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# Rockwell Electronic Calculators



Owner's Manual for  
Slide Rule Memory  
Calculator

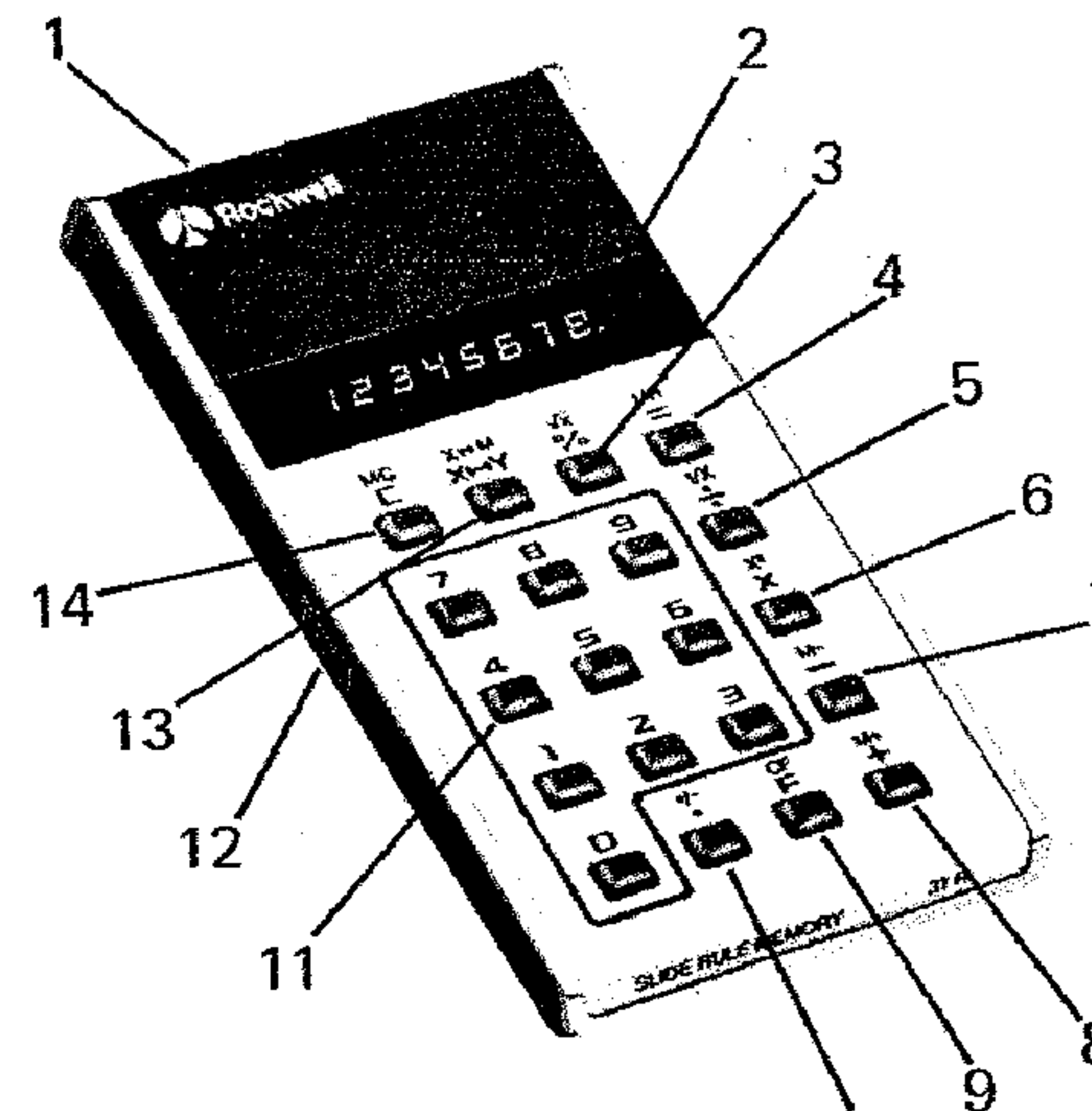
## ROCKWELL RELIABILITY IN CONSUMER ELECTRONIC PRODUCTS

Rockwell calculators are built by the same people who helped put men on the moon. People who have had wide experience with advanced electronics in a variety of important industries — including electronic calculators.

We're not only a pioneer in developing the microelectronic chips for calculators, We're a leading supplier of these chips to other calculator manufacturers here and abroad.

Add these credentials to our record of leadership in technologies as diverse as power tools, printing presses, business machines, aircraft, and Admiral television sets and appliances, and you have the company that's uniquely equipped to bring you such a complete line of electronic calculators.

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1. Battery Charger Jack
2. Eight-Digit Display
3. Percent and Square Root Key
4. Equals and Memory Recall Key
5. Divide and Reciprocal Key
6. Multiply and Square Key
7. Subtract and Subtract-from-Memory Key
8. Add and Add-to-Memory Key
9. Function and Clear Function Key
10. Decimal Point Entry and Change Sign Key
11. Number Entry Keys
12. On-Off Switch
13. Display/Register and Display/Memory Exchange Key
14. Clear and Memory Clear Key

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## GENERAL INFORMATION

### Before Operating Your Calculator:

Charge the batteries. Your Rockwell 31R calculator is supplied with rechargeable internal batteries and a battery charger. To charge the batteries, simply plug the charger into the jack provided on your calculator and a standard AC outlet.

**CAUTION:** Do not turn your calculator on until the batteries have been charged for at least 10 minutes. (This applies after extended storage of your calculator also.)

Do not operate your calculator without the charger until you have charged the batteries for five hours. Failure to do so may damage the batteries.

With the calculator off, allow approximately five (5) hours for the batteries to be fully charged. You can operate your calculator while charging the batteries but the time required for the batteries to become fully charged will increase. When the batteries are fully charged, at least three hours of operating time can be expected.

### Battery Life:

Battery life will be prolonged by recharging the batteries after approximately three (3) hours operating time. A dim display indicates the batteries are discharged and recharging is necessary to avoid permanent damage. Your charger is not an AC adapter and consequently should not be used continuously. Degradation of the batteries may occur if charging is continued for more than 72 hours.

To avoid possible damage to your calculator, use only the charger supplied with it.

Your calculator is delivered with special nickel cadmium rechargeable batteries installed. If the calculator is properly used and recharged when necessary, these batteries have a long life and replacement is not necessary for a long time. When batteries are removed for replacement, do NOT attempt to operate your calculator off the battery charger until you have installed the special new nickel cadmium rechargeable batteries available through your Rockwell dealer.

## OPERATION

### ON/OFF SWITCH

Turning the calculator on automatically clears the calculator (including its memory) to zero. The calculator is then immediately ready for use in solving problems.

### DISPLAY

Your calculator will accept and display any positive or negative number between 0.0000001 and 99999999. A negative number is indicated by a minus sign after the number: 0.25— for example. Results in excess of 8 digits cause an overflow condition which is indicated by illuminating all eight decimal points:  $\boxed{1.2.3.4.5.6.7.8.}$ , for example, and the first 8 (most significant) digits of your answer are saved. (In this circumstance all keys become inoperative except the clear key,  $\boxed{C}$ . See Clear Operations, Overflow Conditions, and Wrap-Around Decimal.)

If a number has been entered in the memory, a Memory Indicator dot is displayed in the far right position of the display: 0.25—., for example.

## EXPLANATION OF KEYS

The Rockwell 31R Slide Rule Memory calculator has 20 keys, including a unique "second function" key that allows each key to have two separate uses. The first (primary) use is identified directly above the key; the second (secondary) use is indicated above the primary identification. In this manual, the first use is represented (except for digits) by enclosing the identification in a box,  $\boxed{\phantom{X}}$ ; the second use, by enclosing the identification in parentheses, ( ). The following explanation will help you understand the operation and uses of each key.

### Number Entry and Decimal Point Keys

Depressing any number entry key enters that digit into the calculator and causes it to appear on the display. Turn your calculator on and depress the 2 and 4 keys. The display shows the following:

Keyboard Entry	Display
2	2.
4	24.

When you want to enter a decimal number, depress the  $\boxed{\cdot}$  key following the number after which you

want the decimal point located.  
To enter 1.6:

Keyboard Entry	Display
1	1.
$\square$	1.
6	1.6

#### Arithmetic Function and Answer Keys

The arithmetic function keys,  $\square$ ,  $\square$ ,  $\square$ , and  $\square$ , enter the desired arithmetic operation to be performed by the calculator. The answer to such an operation is obtained by depressing one of the answer keys,  $\square$  or  $\square$ , or by another depression of an arithmetic function key. Because this calculator has a FLOATING DECIMAL, it automatically places the decimal point in the correct position in your answers.

#### Clear Key

$\square$ : Depressing the  $\square$  key clears the display of erroneous entries, cancels overflow conditions, or clears the calculator of stored numbers and functions. (See Clear Operations, page 21, for detailed instructions on use of the  $\square$  key.)

#### Register Exchange Key

$\square$ : Depressing the  $\square$  key interchanges the contents of the display and the working register.

#### Function Key

$\square$ : Depressing the  $\square$  key conditions the calculator to interpret the next key depressed in accordance with the function identified above the primary identification. The secondary function is canceled after execution of all second function operations.

### ADDITION AND SUBTRACTION

Your Rockwell 31R performs addition and subtraction with algebraic logic. This means that your calculator works the same way you think or would write a problem. For example,  $5 + 4 - 3 = 6$  is entered exactly the way the problem is stated.

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Keyboard Entry

5  $\boxed{+}$   
4  $\boxed{-}$   
3  $\boxed{=}$

Display

5.  
5.  
4.  
9.  
3.  
6.

Notice that the display shows each new numerical entry as you depress the number entry keys, and the result of the previous arithmetic calculation when an arithmetic function key is depressed.

If you want to use an answer in further calculations, there is no need to re-enter the number. Just depress the desired arithmetic function key for the next operation and enter another number. For example, to subtract 39 from the preceding answer, just enter  $\boxed{-}$  39  $\boxed{=}$ .

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Keyboard Entry

$\boxed{-}$   
39  $\boxed{=}$

Display

6.  
6.  
39.  
33.-

**MULTIPLICATION AND DIVISION**

Multiplication and division problems are also entered the same way you think or would write a problem. For example,  $7 \times 9 \div 6 = 10.5$  is entered as stated.

Keyboard Entry	Display
7	7.
$\times$	7.
9	9.
$\div$	63.
6	6.
$\equiv$	10.5

**MIXED (CHAIN) CALCULATIONS**

Addition, subtraction, multiplication and division can be intermixed in any desired combination. All four arithmetic operations are used in the following example:

$$\frac{(5 + 6) 7 - 8}{9} = 7.66666666$$

Keyboard Entry	Display
5	5.
$+$	6.
6	11.
$\times$	7.
7	77.
$-$	8.
8	69.
$\div$	9.
9	7.66666666



### REPEAT OPERATIONS

The repeat operation capability of your Rockwell 31R is a convenient, time-saving feature that enables you to add, subtract, multiply or divide a series of identical numbers without re-entering the numbers each time.

For example, to compound 7.5% interest on your 4-year \$1000 bank certificate of deposit, you would multiply 1.075 by itself four times (1.075<sup>4</sup>) and multiply the result by 1000 to determine the value after four years.

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Keyboard Entry	Display	Comments
1.075	1.075	(100 + 7.5)% entered
$\boxed{\times}$	1.075	as decimal

$\boxed{\times}$	1.155625	1.075 <sup>2</sup> = 1.075 x 1.075
$\boxed{\times}$	1.2422968	1.075 <sup>3</sup>
$\boxed{\times}$	1.335469	1.075 <sup>4</sup>
1000	1000.	
$\boxed{=}$	1335.469	Value at maturity

### AUTOMATIC CONSTANT

The automatic constant is another time-saving feature. This feature enables you to add, subtract, multiply or divide by the same number repeatedly without re-entering the number for each new calculation. The number entered after the last arithmetic function key depressed is always saved as the constant (addend, subtrahend, multiplier, or divisor). The constant function is the last arithmetic function key depressed before depressing the  $\boxed{=}$  key. To perform multiple operations with the saved constant, enter a new augend, minuend, multiplicand or dividend, and depress the  $\boxed{=}$  key for an answer.

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### AUTOMATIC CONSTANT (CONT)

For Example:  $6 \times 1.75 = 10.5$

$1.5 \times 1.75 = 2.625$

Keyboard Entry	Display	Comments
$\boxed{\times}$ 6	6.	
$\boxed{\times}$ 1.75	1.75	1.75 established as constant multiplier
$\boxed{=}$	10.5	
1.5	1.5	
$\boxed{=}$	2.625	

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In all instances, the constant is retained until a different number is entered after an arithmetic function key is depressed. The following example shows how the constant and constant function change as new numbers and function keys are depressed.

$$\frac{(5 + 3) 3 - 2}{2} = 11$$

### Keyboard Entry

5  
 $\boxed{+}$  3  
 $\boxed{\times}$   
 $\boxed{-}$  2  
 $\boxed{\div}$   
 $\boxed{=}$

### Display

5.  
3.  
8.  
24.  
2.  
22.  
11.

### Comments

Constant undetermined  
Constant addend = 3  
Constant multiplier = 3  
Constant subtrahend = 3  
Constant subtrahend = 2  
Constant divisor = 2  
Constant divisor = 2

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### PERCENTAGE OPERATIONS

The percent key,  $\boxed{\%}$ , operates just like the  $\boxed{=}$  key when multiplying or dividing except that the  $\boxed{\%}$  key causes the answer to be divided by 100 for multiplication, and multiplied by 100 for division.

### PERCENTAGE OPERATIONS (CONT)

**For Example:** Suppose you have answered 57 of 65 examination questions correctly. What is your percentage of correct answers?

Keyboard Entry	Display
57	57.
$\div$ 65	65.
$\%$	87.6923

$\infty$  When used with the  $\div$  or  $\%$  keys, the  $\%$  key performs MARK-ON and DISCOUNT calculations automatically. This capability is another time-saving feature when you want to add or subtract a percentage of a number to that number.

To perform a mark-on or discount operation, enter the number which you want to mark-on or discount, depress the  $\div$  key for mark-on or the  $\%$  key for discount, enter the desired percentage, depress the  $\%$  key to display the amount of the mark-on or discount, and press the  $\equiv$  key to display the marked-on or discounted amount.

Mark-on and discount operations can be chained if desired. For example, if a \$19.95 item is discounted by 15% and a 6% sales tax is added, what is the total cost?

Keyboard Entry	Display	Comments
19.95	19.95	
$\%$ 15	15.	
$\%$	2.9925	Discount
$\div$	16.9575	Discounted amount
6	6.	
$\%$	1.01745	Sales tax
$\equiv$	17.97495	Total cost (\$17.97)

### REGISTER EXCHANGE OPERATION

Another useful feature of your Rockwell 31R is the register exchange capability, X ↔ Y. Depressing the  $\boxed{X \leftrightarrow Y}$  key exchanges the data (number) in the display with the number in the working register (the previously displayed number or the constant).

20 Problem:  $\frac{15}{3+6} = 1.6666666$

Keyboard Entry	Display Register	Working Register Constant
3	3.	Undetermined
$\boxed{+}$	3.	3.
6	6.	3.
$\boxed{=}$	9.	6.

$\frac{15}{\boxed{X \leftrightarrow Y}}$       15.      9.  
 $\boxed{=}$       1.6666666      15.      9.

### CLEAR OPERATIONS

1. A single depression of the  $\boxed{C}$  key when there is no overflow condition clears the displayed number but does not affect the stored constants or the operation in progress with the following exception:

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A single depression of the  $\boxed{C}$  key immediately after the  $\boxed{X \leftrightarrow Y}$  key clears both the displayed number and the number in the working register (the constant.)

### CLEAR OPERATIONS (CONT)

Problem:

Entry Correction:  $12 + 5.5 = 17.5$

Keyboard Entry	Display	Comments
12	12.	
$\boxed{+}$ 5.6	5.6	
$\boxed{C}$	0.	Error; wrong number Cleared
5.5	5.5	
$\boxed{=}$	17.5	

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2. A double depression of the  $\boxed{C}$  key clears any operation in progress and clears the calculator except the memory.

Problem:

Clear Calculator (Except Memory)

Keyboard Entry	Display	Comments
2	2.	
$\boxed{+}$	2.	
$\boxed{C}$	0.	Entry cleared
$\boxed{C}$	0.	Calculator cleared

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3. Depressing the  $\boxed{C}$  key during an overflow (see Overflow Conditions) cancels the overflow condition. The number in the display is correct if multiplied by  $10^8$  (100,000,000) and may be used in further calculations. Chain and constant operations are not affected by overflowing.

(Continued on Page 24)

### CLEAR OPERATIONS (CONT)

Problem:

Clear Error (Overflow):  $12345678 \times 9 = 111111102$

Keyboard Entry	Display	Comments	
12345678	12345678.	Overflow Indicator lights; calculator accepts only clear entry	
$\times$ 9	9.		Answer must be multiplied by $10^8$ (see Wrap-Around Decimal.)
$=$	1.1.1.1.1.1.1.0.		
$\square$	1.1111110		

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4. Depressing the (CF) key after pressing the  $\square$  key clears the secondary function operation and restores the previous conditions (see page 39).

5. Depressing the  $\square$  and (MC) keys clears the memory (see Memory Operation).

### OVERFLOW CONDITIONS

The following operations result in an overflow condition which causes the Overflow Indicator, all decimal points, to light and all keys except  $\square$  to become inoperative:

1. Any answer or subtotal exceeding 8 whole digits to the left of the decimal point, regardless of the arithmetic sign (absolute value greater than 99,999,999). The 8 most significant digits are displayed as follows:  $\square.X.X.X.X.X.X.X.$ . Calculations can be continued, if desired (see Wrap-Around Decimal).
2. A memory accumulation exceeding 8 whole digits to the left of the decimal point, regardless of the arithmetic sign. The number to be added to the memory remains in the display with leading zeroes sufficient to fill the display:  $\square.0.0.0.0.X.X.X.$ . The number in the memory is unaffected. Depressing the  $\square$  key clears the overflow condition and the number remains in the display:  $\square.XXX.$
3. Division by zero. All zeroes and decimal points are displayed:  $\square.0.0.0.0.0.0.0.$

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### WRAP-AROUND DECIMAL

The wrap-around decimal feature of your calculator lets you proceed when the answer obtained in the display or memory exceeds the capacity of the calculator ( $10^8$  or greater). The calculator automatically retains the 8 most significant digits, places the decimal point 8 positions to the left of its true position, and lights the Overflow Indicator. You may proceed with the problem solution after depressing the  $\square$  key once to clear the overflow condition, but you must multiply the final problem answer by  $10^8$  (100,000,000) or move the decimal point 8 places to the right. Any numbers subsequently added or subtracted must be divided by  $10^8$  before entering. If two overflows occur in the same problem, the final answer must be multiplied by  $10^8 \times 10^8 = 10^{16}$  and so on.

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Problem:  $\frac{98,000,000 \times 2,000}{0.04} - 20,000,000 = 4,899,980,000,000$

Keyboard Entry	Display	Comments
98000000	98000000.	
$\square$ 2000	2000.	
$\div$	1.9.6.0.0.0.0.0.	Overflow Indicator lights
$\square$	1960.0000	Displayed number times $10^8$ equals true number
.04	0.04	
$\square$	49000.	
.2	0.2	
$\square$	48999.8	Number entered (20000000 $\div$ $10^8$ ) = 0.2 This answer times $10^8$ equals true answer

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### COMPUTATIONS WITH VERY LARGE OR VERY SMALL NUMBERS

Computations can be made with numbers which are too large or too small for the capacity of the calculator by scaling (shifting the decimal point to the left, or to the right) before entering the number. The decimal point in the answer must then be shifted in the opposite direction. For example, to multiply  $0.000019 \times 0.00017$  you must first scale at least one of the numbers or your calculator will display an answer of zero because the first non-zero number in the answer (.00000000323) is beyond the 8-digit capacity of the calculator. However, if you shift the decimal point to the right of the number in each number (for maximum accuracy), you will obtain the correct number in the answer and you will only need to position the decimal point. In this instance, a shift of 7 decimal places to the right in one number and

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5 decimal places to the right in the other would require a 12 (7 + 5) decimal place shift to the left in the answer. For example:

Keyboard Entry	Display	Comments
19	19.	
<input type="text" value="x"/> 17	17.	
<input type="text" value="="/>	323.	The correct answer is .00000000323

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## MEMORY OPERATION

Your Rockwell 31R has a completely independent memory which is unaffected by arithmetic or scientific operations. Through the use of this memory, you can perform chain operations involving complex mathematical problems with a minimum of key depressions. All of the memory operation keys are activated by depressing the [E] key. The functions of the memory operation keys are as follows:

Key	Function
(MC)	Clear memory. The displayed number and any functions are not affected.
(M+)	Add to memory.
(M-)	Subtract from memory.
(MR)	Display number in memory.
(X ↔ M)	Exchange number being displayed with number in memory.

The following example illustrates use of the memory operation keys and the memory clearing procedure.

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Keyboard Entry	Display	Memory	Comments
[C]	0.	0*	Memory cleared; display not altered
[E] (MC)	0.	0	
[4]	4.	4.	← Displayed number added to memory; display not altered. Memory Indicator lights.
[E] (M+)	4.	4.	
[x]	4.	4.	Multiply operation established
3	3.	4.	← Displayed number subtracted from memory; display not altered
[E] (M-)	3.	1.	

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(Continued on Page 32)

\* The memory is automatically cleared when the calculator is turned on. Consequently, the memory will contain zero if it has not been previously used. If the memory has been used and has not been cleared since turning the calculator on, the memory contains the last stored value. A non-zero memory is indicated by a dot in the far right position of the display.

### MEMORY OPERATION (CONT)

Keyboard Entry	Display	Memory	Comments
$\boxed{+}$	12. .	1.	3 x 4 executed and addition operation established
$\boxed{F}$ (MR)	1. .	1.	Contents of memory recalled to display; original number moved to working register
$\boxed{=}$	13. .	1.	12 + 1 executed
$\boxed{F}$ (X $\leftrightarrow$ M)	1. .	13.	Contents of memory exchanged with displayed number

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The flexible memory in your Rockwell 31R allows you to solve many problems which cannot be solved (without pencil and paper) by ordinary calculators, or which are cumbersome with calculators with ordinary store/recall memories. For example, first try to solve the following problem without using memory. Then see how easy it is with your Rockwell 31R calculator.

**Problem:**  $7/8 + 3/32 - 9/16 = 0.40625$

Keyboard Entry	Display	Memory	Comments
$\boxed{F}$ (MC)	0.	0	Ensure you start with 0 in memory
$\overset{7}{\boxed{\div}}$	7.	0	
$\boxed{8}$	8.	0	
$\boxed{=}$	0.875	0	
$\boxed{F}$ (M+)	0.875	0.875	

(Continued on Page 34)

**MEMORY OPERATION (CONT)**

Keyboard Entry	Display	Memory	Comments
3	3.	0.875	
$\boxed{\div}$ 32	32.	0.875	
$\boxed{=}$	0.09375	0.875	
$\boxed{F}$ (M+)	0.09375	0.96875	0.875 + 0.09375 in memory
9	9.	0.96875	
$\boxed{\div}$ 16	16.	0.96875	
$\boxed{=}$	0.5625	0.96875	
$\boxed{F}$ (M-)	0.56250	0.40625	.96875 - 0.5625 in memory
$\boxed{F}$ (MR)	0.40625	0.40625	

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Most memory problems can be solved in a variety of ways with your Rockwell 31R. Some ways are slightly more efficient than others. Experiment to find the approach that is most natural for you. As an example, two alternate solutions are shown for the following problem.

**Problem:**  $\frac{5+6}{7-9} = -5.5$

**Solution No. 1**

Keyboard Entry	Display	Memory
$\boxed{F}$ (MC)	0.	0
5	5.	0
$\boxed{+}$ 6	6.	0
$\boxed{=}$	11.	0
$\boxed{F}$ (M+)	11.	11.
7	7.	11.
$\boxed{-}$ 9	9.	11.
$\boxed{\div}$	2.-	11.
$\boxed{F}$ (X $\leftrightarrow$ M)	11.+	2.-
$\boxed{X}$ $\leftrightarrow$ $\boxed{Y}$	2.-	2.-
$\boxed{=}$	5.5 -	2.-

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**Solution No. 2**

Keyboard Entry	Display	Memory
$\boxed{F}$ (MC)	0.	0
7	7.	7.
$\boxed{F}$ (M+)	9.	2.-
$\boxed{F}$ (M-)	5.	2.-
5	6.	2.-
$\boxed{+}$ 6	11.	2.-
$\boxed{\div}$	2.-	2.-
$\boxed{F}$ (MR)	5.5 -	2.-
$\boxed{=}$		

### SQUARE (X<sup>2</sup>)

Depressing the  $\boxed{\text{E}}$  and (X<sup>2</sup>) keys causes the square of the displayed number to be computed and displayed. Your 31R calculator will allow you to chain x<sup>2</sup>,

$\sqrt{x}$ , and  $\frac{1}{x}$  operations. (see the Sample problems on Pages 41 - 43).

Problem:  $5^2 = 25$

Keyboard Entry

$\boxed{\text{E}}$  (X<sup>2</sup>)

Display

5.  
25.

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### SQUARE ROOT ( $\sqrt{x}$ )

Depressing the  $\boxed{\text{E}}$  and ( $\sqrt{x}$ ) keys causes the square root of the number being displayed to be computed and displayed. Note: If you inadvertently try to

calculate the square root of a negative number your Rockwell 31R will compute the square root of the absolute value of x and display the answer with a minus sign. (Mathematically, the square root of a negative number is imaginary.)

Problem:  $\sqrt{\sqrt{81}} = 3$

Keyboard Entry

$\frac{81}{\boxed{\text{E}}} (\sqrt{x})$   
 $\boxed{\text{E}} (\sqrt{x})$

Display

81.  
9.  
3.

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### RECIPROCAL (1/x)

Depressing the  $\boxed{\text{E}}$  and (1/X) keys causes the reciprocal of the number being displayed to be computed and displayed.

Problem:  $\frac{1}{20} = 0.05$

$\frac{20}{\boxed{\text{E}}} (1/X)$

Display

20.

0.05

### CHANGE SIGN (+/-)

Depressing the  $\boxed{F}$  and (+/-) keys changes the sign of the number in the display. The Rockwell 31R allows sign change at any point in a calculation.

Problem:  $\frac{4^2 (-3)}{6} = -8$

Keyboard Entry	Display
4	4.
$\boxed{\times}$	4.
$\boxed{\times}$	16.
3	3.
$\boxed{F}$ (+/-)	3.-
$\boxed{\div}$	48.-
6	6.
$\boxed{=}$	8.-

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### RECOVERY TECHNIQUES

Occasionally you may unintentionally depress one of the function keys. The following techniques allow easy correction without loss of the displayed number.

Unintentional  $\boxed{F}$ : Depressing the (CF) key immediately after an unintentional  $\boxed{F}$  key clears the calculator of secondary function operation.

Problem:  $4 \times 3 = 12$

Keyboard Entry	Display	Comments
4	4.	
$\boxed{\times}$	3.	
3	3.	Error!! Did not want to press $\boxed{F}$

(Continued on Page 40)

### RECOVERY TECHNIQUES (CONT)

Keyboard Entry

Display

(CF)  
 $\equiv$

3.  
12.

Unintentional  $\times$  or  $\div$ : Depress 1, then  $\equiv$ . If constant multiplication or division is being performed, the constant is replaced by 1.  
Unintentional  $+$  or  $-$ : Depress 0, then  $\equiv$ . If constant addition or subtraction is being performed, the constant is replaced by 0.

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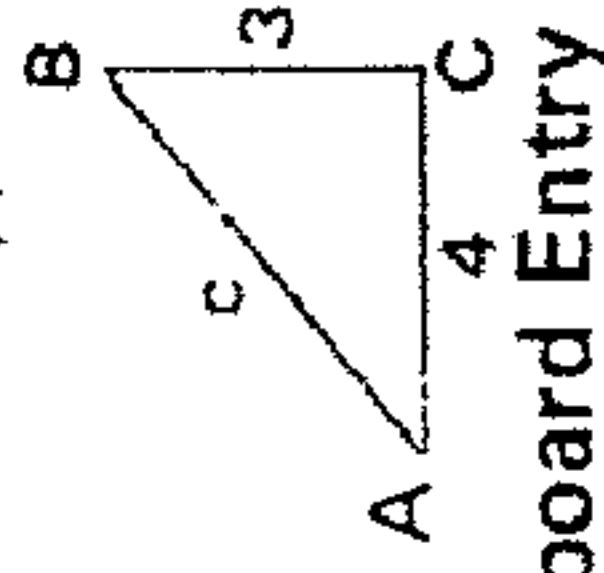
### SAMPLE PROBLEMS

Your Rockwell 31R Slide Rule Memory calculator is a versatile problem solving tool. Several practical examples were chosen from different fields of interest to

familiarize you with the calculator. We recommend that you gain familiarity with your Rockwell 31R by working the sample problems.

Problem:

**THE PYTHAGOREAN THEOREM:** Given right triangle ABC with sides 3 and 4, find the hypotenuse (c).



$$\text{Formula } c = \sqrt{3^2 + 4^2} \quad c = 5$$

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Keyboard Entry

Display

Comments

$\square$  C  
 $\square$  E (MC)  
3

0.  
0.  
3.

(Continued on Page 42)

THE PYTHAGOREAN THEOREM (CONT)

Keyboard Entry	Display	Comments
$\boxed{F} (X^2)$	9.	
$\boxed{+}$	4.	
$\boxed{F} (X^2)$	16.	
$\boxed{=}$	25.	
$\boxed{F} (\sqrt{x})$	5.	Hypotenuse (c)

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Problem:

**PARALLEL RESISTORS:** Three resistors of 5 ohms, 20 ohms and 10 ohms are connected in parallel. What is the equivalent resistance?

Formula: R equivalent = 
$$\frac{1}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}}$$

Keyboard Entry	Display	Comments
5	5.	$R_1$
$\boxed{F} (1/X)$	0.2	$1/R_1$
$\boxed{+}$	0.2	
20	20.	$R_2$
$\boxed{F} (1/X)$	0.05	$1/R_2$
$\boxed{+}$	0.25	$1/R_1 + 1/R_2$
10	10.	$R_3$
$\boxed{F} (1/X)$	0.1	$1/R_3$
$\boxed{=}$	0.35	$1/R_1 + 1/R_2 + 1/R_3$
$\boxed{F} (1/X)$	2.8571428	Equivalent resistance

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**Problem:**  
**INVOICE CALCULATIONS**

24 spark plugs at \$1.08 each	=	25.92
24 condensers at \$0.35 each	=	8.40
24 filters at \$2.81 each	=	<u>67.44</u>
Net total		101.76
6% sales tax		<u>6.11</u>
Gross total		107.87

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Keyboard Entry	Display	Memory	Comments
$\boxed{=}$ (MC)	0.	0	
$\boxed{=}$ (M+) 1.08	1.08	0	
$\boxed{\times}$ 24	24.	0	24 becomes constant multiplier

$\boxed{=}$	25.92	0	
$\boxed{=}$ (M+) .35	25.92	25.92	
$\boxed{=}$	0.35	25.92	
$\boxed{=}$ (M+) 2.81	8.4	34.32	
$\boxed{=}$	8.40	34.32	
$\boxed{+}$	2.81	34.32	
$\boxed{+}$	67.44	34.32	
$\boxed{=}$ (MR)	67.44	34.32	
$\boxed{+}$	34.32	34.32	
$\boxed{+}$	101.76	34.32	Net total
$\boxed{6}$	6	34.32	
$\boxed{\%}$	6.1056	34.32	Sales tax
$\boxed{=}$	107.8656	34.32	Gross total

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# Consumer Warranty

Rockwell International  
Corporation  
Electronic Calculator

This electronic calculator from ROCKWELL is warranted to be free from defects in materials and workmanship under normal use and service for one year from the date of retail purchase. ROCKWELL will, free of charge, repair or replace (at its option) any part(s) which are found to have become defective through normal use, provided that the calculator is returned prepaid within one year to one of the ROCKWELL Customer Service Centers. (The original packaging may be used for this purpose.) If a ROCKWELL battery charger is used with your calculator, return it with your calculator.

To assure proper handling and servicing of your calculator under the one-year warranty, you must send with your calculator a copy of the sales receipt (or other proof of purchase date). Calculators returned without proof of purchase date will be serviced out-of-warranty at our prevailing service rates.

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This Warranty does not extend to any article which has been subject to misuse, neglect or accident, or if the Serial Number has been altered or defaced, or if the calculator has been serviced by anyone other than a ROCKWELL Customer Service Center. Batteries are excluded from this Warranty.

This Warranty contains the entire obligation of ROCKWELL and no other warranties express or implied or statutory are given. In no event shall ROCKWELL be liable for consequential damages.

For service under this Warranty, send your ROCKWELL electronic calculator prepaid, with copy of sales receipt or other proof of purchase date, to your nearest ROCKWELL Customer Service Center.

#### Out-of-Warranty Service

If the calculator fails to operate satisfactorily beyond the one-year warranty period, ROCKWELL Customer Service Centers will repair and return the calculator to you at our prevailing service rates.

WARRANTY NOT VALID  
OUTSIDE U.S.A. AND CANADA

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