHKIT[®]
OPERATION MANUAL



Price \$2.00



Copyright ©1973
Heath Company
All rights reserved

I-597-1259

Dear Customer:

The Heathkit electronic product you have purchased is one of the best performing electronic products in the world.

Here's how we aim to keep it that way:

Your Heathkit Warranty

During your first 90 days of ownership, any parts which we find are defective, either in materials or workmanship, will be replaced or repaired free of charge. And we'll pay shipping charges to get those parts to you — anywhere in the world.

If we determine a defective part has caused your Heathkit electronic product to need other repair, through no fault of yours, we will service it free — at the factory, at any retail Heathkit Electronic Center, or through any of our authorized overseas distributors.

This protection is exclusively yours as the original purchaser. Naturally, it doesn't cover damage by use of acid-core solder, incorrect assembly, misuse, fire, flood or acts of God. But, it does insure the performance of your Heathkit electronic product anywhere in the world — for most any other reason.

After-Warranty Service

What happens after warranty? We won't let you down. If your Heathkit electronic product needs repairs or you need a part, just write or call the factory, your nearest retail Heathkit Electronic Center, or any Heath authorized overseas distributor. We maintain an inventory of replacement parts for each Heathkit model at most locations — even for many models that no longer appear in our current product line-up. Repair service and technical consultation are available through all locations.

We hope you'll never need our repair or replacement services, but it's nice to know you're protected anyway — and that cheerful help is nearby.

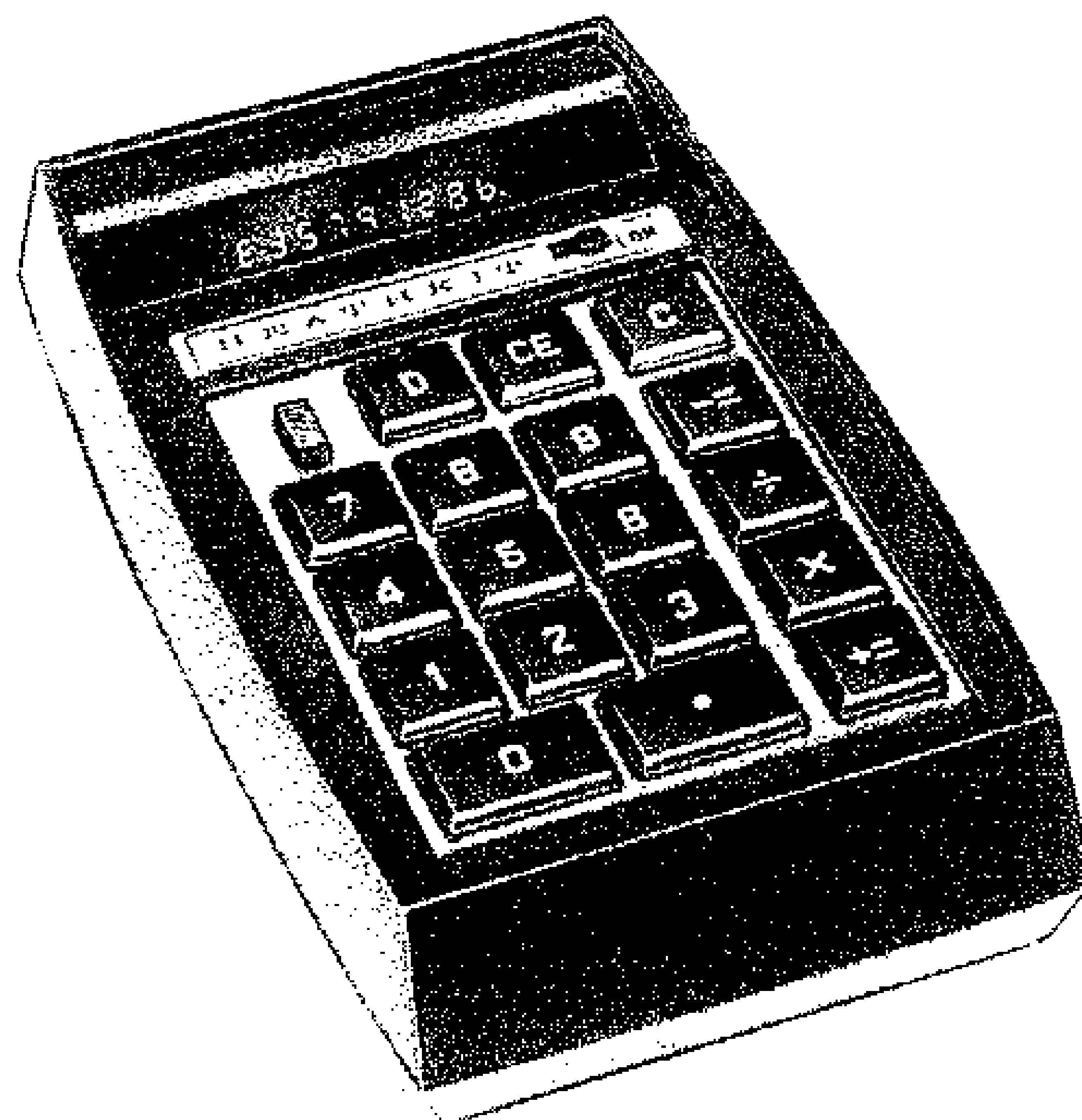
Sincerely,

HEATH COMPANY
Benton Harbor, Michigan 49022

Operation Manual
for the



MODEL IC-2009 CALCULATOR



HEATH COMPANY
BENTON HARBOR, MICHIGAN 49022



TABLE OF CONTENTS

INTRODUCTION	3
OPERATION	4
OPERATING PROCEDURE	6
Chart #1 Addition	7
Chart #2 Subtraction	7
Chart #3 Multiplication	8
Chart #4 Division	9
Chart #5 Mixed Calculations in Series	10
Chart #6 Multiplying by a Constant, K	11
Chart #7 Dividing by a Constant, K	12
Chart #8 Raising a Number to a Power Using the Constant Function, K	13
Chart #9 Calculating Negative Powers of Numbers Using the Constant Function, K	14
Chart #10 Using the CE Key to Remove Erroneous Input	15
OPERATIVE CONSIDERATIONS	16
TYPICAL USES	17
REFERENCE TABLES	19

INTRODUCTION

This Manual explains the basic operation of your Calculator. Take a few minutes to read the features and procedures so you will become familiar with your unit.

You can quickly and accurately add, subtract, multiply, and divide in an easy straightforward way. In fact you may soon use your Calculator for problems in areas you did not originally consider. Common examples and tables are provided for quick reference as you need them.

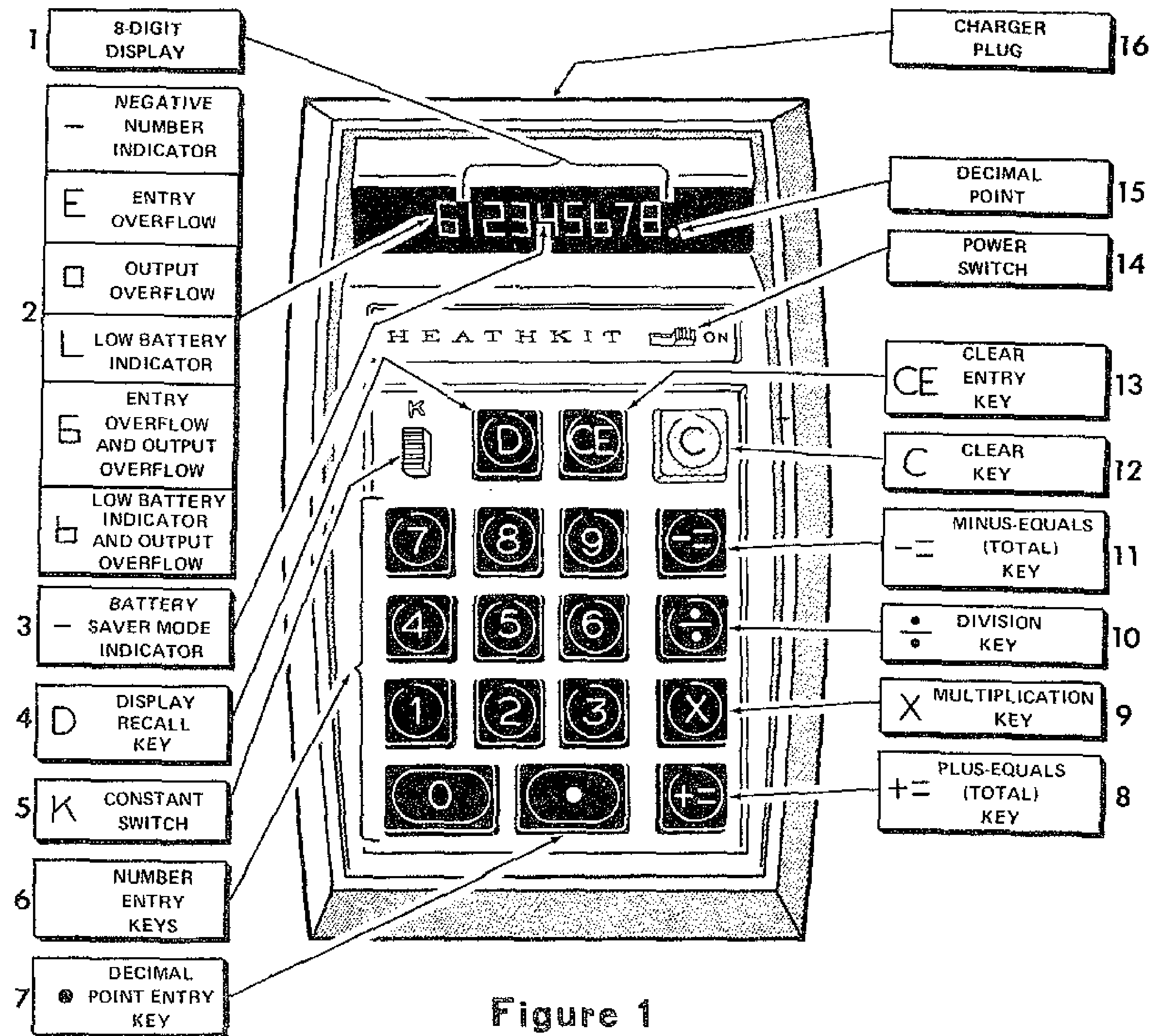


Figure 1



OPERATION

This section of the Manual details each function of the Calculator. Study the following information to become familiar with the Calculator and its operation.

OPERATING FEATURES

Figure 1 points out the operating features of the Calculator. Each feature is described below.

1. **8-DIGIT DISPLAY** — Displays the numbers entered by the keyboard or the result of a calculation.
2. **NEGATIVE NUMBER INDICATOR** — Center segment (—) lights to indicate a negative number.

ENTRY OVERFLOW — Lights (E) when the 8-digit input capacity of the Calculator has been exceeded. The display shows only the first eight digits entered.

OUTPUT OVERFLOW — Lights (O) when the result of a calculation exceeds the Calculator 8-digit display capacity. The display shows only the "most significant" numbers of the calculation. See the "Overrange" section on Page 16.

LOW BATTERY INDICATOR — Lights (L) when the battery voltage drops to a level where further calculations (in excess of fifteen minutes) may no longer insure accurate results.

3. **BATTERY SAVER MODE INDICATOR** — Approximately 15 seconds after the last entry is made on the keyboard, the display, except for the center segment of the center digit (—), will disappear. This indicates the Calculator has gone into its "battery saver mode" to conserve the battery.
4. **(D) DISPLAY RECALL KEY** — Pressing the D key, while the Calculator is in the battery saver mode, will cause the last display to relight.
5. **(K) CONSTANT SWITCH** — Slide this switch upward (↑) before you enter a number that will be used as a constant for multiplication or division. The constant (K) is the number and function (X or ÷) entered. This constant is *remembered by the Calculator for each new problem until the CLEAR (C) KEY* is pressed. The switch should be left in the upward position until the end of calculations that no longer require a constant.
6. **NUMBER ENTRY KEYS** — Use these keys to enter numbers into the Calculator.
7. **(.) DECIMAL POINT ENTRY KEY** — Press this key to enter a decimal point in the number being entered into the Calculator. This key must be pressed in the proper sequence with the number keys to enter the decimal point at the proper position.

8. **(+ =) PLUS-EQUALS (TOTAL) KEY** — This key performs two operations: The (+) locks in a positive number entry and the (=) gives the total to a calculation. Press this key right after the entry of:
- A. A positive number when adding or subtracting.
 - B. The last number of a multiplication problem to find the total.
 - C. The last number of a division problem to find the total.
9. **(X) MULTIPLICATION KEY** — Push this key before you enter a number to be multiplied by an existing number in the Calculator.
10. **(÷) DIVISION KEY** — Push this key before you enter a number to be divided into an existing number in the Calculator.
11. **(- =) MINUS-EQUALS (TOTAL) KEY** — This key performs two operations: The (-) locks in an entry as a negative number and the (=) gives the total to a calculation. Press this key right after the entry of:
- A. A number that is to be subtracted from an existing number in the Calculator. This also gives the total of the calculation.

- B. A negative number to be used in a multiplication or division problem.

NOTE: When you perform a subtraction problem, the Calculator actually finds the difference between a positive and negative number by addition. The negative number can be entered in any sequence providing the (-=) key is pressed right after the number is entered in the Calculator.

12. **(C) CLEAR KEY** — Push this key to clear all numbers in the Calculator and reset it to zero. If a (K) constant is being used, it is also cleared.
13. **(CE) CLEAR ENTRY KEY** — Push this key to clear any number shown on the display. This key will not affect any other number or operation previously entered into the Calculator. The (CE) key will clear an incorrect number entry so that the correct number can be entered without disturbing any previous entry in the Calculator.
14. **POWER SWITCH** — Turns the Calculator on and off.
15. **DECIMAL POINT** — Indicates the location of the decimal point in the number shown in the display.
16. **CHARGER PLUG** — Connects the Charger to the Calculator to charge the battery when the Charger is connected to an AC outlet.



OPERATING PROCEDURE

Charts 1 through 4, which follow, illustrate the four basic functions of the Calculator: ADDITION, SUBTRACTION, MULTIPLICATION, and DIVISION. Chart 5 shows mixed calculations; Charts 6 and 7 show multiplication and division by a constant; Charts 8 and 9 show how to calculate positive and negative powers of numbers; Chart 10 shows the use of the (CE) CLEAR ENTRY.

Each numbered step (line) of the Charts shows which input and function keys to push, and what the readout will be. In the "Display" column, the light lines represent all the segments that can light whereas the heavy lines indicate the segments to be lighted for that step.

Until you become familiar with using the Calculator, it will be helpful to refer to these charts from time to time.

Connect the charger into an appropriate AC power source and connect the charger cord into the Calculator. The Calculator can be used for desk top operation even with the Charger connected. It will take approximately 14 hours (with the Calculator turned off) before the batteries are completely charged. The Calculator, when used as a portable, can be expected to operate for approximately five hours when starting with a fully charged battery. (No warmup time is required to use the Calculator.)

Before you begin any calculation, always push the (C) CLEAR key to clear the Calculator.

CHART #1 – ADDITION

$$\begin{array}{r}
 \text{ADD:} \quad 155.1 \\
 + \quad 25.3 \\
 \hline
 180.4
 \end{array}$$

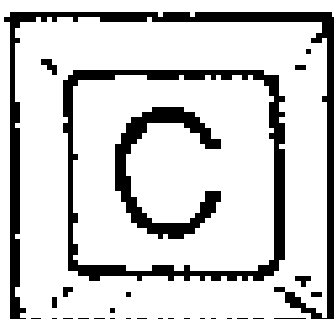
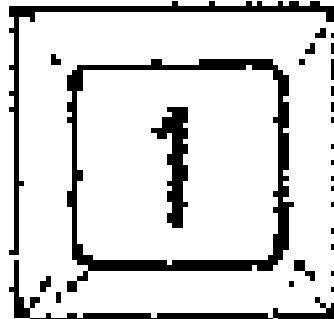
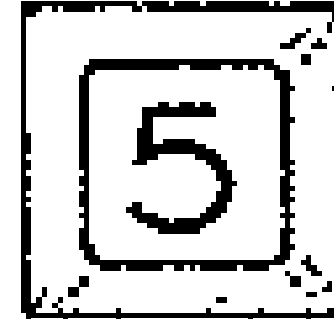
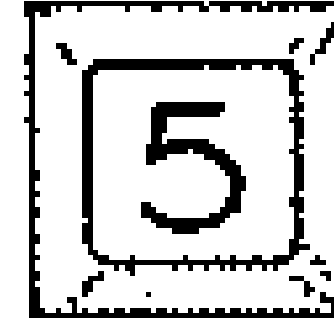
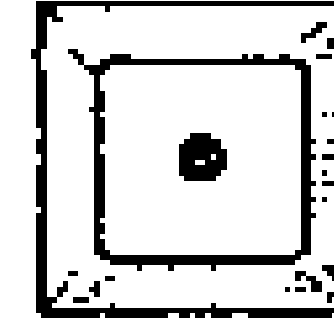
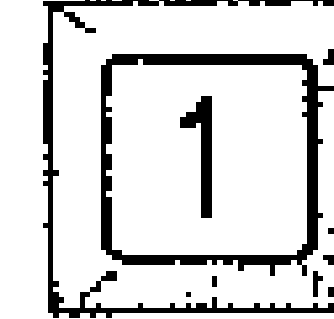
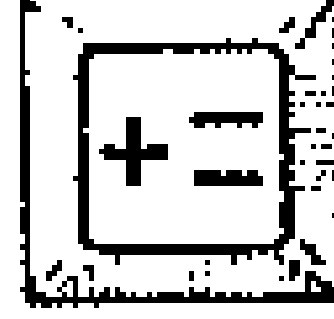
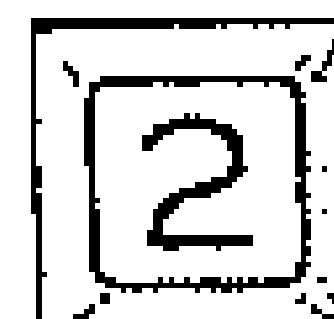
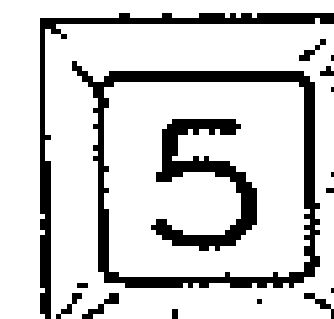
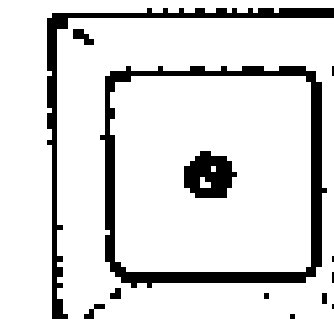

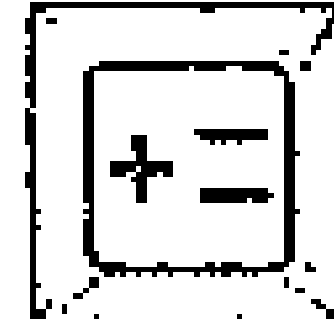
STEP	INPUT	FUNCTION	DISPLAY
1	     		00000005.1
2	   		00000000.4

CHART #2 – SUBTRACTION

$$\begin{array}{r}
 \text{SUBTRACT:} \quad 108.48 \\
 - \quad 48.22 \\
 \hline
 60.26
 \end{array}$$

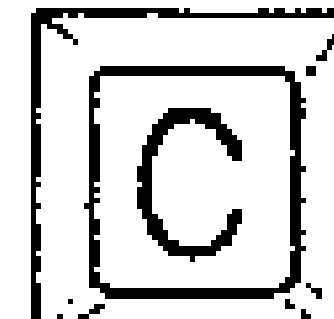
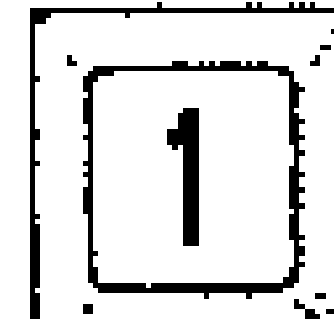
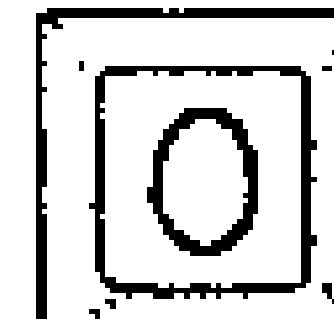
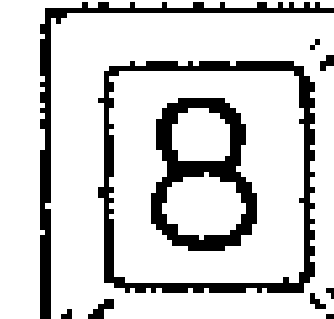
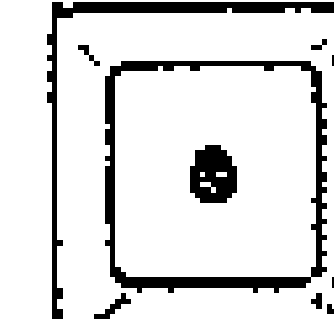
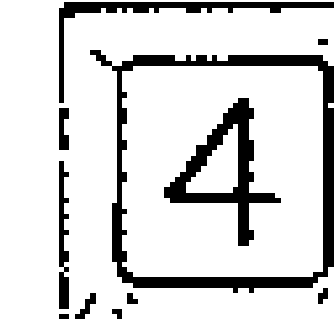

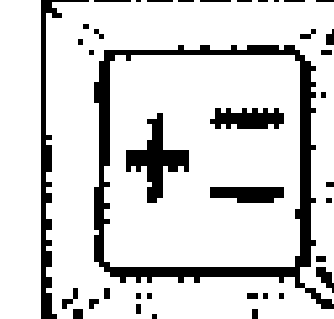
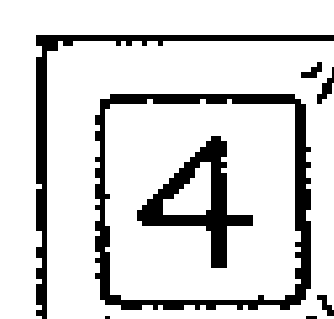
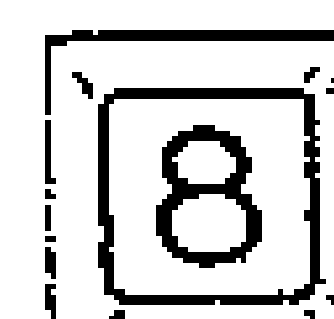
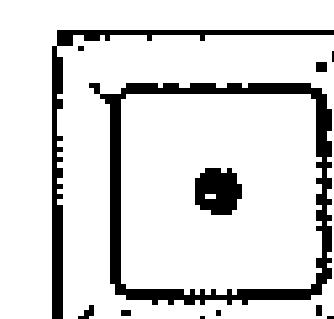
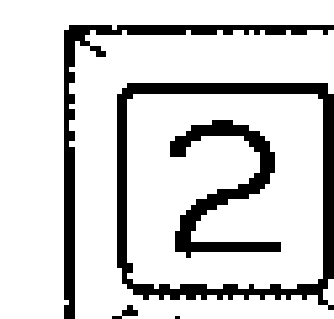

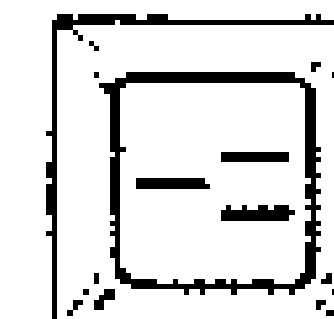
STEP	INPUT	FUNCTION	DISPLAY
1	      		00000004.88
2	    		00000060.26

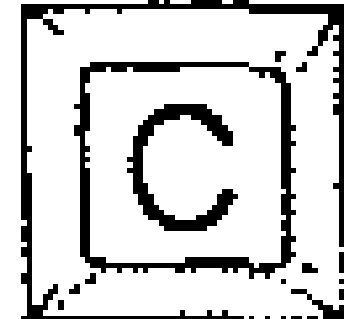

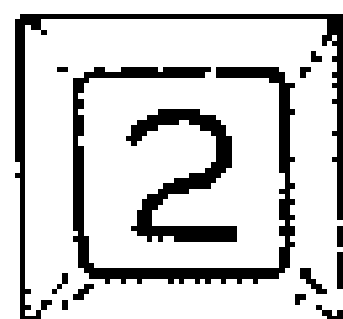
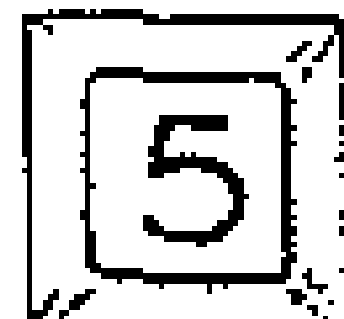
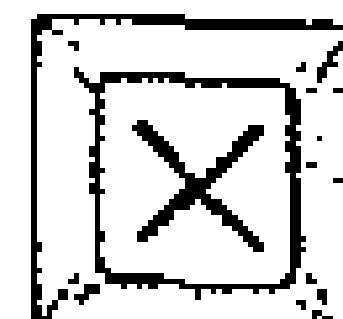
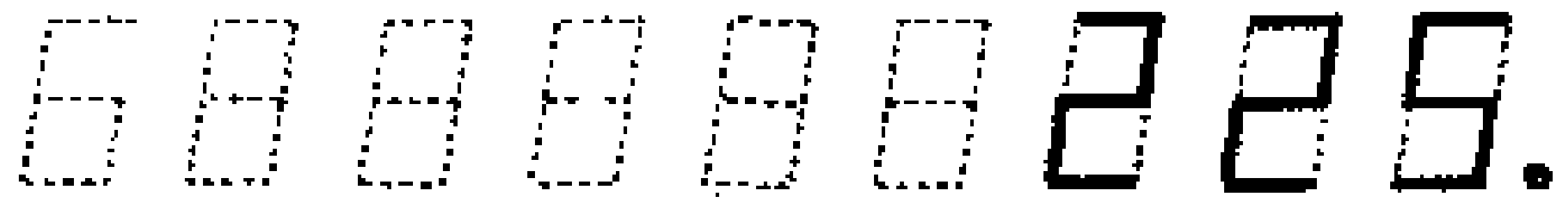
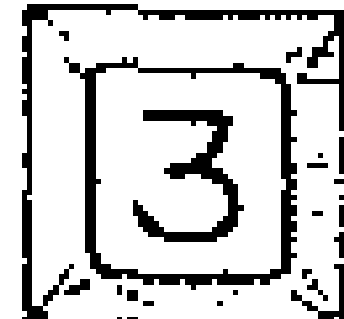
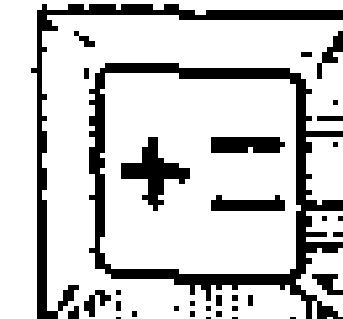
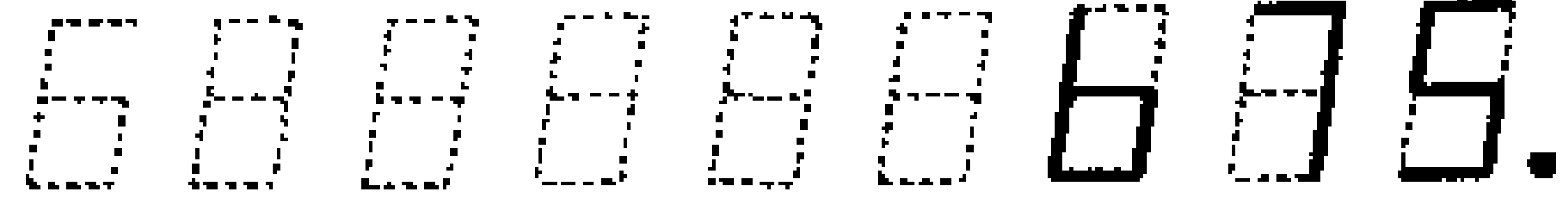
CHART #3 – MULTIPLICATION			
MULTIPLY: 225 x 3 <u> </u> 675			
STEP	INPUT	FUNCTION	DISPLAY
1	   		
2			

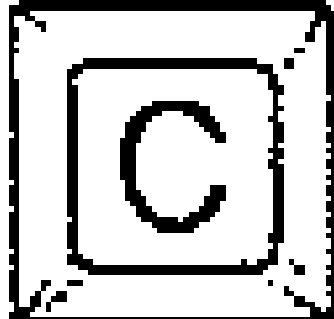
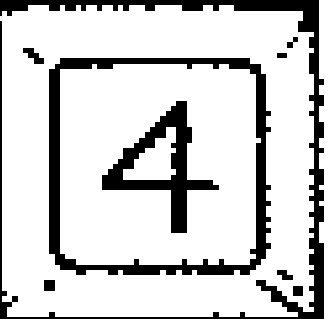
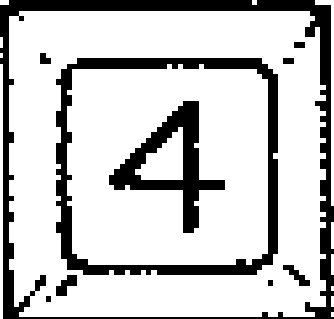
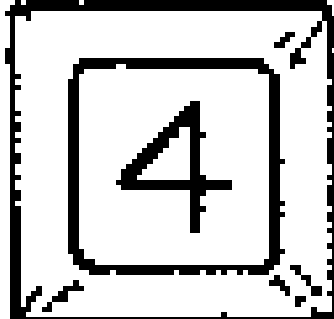
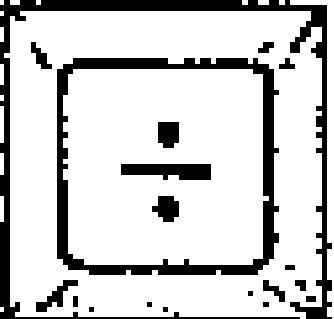
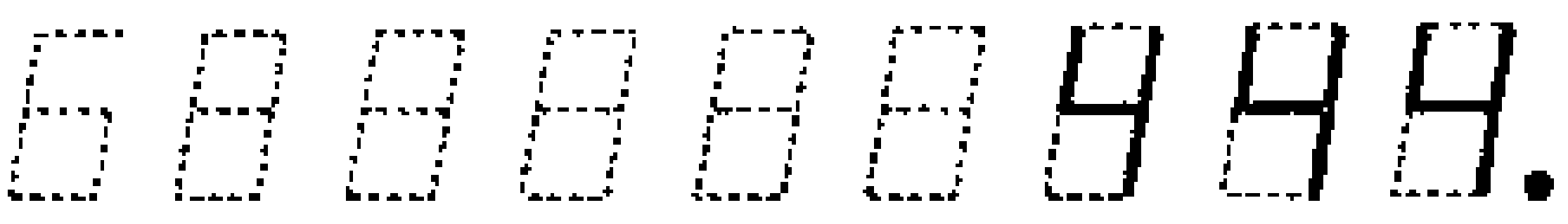
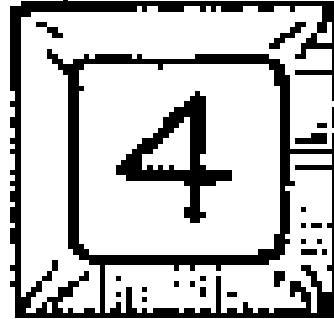
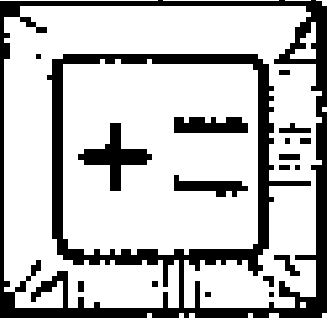
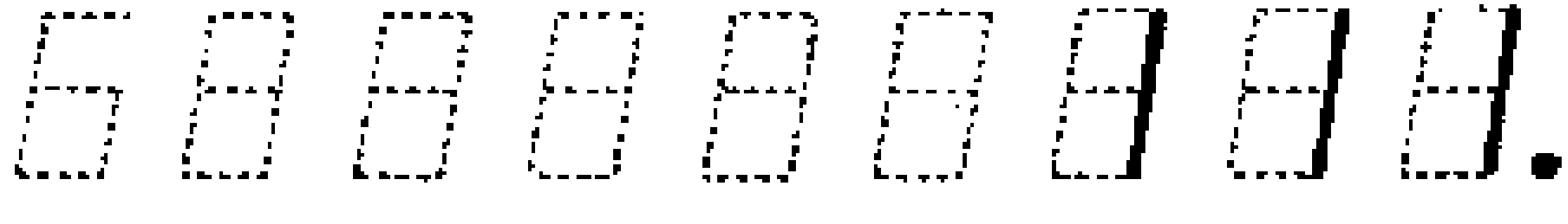
CHART #4 – DIVISION			
DIVIDE: $444 \div 4 = 111$			
STEP	INPUT	FUNCTION	DISPLAY
1	   		
2			

CHART #5 – MIXED CALCULATIONS IN SERIES

ADD, SUBTRACT, ADD, MULTIPLY, AND
DIVIDE IN SERIES:

$$\frac{(15 + 20 - 5 + 12) \times 8}{4}$$

= 84

STEP	INPUT	FUNCTION	DISPLAY
1			0000000005.
2			0000000020.
3			0000000000.
4			0000000042.
5			0000000442.
6			0000000006.
7			0000000004.

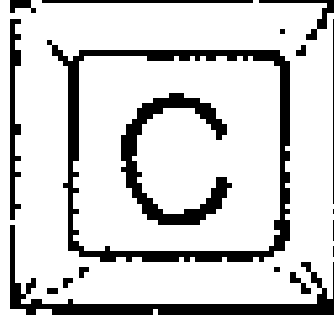
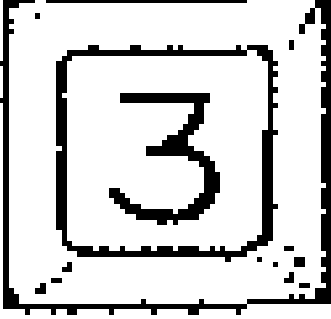
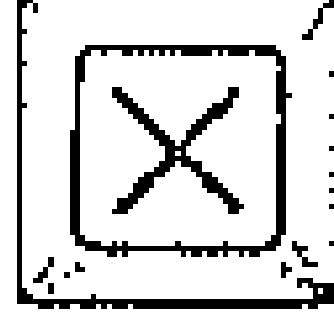

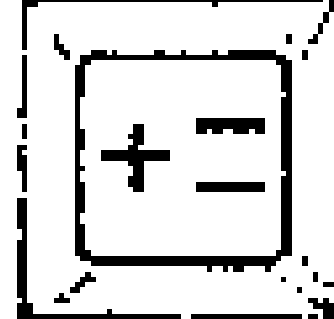
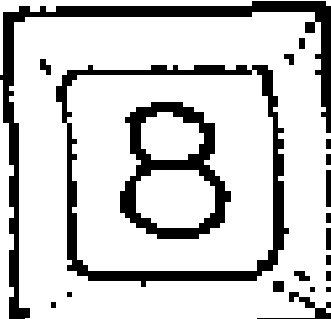
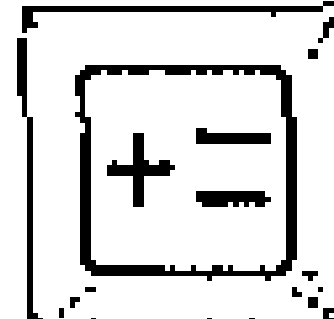
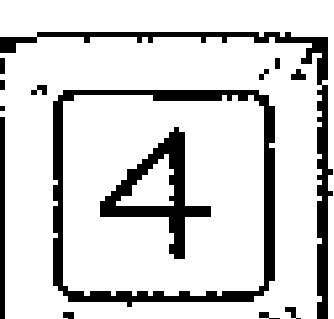
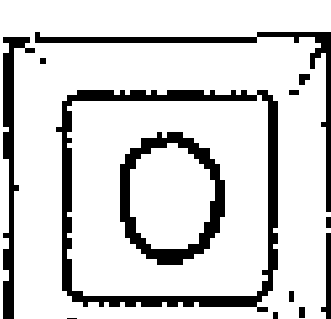
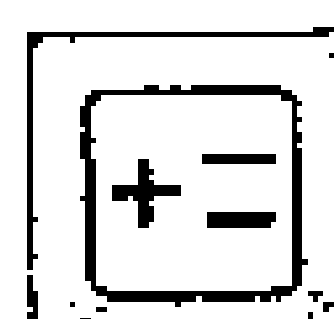
CHART #6 – MULTIPLYING BY A CONSTANT, K

WHERE CONSTANT K = 3:

$$K \times 2 = 6$$

$$K \times 8 = 24$$

$$K \times 40 = 120$$

STEP	INPUT	FUNCTION	DISPLAY
1	 K↑ * 		6000000000.
2			6000000006.
3			6000000024.
4	 		6000000200.
5	K↓		

*NOTE THAT FOR MULTIPLICATION THE CONSTANT IS THE FIRST NUMBER ENTERED.

CHART #7 – DIVIDING BY A CONSTANT, K			
WHERE CONSTANT K = 4:			
$12 \div K = 3$ $20 \div K = 5$ $28 \div K = 7$			
STEP	INPUT	FUNCTION	DISPLAY
1	K↑		6888888888.
2	*		6888888888.
3			68888888885.
4			68888888887.
5	K↓		

*NOTE THAT FOR DIVISION THE CONSTANT IS THE SECOND NUMBER ENTERED.

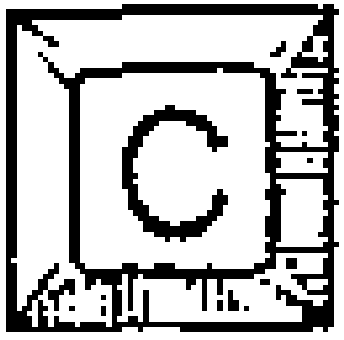
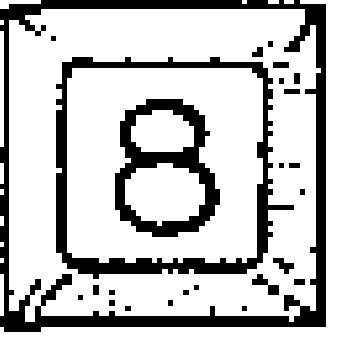
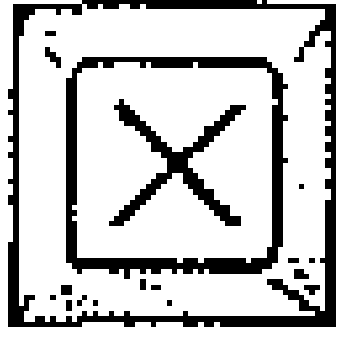
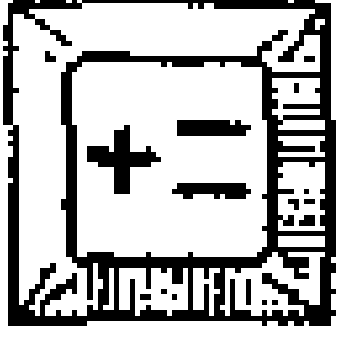
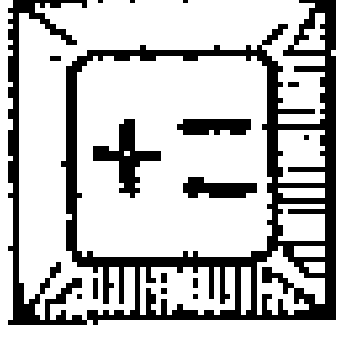
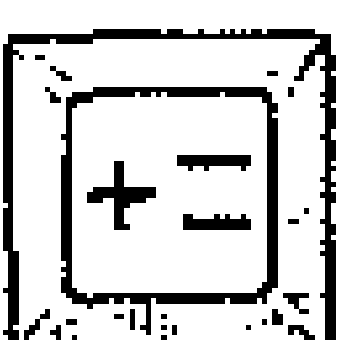
CHART #8 – RAISING A NUMBER TO A POWER USING THE CONSTANT FUNCTION, K			
RAISE 8 TO ITS FOURTH POWER: WHERE CONSTANT K = 8: $8^4 = 8 \times 8 \times 8 \times 8 = 8 \times \text{+=} \text{+=} = 4096$			
STEP	INPUT	FUNCTION	DISPLAY
1	 K↑ 		6888888888.
2			6888888888.
3			6888888888.
4			6888888888.
5	K↓		

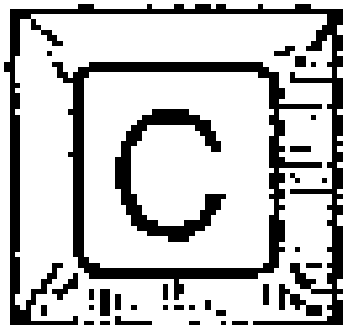
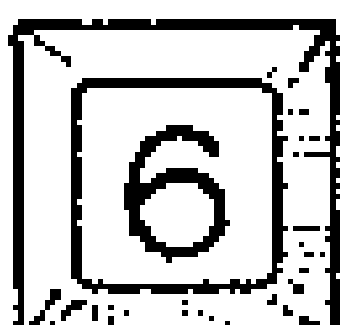
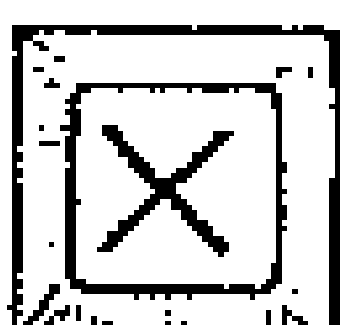
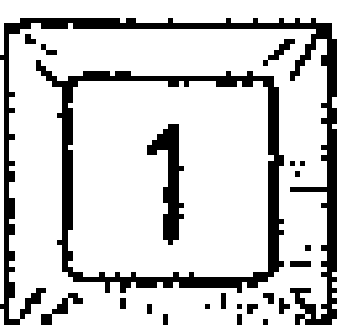
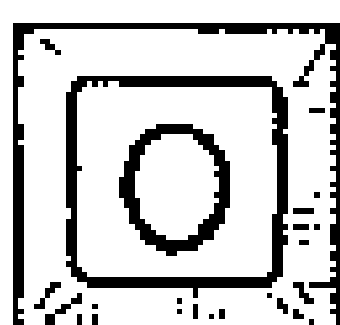
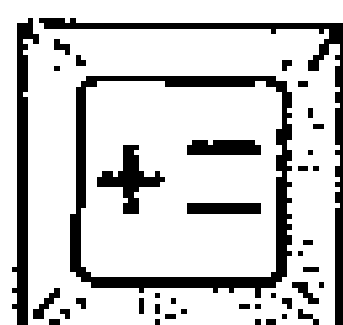
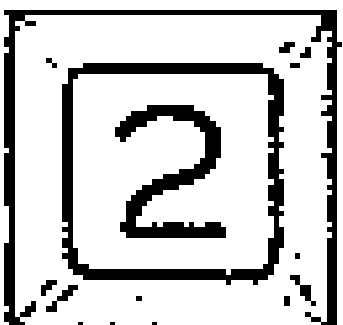
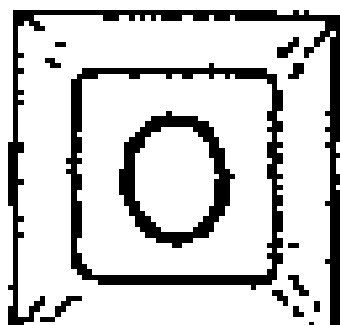
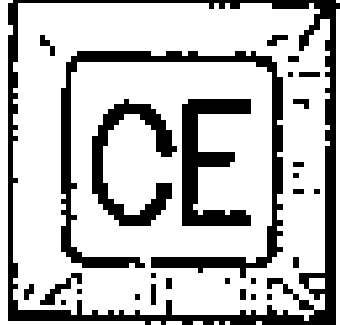
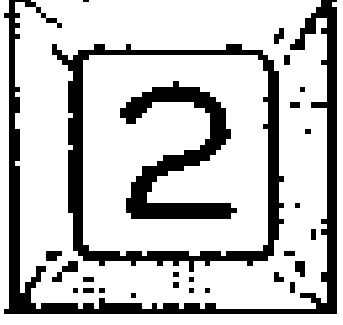
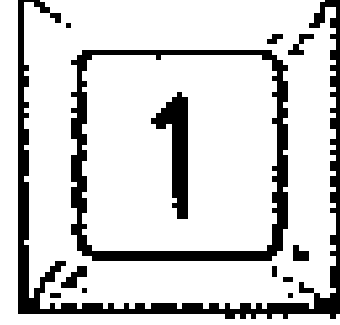
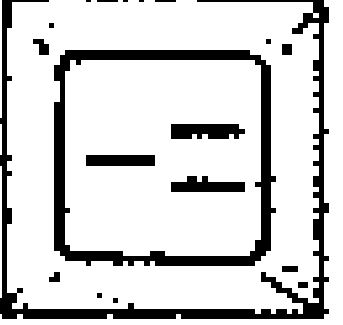
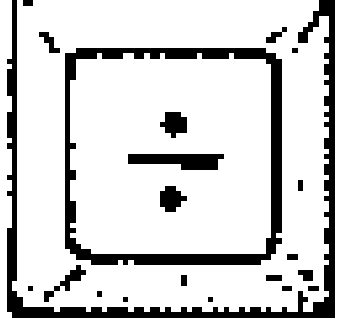
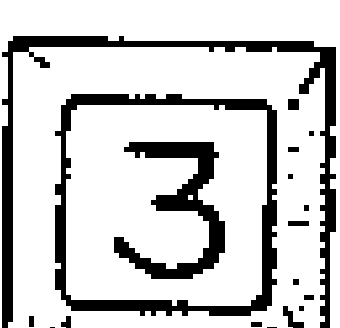
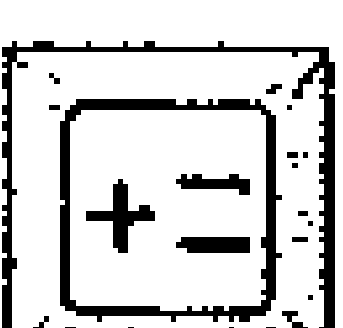
CHART #9 – CALCULATING NEGATIVE POWERS OF NUMBERS USING THE CONSTANT FUNCTION, K

**CALCULATE: THE NEGATIVE FOURTH POWER OF 2:
WHERE CONSTANT K = 2:**

$$2^{-4} = \frac{1}{2^4} = \frac{1}{2 \times 2 \times 2 \times 2} = 1 \div 2 \div 2 \div 2 \div 2 = .0625$$

STEP	INPUT	FUNCTION	DISPLAY
1	K↑		0000000000.
2			000000000.0
3			00000000.00
4			000000.0000
5			0000.000000
6	K↓		

CHART #10 – USING THE CE KEY TO REMOVE ERRONEOUS INPUT NUMBERS
MULTIPLY, SUBTRACT, AND DIVIDE
IN SERIES: $\frac{(6 \times 10) - 21}{3} = 13$

STEP	INPUT	FUNCTION	DISPLAY
1	 		6000000000.
2	 		6000000000.
3	ERROR  		6000000000.
4	CLEAR DISPLAY 		6000000000.
5	 		6000000000.
6			
7			6000000000.



OPERATING CONSIDERATIONS

OPERATING TEMPERATURE

The solid-state devices in the Calculator are designed to operate normally at temperatures between 0 and 50 degrees Centigrade (32 to 120 degrees Fahrenheit). If you operate the Calculator in temperatures outside of this range, you may encounter inaccurate operation.

NEGATIVE NUMBERS

Negative numbers can be used in any calculations. To establish a negative number, push the (-) key immediately after you enter the number.

DECIMAL PLACES

The Calculator has a floating decimal point. It is necessary to push the DECIMAL (.) key in proper sequence to enter the decimal point in the entry.

$$\begin{array}{r}
 6843.6919 \\
 (+) \underline{7362.9587} \\
 14206.6506 \leftarrow \text{NOT SHOWN} \\
 \hline
 \end{array}$$

8-DIGIT DISPLAY

Note that the last digit shown is not rounded off to indicate the value of the part of the answer which is beyond the readout capacity of the Calculator.

The floating DECIMAL POINT gives only the most significant digit (within the 8-digit capacity of the Calculator) to the right of the decimal point as shown. Since "5" is the last significant digit in the answer to the addition above, the answer displayed would be 14206.65.

A characteristic of the Calculator is that any fractional number is always preceded by 0 (zero) or a whole number. This characteristic limits the input and readout capacity of the Calculator to seven digits to the right of the decimal point. The Calculator, however, can handle up to 14 places in multiplying and dividing fractional numbers.

OVERRANGE

The overrange indicator at the left end of the display will light (E) when the whole-number entered, or (□) if the final answer in a calculation, is beyond the 8-digit capacity of the Calculator. In an overrange condition, the part of the answer shown will be correct, but the decimal point will be eight places to the left of its correct location and the part of the answer beyond eight digits will not be shown. The presence of the (E) does not prevent further calculations although it would hide the presence of a minus sign.

The presence of the (□) does prevent further entry and only pressing the (C) key will restore the Calculator for further calculations.

ENDING A CALCULATION

When you have completed all inputs for a calculation, push the (+=) PLUS-EQUALS key, or the (-=) MINUS-EQUALS key if the last entry is a negative number. This displays the answer. It is then necessary to push the (C) CLEAR key to clear the Calculator before you enter numbers for a new calculation.

PERCENT OF A NUMBER

Just as a cent is one one-hundredth of a dollar, one percent is one one-hundredth of a unit. Therefore just as a cent (1 penny) times one hundred equals one dollar, one hundred times one percent equals one unit (100%). Divide one percent by one hundred and the result is the decimal equivalent.

Example: $1 (\%) \div 100 = 0.01$

A 4% (.04) sales tax on a five dollar purchase would be .04 times the purchase price.

Example: $\$5.00 \times .04 = \0.20 sales tax

The total amount of a five dollar purchase, including the tax would be $\$5.00 \times 1.04$ (one times five dollars plus .04 times five dollars).

Example: $\$5.00 \times 1.04 = \5.20 total amount

SUBTOTALING

In series calculations, the (+ =) PLUS-EQUALS key and (- =) MINUS-EQUALS key display a subtotal.

TYPICAL USES

THE PERCENT ONE NUMBER IS OF ANOTHER NUMBER

A \$5.50 increase on a \$110 item.

Example: $5.50 \div 110 = 0.05$
 $.05 \times 100 = 5\%$

UNIT COSTS

The cents per pound cost of an item sold as ten pounds for \$0.69 would be \$0.069 a pound.

Example: $\$.69 \div 10 = \0.069 for one pound.

A dozen (12) items at \$0.60 would be \$0.05 each.

Example: $\$0.60 \div 12 = \0.05 each.

A car travels 360 miles and requires 20 gallons of gas, a gallon for every 18 miles or \$0.02 a mile at \$0.36 per gallon.

Example: $360 \div 20 = 18$ miles per gallon
 $\$0.36 \div 18 = \0.02 cost per mile for gas



FRACTION TO DECIMAL

One sixteenth of an inch equals .0625 of an inch.

Example: $1 \div 16 = 0.0625$

SQUARE AREA

A rug 13.6 feet by 14.6 feet equals 198.56 square feet or 22.062 square yards (9 square feet equal one square yard). See the conversion chart on Page 23 for converting feet to a decimal.

Example: $13.6 \times 14.6 = 198.56$ square feet
 $198.56 \div 9 = 22.062$ square yards

RAISING A NUMBER TO A POWER

A number multiplied by itself will give the square of the number, or the second power of the number. The square of the number multiplied by the number will give the cube or the third power of the number and so on.

Example: $15 \times 15 = 225$ (15^2)
 $15 \times 15 \times 15 = 3375$ (15^3)

SQUARE ROOT OF A NUMBER (trial and error)

This Calculator does not provide a single step method to determine the square root of all numbers. However, with the following formula the square root of any number can be determined in about four steps.

Let N represent the number, and A will be your first rough estimate for the square root. For example, to find the square root of 226, use 226 for N. In the example above, 15 is the square root of 225, and a good first estimate. Therefore, let 15 represent A. Substitute the numbers into the formula below and the result of step 1 will be a closer estimate number to substitute for A in step 2. Then repeat the process. For step 3, substitute the result of step 2 for A and so on until the same answer is obtained in two successive substitutions, or until the answer is judged to be close enough. The closeness can readily be determined by the "Check" at the end of step 3, by pushing the "X" and "+ =" keys. This squares the answer. When the same answer is obtained two times in a row, squaring the number, as above, will show the closest possible answer this method can produce, which is generally close enough.

Example: N = 226, A = 15 in the formula $\frac{N}{A} + A$
 $\frac{\quad}{2}$

Step 1. $226 \div 15 + 15 = 30.066666 \div 2 = 15.033333$

Step 2. $226 \div 15.033333 + 15.033333 = 30.066592 \div 2 = 15.033296$

Step 3. $226 \div 15.033296 + 15.033296 = 30.066592 \div 2 = 15.033296$

Check: $15.033296 \times = 225.99998$

REFERENCE TABLES

The following tables are included as a guide for some of the many applications of your Calculator.

LIQUID OR FLUID MEASURE

4 ounces (oz.)	= 1 gill
2 gills	= 1 cup
2 cups	= 1 pint (pt.)
2 pints	= 1 quart (qt.)
4 quarts	= 1 gallon (gal.)
31-1/2 gallons	= 1 barrel (bbl.)
2 barrels	= 1 hogshead (hhd.)

DRY MEASURE

2 pints	= 1 quart
8 quarts	= 1 peck
4 pecks	= 1 bushel (bu.)

MEASURES OF WEIGHT

Avoirdupois

16 drams	= 437.5 grains = 1 ounce (oz.)
16 ounces	= 7000 grains = 1 pound (lb.)
100 pounds	= 1 cental = 1 hundredweight (cwt.)
2000 pounds	= 1 short ton (T.)
2240 pounds	= 1 long ton or gross ton

Also (in Great Britain)

14 pounds	= 1 stone
2 stones	= 1 quarter
4 quarters	= 112 lb. = 1 hundredweight
20 hundredweight	= 1 long ton

Troy (Precious Metals)

24 grains	= 1 pennyweight (dwt.)
20 pennyweights	= 480 grains = 1 ounce
12 ounces	= 5760 grains = 1 pound



Reference Tables (cont'd.)

NAUTICAL MEASURE

6,080 feet	= 1 nautical mile
6 feet	= 1 fathom
120 fathoms	= 1 cable length
1 nautical mile per hour	= 1 knot of speed

SURVEYORS' MEASURE

7.92 inches	= 1 link
25 links	= 1 rod
100 links	= 66 ft. = 1 chain
80 chains	= 1 mile

COMMON EQUIVALENTS (approximate)

1 bushel	= 2150 cubic inches or 1-1/4 cubic feet
1 gallon	= 231 cubic inches
1 cubic foot	= 7-1/2 gallons
1 cubic foot of water	= 62-1/2 pounds
1 gallon of water	= 8-1/3 pounds
1 cubic foot of ice	= 57-1/2 pounds
1 barrel (bbl.) flour	= 196 pounds
1 ton hay	= 500 cubic feet
1 ton hard coal	= 35 cubic feet
1 ton soft coal	= 42 cubic feet

WEIGHT OF WATER

1 cubic inch . . . . .	.0360 pound
12 cubic inches . . . . .	.433 pound
1 cubic foot	62.3 pound
1 cubic foot	7.48052 U.S. gallons
1.8 cubic feet	112.0 pounds
35.96 cubic feet	2240.0 pounds
1 Imperial gallon	10.0 pounds
11.2 Imperial gallons	112.0 pounds
224 Imperial gallons	2240.0 pounds
1 U.S. gallon	8.33 pounds
13.45 U.S. gallons	112.0 pounds
269.0 U.S. gallons	2240.0 pounds

COMMON KITCHEN MEASUREMENTS

STANDARD

EQUIVALENT

One pinch or dash	= 1/16 teaspoon
3 teaspoons	= 1 tablespoon (1/2 ounce liquid)
4 tablespoons	= 1/4 cup (2 ounces liquid)
1/3 cup	= 5 tablespoons plus 1 teaspoon
1/2 cup	= 8 tablespoons (4 ounces liquid)
1 gill	= 1/2 cup (4 ounces liquid)
1 cup	= 16 tablespoons (8 ounces liquid)
2 cups	= 1 pint (16 ounces liquid)
2 pints	= 1 quart (32 ounces liquid)
4 quarts	= 1 gallon

Reference Tables (cont'd.)

8 quarts = 1 peck
 4 pecks = 1 bushel
 16 ounces = 1 pound (dry measure)

NOTE: All measurements quoted are level.

COUNTING

12 units 1 dozen (doz.)
 12 dozen or 144 units = 1 gross (gr.)

LINEAR MEASURE

12 inches = 1 foot
 4 inches = 1/3 (4/12) foot = 1 hand
 9 inches = 1 span
 3 feet = 1 yard
 5-1/2 yards = 16-1/2 feet = 1 rod, pole or perch
 40 poles = 220 yards = 1 furlong
 8 furlongs = 1,760 yards = 5,280 feet = 1 mile
 3 miles = 1 league
 69-1/8 miles = 1 degree
 320 rods = 1 mile

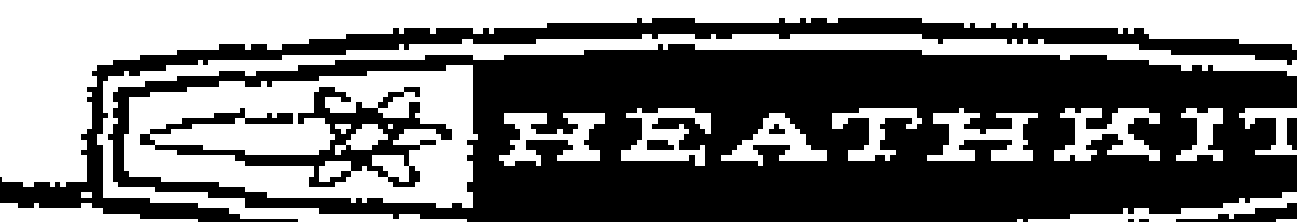
SQUARE OR AREA MEASURE

144 square inches = 1 square foot
 9 square feet = 1 square yard
 30-1/4 square yards = 1 square rod, pole or perch
 160 square rods = }
 10 square chains = 43,560 sq. ft. } 1 acre
 640 acres = 1 square mile = 1 "section" of U.S. Government surveyed land

CUBIC OR VOLUME MEASURE

1,728 cubic inches = 1 cubic foot
 27 cubic feet = 1 cubic yard
 1 cord of wood = 128 cubic feet
 1 board foot = 144 cubic inches = 1/12 cubic foot
 1 perch of stone or brick = 24-3/4 cubic feet
(May vary from 16-1/2 to 25 cubic feet)

Number of board feet in a log = $[1/4 (d-4)]^2 L$; where "d" = diameter of log (taken inside the bark at the small end) in inches; and L = length of log in feet. The 4 inches subtracted are an allowance for slab. Remember to square the formula before multiplying by the length.



Reference Tables (cont'd.)

ANGLES AND ARCS

60 seconds (")	= 1 minute (')
60 minutes	= 1 degree (°)
90 degrees	= 1 right angle
360 degrees of arc (circle)	= 1 circumference
360 degrees of angle	= 1 complete rotation

METRIC EQUIVALENTS

Linear

1 millimeter (mm)	= .0394 in.
1 centimeter (cm)	= .3937 in.
1 decimeter (dm)	= 3.937 in.
1 meter (m)	= 39.37 in. = 1.1 yd.
1 decameter	= 393.7 in. = 10 yd. 2.8 ft.
1 hectometer	= 328 ft. 1 in.
1 kilometer	= 3,280 ft. 1 in.

Square

1 square millimeter	= .00155 sq. in.
1 square centimeter	= .155 sq. in.
1 square meter	= 10.764 sq. ft. or 1.196 sq. yd.
1 square kilometer	= .3861 sq. mile
1 are	= 100 sq. meters = 119.6 sq. yd.
	= basic unit in measuring land

Cubic

1 cubic millimeter	= .000061 cubic inches
1 cubic centimeter	= .0610 cubic inches
1 cubic meter	= 35.314 cubic feet = 1.3079 cubic yards

LIQUID OR FLUID MEASURE

1 centiliter (cl)	= .6102 cu. in. = .338 oz.
1 deciliter (dl) (10 cl)	= 6.102 cu. in. = .845 gill
1 liter (l) (10 dl)	= .908 qt. = 1.0567 qt.
1 decaliter (dal) (10 l)	= 9.08 qt. = 2.64 gal.

Weight

1 gram	= .03527 ounces
1 kilogram	= 2.2046 pounds

Reference Tables (cont'd.)

CONVERTING INCHES AND FRACTIONS OF AN INCH TO DECIMALS OF A FOOT

Inches Feet	1 .0833	2 .1667	3 .25	4 .333	5 .4167	6 .5	7 .5833	8 .667	9 .75
Inches Feet	10 .833	11 .9167	1/8 .0104	1/4 .0208	3/8 .0313	1/2 .0417	5/8 .0521	3/4 .0625	7/8 .0729

DECIMAL EQUIVALENTS OF COMMON FRACTIONS

1/2	.5000	1/32	.0313	3/11	.2727	6/11	.5455
1/3	.3333	1/64	.0156	4/5	.8000	7/8	.8750
1/4	.2500	2/3	.6667	4/7	.5714	7/9	.7778
1/5	.2000	2/5	.4000	4/9	.4444	7/10	.7000
1/6	.1667	2/7	.2857	4/11	.3636	7/11	.6364
1/7	.1429	2/9	.2222	5/6	.8333	7/12	.5833
1/8	.1250	2/11	.1818	5/7	.7143	8/9	.8889
1/9	.1111	3/4	.7500	5/8	.6250	8/11	.7273
1/10	.1000	3/5	.6000	5/9	.5556	9/10	.9000
1/11	.0909	3/7	.4286	5/11	.4545	9/11	.8182
1/12	.0833	3/8	.3750	5/12	.4167	10/11	.9091
1/16	.0625	3/10	.3000	6/7	.8571	11/12	.9167

Reference Tables (cont'd.)

Miscellaneous Constants

1 btu/hr	. . . . .	= .2931 watts
1 horsepower	. . . . .	= 745.7 watts
		= 550 ft. lb/sec
$^{\circ}\text{C}$	. . . . .	= $5/9 \times (^{\circ}\text{F} - 32)$
$^{\circ}\text{F}$	. . . . .	= $(9/5 \times ^{\circ}) + 32$
π	. . . . .	= 3.1415927
1 ft/sec	. . . . .	= .6818 mi/hr
$\log_{10}(^m)$	. . . . .	= 2.302585 ln (m)
Acceleration of gravity	. . . . .	= 32.17 ft/sec/sec
Speed of sound	. . . . .	= 1089 ft/sec
Speed of light	. . . . .	= 186,272 mi/sec

HEATH

Schlumberger

HEATH COMPANY • BENTON HARBOR, MICHIGAN

THE WORLD'S FINEST ELECTRONIC EQUIPMENT IN KIT FORM

LITHO IN U.S.A.