Texas Instruments SR-60 programmable prompting calculator.

The SR-60 combines the convenience, simplicity and value of a desktop calculator with the powerful features found only on its more expensive relative—the computer.

Prompting. The alphanumeric prompting feature used in conjunction with programming, displays letters, numbers and special symbols that let you make words and phrases that will later "ask" for entries or decisions to solve the problem.

The SR-60's large (1¼ by 9¼-inch) 20-character light emitting diode display (5 by 7 dot matrix) "asks" you for your input, in terms you understand, at each stage of the problem—then waits for your keyed in response before it continues. So you really interact or "talk through" a problem—you providing raw data, the SR-60 giving back complete answers.

This rapid dialogue lets you solve a problem using different inputs, letting you explore multiple options. And, should your dialogue be interupted, just leave the SR-60 on and its display will tell you where you are when you return. But this is just the beginning.

The SR-60's prompting feature helps you if you know the problem by keeping track of steps and eliminating demands on your mental organization. But what's really remarkable is that the SR-60 works for those who don't ordinarily work with complex problems. As long as the user gives the appropriate input to each question, he doesn't need to know how to solve the problem—the SR-60 does it automatically.

Programming. Easy to learn. No codes or special rules to master. More time can be spent formulating problems. And it's not necessary to learn all the functions to write simple programs. The SR-60 can also handle very large problems with its: 40 data registers. 480 program memory locations. 10 flags. 8 branching instructions. 4 subroutine levels. Alphanumeric prompting. Choice of labels or absolute addressing. Direct or indirect addressing.

Prerecorded programs are also supplied. So easy to use, a person merely needs a general concept of what's to be solved to have a solution in seconds. People with a minimum math background can use prerecorded programs (or programs developed by others) with a minimum amount of instruction.

Any program can be recorded on blank magnetic cards for continual use.

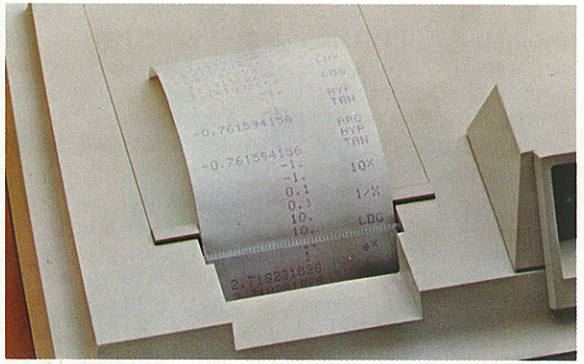
Algebraic operating system (AOS) with 9 levels of parentheses solves problems with up to 10 pending operations. Entry is left-to-right just as the problem is written. Results are displayed up to 10 digits, plus two more for power of 10 exponents.

Printing. Quiet thermal printer prints any number that appears on the display. Up to 20 characters (5 by 7 dot matrix) on 2½-inch wide thermal paper. A scaled replica of the display.

Fast and reliable, the SR-60's printer delivers a "hard" permanent copy of all your calculations and results. Identifies pertinent data and answers—helps eliminate confusion when analysizing results.

Prints any item that appears in the display. Also prints a list of an entire program including the entries made into data registers. You may halt whenever you wish, or begin printing from any point in the program.

The SR-60's trace mode key automatically begins recording all calculations whether entered from the keyboard or run with a program. So you can see how the program is being executed. Very useful for editing and debugging a program. Conveniently lets you verify that instructions are keyed in correctly. Get a quick check on hastily constructed programs, or programs not carefully documented. Verify that program results are based on correctly formulated problem.



The SR-60 Basic Library of prerecorded programs is the foundation of a growing problems-solving resource. Useful to both business and technology.

Eight prerecorded programs on magnetic cards 2-inches wide, 10½ inches long come with the SR-60.

And you can put them to work right away. No computer knowledge is necessary. There's no complicated entry system to learn.

Two diagnostic programs are also supplied to test the SR-60's internal operation.

You also get a Basic Library Manual which details each program, contains sample problems, user-instructions and program listings.

The SR-60 Basic Library offers a basic variety of mathematical programs. Programs that will add a new dimension to your problem-solving capability:

Power Transformer Design
Calculates core weight, core area, flux density, frequency and primary and secondary turns.

Chebyshev and Butterworth Filter Design
Specify filter order, termination resistance, corner frequency and allowable ripple to get component values.

Add-On Rate Installment Loan
Calculates the payment amount and annual percentage rate for an installment loan.

Compound Interest
Calculates any of four variables (PV, FV, I, N) in classical compound interest equation.

Basic Statistics for One or Two Variables
Mean, standard deviation and standard error are found for a set of observations on a variable. Enter observations as grouped or ungrouped data. For a set of observations on two variables these measures may be found for each. Covariance and correlation coefficient relating the two variables are also found.

Optional Libraries
Six libraries containing well over 100 different programs will soon be available. Finance, with 21 programs and Electrical Engineering with 16 programs are available now. The others: Math I, 20 programs. Math II, 18 programs. Statistics, 19 programs. And Surveying, 7 programs, will be available in early 1976.

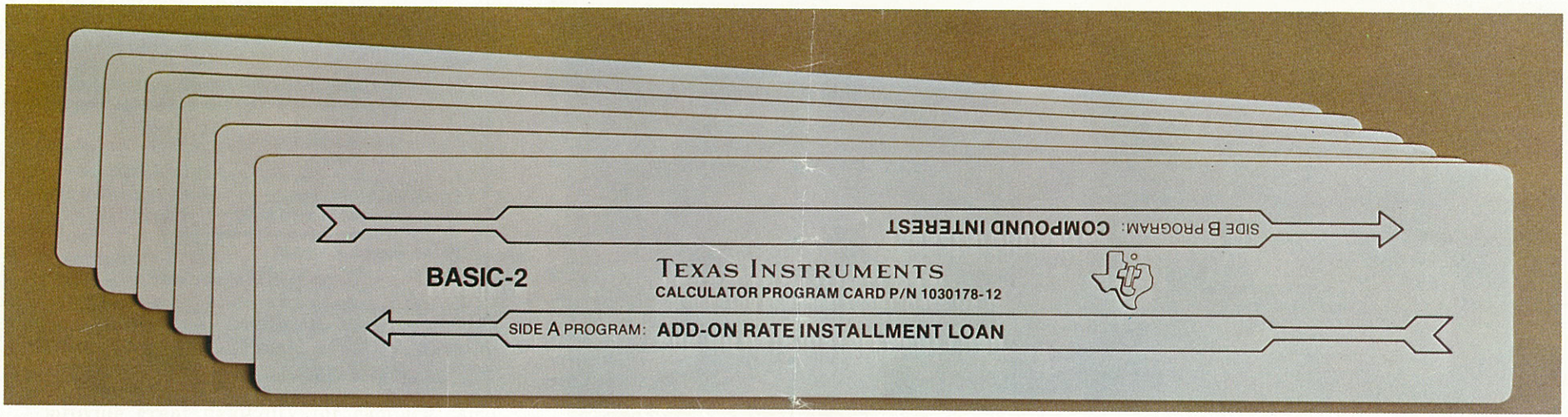
Random Number Generator
Uses linear congruential method to find uniformly distributed random numbers for the interval (0,1). Normally distributed random numbers found by direct method.

Polynomial Evaluation
A polynomial: $(Px) = a_0 + a_1x + a_2x^2 + \ldots + a_nx^n$ may be evaluated at a point x when the coefficients are known. The degree of the polynomial must be 15 or less for the basic SR-60 or 45, or less, for the expanded machine. Repeated evaluations of the polynomial may be performed without reentering the coefficients.

Solution of Cubic and Quadratic Equations
Solves for both real and complex roots using the general forms of the equations and roots.

Diagnostic 1
Checks mathematical functions, memory registers and prints results.

Diagnostic 2
Checks programming functions, display and printer.



Programming an SR-60 is almost as easy as solving problems on a calculator that can't be programmed. But with one difference... You can record programs or use prerecorded programs again and again.

Does calculator programming mean you have to learn a complex programming language? Emphatically, no.

Programming an SR-60 is almost as simple as solving a problem on many non-programmable calculators. In fact, if you can solve your problem by just using the keyboard, then much of the job is already done. And, once your problem is programmed you don't have to key in the same steps over and over again every time your data changes.

Programming is really no more than taking small problems and integrating them to solve bigger problems. On the SR-60 programming is merely listing the keystrokes necessary to carry your problem through to its solution.

Some may still feel that programming is too complex for the untrained person to master. A view that probably is helped along by the vocabulary associated with programming. Words like direct and indirect addressing, conditional and unconditional branching, labels, and flags sound esoteric and abstract. Yet these words are just a shorthand used to describe manipulations almost anyone can grasp. In fact, they're not even mathematical.

Suppose part of your work involves calculating areas of circles. You know how to do it on the keyboard. Enter the radius, x^2, and multiply by π. Programming these steps can save you the bother of having to key in the problem again and again. All you would need do is enter the radius and the SR-60 does the rest.

When you turn on the SR-60 the first thing it asks you is if you're going to want to be prompted: "PROMPTING DESIRED?". You answer No. And since you want to teach it how to find the areas of circles you put it in the learn mode. Now you're ready to program.

1. Name the program by giving it a label, e_1, for example.
2. Spell out the prompting message: "ENTER RADIUS" might be a way to phrase it.
3. Use the Que key so the SR-60 can stop while you enter data. There are five possible prompting responses on the SR-60: Yes, No, Not Known, Not Apply, and Enter. They provide great flexibility for complex calculations. But for this simple problem only one response is necessary—entering the radius value with the Enter key.
4. Enter the basic calculation: x-squared, times, pi, and equals.
5. Tell the SR-60 what you want to do with the answer. Display it, print it, or both. If you wish, you can even print your answer and automatically return to the start of the program—ready for another radius value.

Now the program is completed.

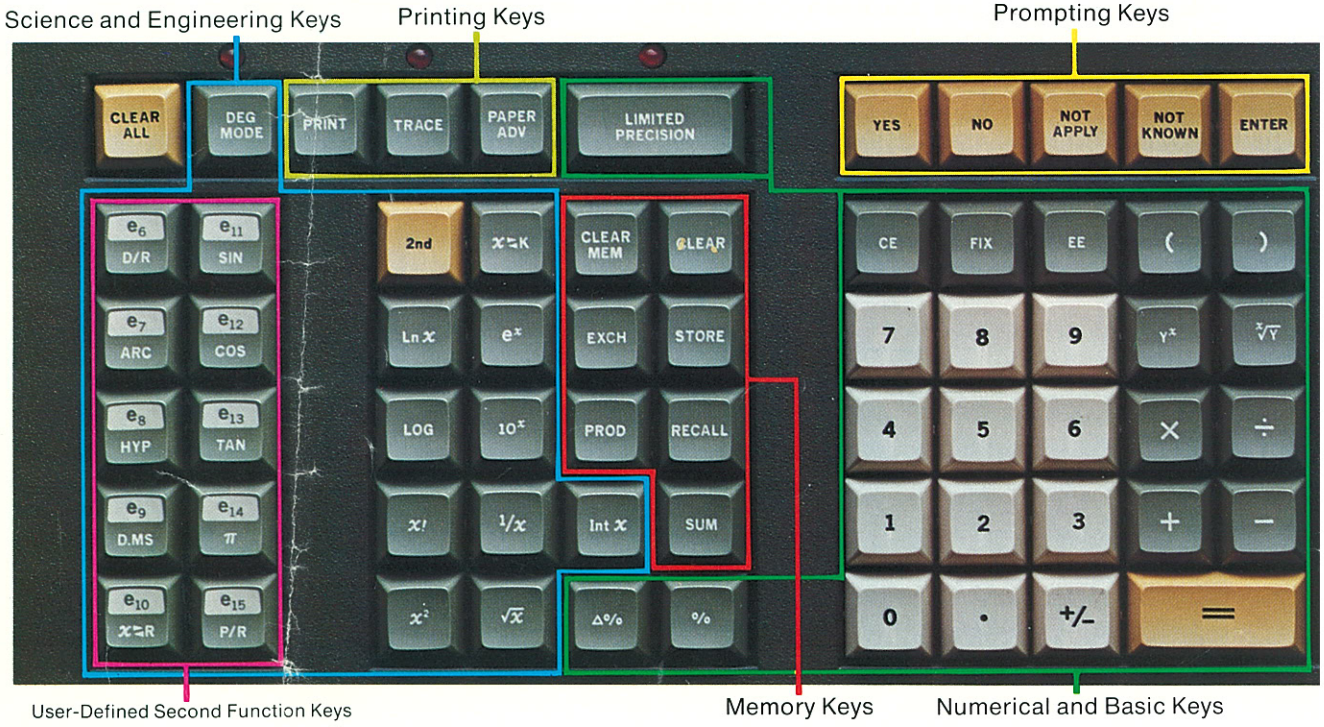
If you wish to keep the program you can record it on a magnetic card which anyone can use at any time by simply inserting the card and responding to the prompted instruction.

When you use just the keyboard to solve your problems you make all the decisions for yourself. But the real idea of programming is to turn as much as possible over to the SR-60. Programming lets you tell the SR-60 to make many kinds of decisions and to take the appropriate action. This is called branching, or transferring—it means taking different paths through a program, depending on the input or calculated results. We keep track of the paths by addresses and labels that serve as our reference points.

Couple this with the SR-60's unique prompting feature and you can instruct the calculator to display and/or print a verbal message, to tell you what you must do next—to halt while you do it and then to continue after you have responded to the message with one of the five response keys.

Optional memory expansion module

An optional module set is now available for the SR-60 which expands its calculating power to 1,920 program locations and 100 data memories—that's 4 times more locations, 2½ times more memories. This makes the SR-60 even more powerful with a minimum amount of effort and expense.



95 keys. 46 are scientific functions...and all functionally organized to let you put the SR-60's enormous calculating power to work fast.

The SR-60's 95 keys are functionally organized to preclude memorizing locations. Functions include: Standard math. Trig. Hyperbolics. Logs. Angular and polar/rectangular conversions. Integer x. Percent change (delta). And constant. Accuracy is up to 10 decimal places in the display and up to 12 places internally.

You can "fix" the position of the decimal point so that the number of places you see are the ones you need to see. You can also determine how results are rounded and control precisely the number of digits accuracy you want with 2nd Fix and Limited Precision keys. Rounding does not affect the digits carried internally.

The Limited Precision key allows you to limit calculation accuracy to just what appears on the display and operates on results produced by the equals key, close parenthesis key, special function keys or conversion keys.

You can also discard all digits to the left or right of the decimal in the display with the keys Intx and 2nd Intx to get the integer or fractional parts of a number.

Easily makes repetitive calculations (+,−,×,÷, y^x,$\sqrt[x]{y}$,Δ%) in the constant mode. The percent key converts the number in the display from a percent to a decimal. Also calculates percent change between two values.

Even though the SR-60 has many functions, no one can anticipate all your needs. Fifteen user-defined keys are provided—make them any function you may need.

The Label key tells the SR-60 that the next key pressed will be a label. There are 77 keys, including the user-defined keys, that you can use as labels.

If Positive, If Zero, and If Error are keys that test the contents of the display. Branching occurs if the conditions: positive, zero, or flashing display are true. Branching occurs if the conditions are not true when these keys are prefixed by the 2nd key.

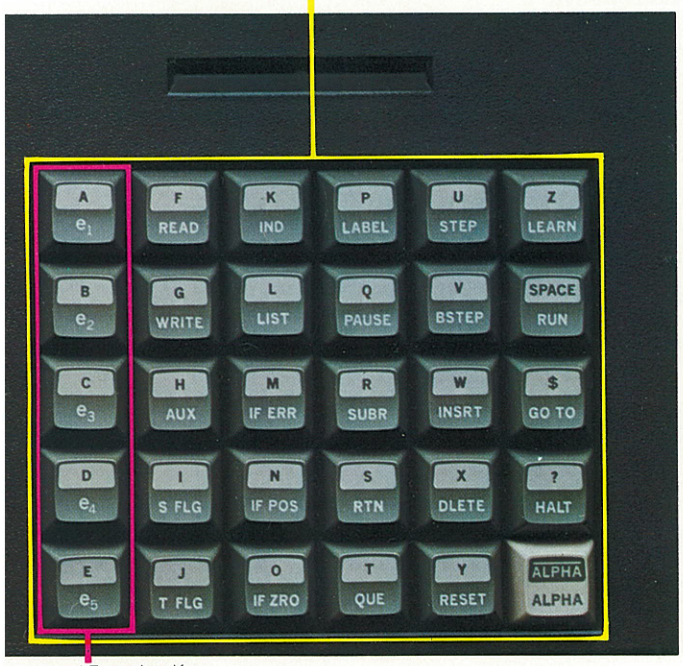
Alternate calculating paths can be defined by the Set Flag key followed by a number from 0 through 9 then the Test Flag key tests the state of the flag—set or reset. The SR-60 branches if the specified flag is set, or continues sequentially if the flag is not set. 2nd, Test Flag reverses the sense of the test.

The indirect addressing (IND) key is used with unconditional, conditional and data memory keys. An example: IND, TFLG, 2,0,5. means the SR-60 tests flag number 2, and looks at the contents of the data memory register 05 to find the program address to which to branch if flag 2 is set.

The Que key halts the SR-60's operation and waits for a response from these keys: Yes, No, Not Known, Not Apply, Enter. Press Yes and the SR-60 branches to the first label which follows Que. Pressing No causes it to branch to the second label, and so on. These five label keys are equivalent to a five-way branch. The alphabetical letters and symbols on keys are activated by the Alpha key to enter prompting messages for display or print. The convenient Pause key permits a message or result to be displayed for about ½ second.

The SR-60's editing and debugging keys let you go through a program one step at a time. Or single-step backward through a program. The Insert key moves the current and all your following instructions down one location so that a change can be made at any place within a program without rewriting it. Remove your displayed instruction and move all following instructions up with the Delete key. The SR-60 can also print a trace, or a record, of all functions, numbers and calculations.

Programming and Alphabet Keys



-Defined Function Keys

Two Prompting/Programming Examples That Show How Easy the SR-60 Operates

Compound Interest

(Solve for Present Value)

Step	Prompting Message/Printout	Your Response
1.	Enter present value	Not known
2.	Enter interest %	9
3.	Enter no. periods	24
4.	Enter future value	5000
5.	Present value (Printed)	

Payroll Calculation *

Step	Prompting Message/Printout	Your Response
1.	Enter employee card	Feed card into SR-60
2.	Employee SSN (Printed)	
3.	Company number (Printed)	
4.	Regular hours	Enter straight time hours
5.	Overtime rate 1	Enter time and one-half hours
6.	Overtime rate 2	Enter double time hours
7.	Miscellaneous pay	Enter miscellaneous pay
8.	Gross wages (Printed)	
9.	Federal withholding tax (Printed)	
10.	State withholding tax (Printed)	
11.	Local withholding tax (Printed)	
12.	FICA deduction (Printed)	
13.	Voluntary deductions (Printed)	
14.	Total voluntary deduction (Printed)	
15.	Net wages due (Printed)	
16.	Year to date totals for each of above (Printed)	
17.	Enter employee card for update	Feed card into SR-60 (records all year to date totals on employees card)

* Requires optional expansion module.

Now the power of the programmable calculator can be made available to everyone. Scientists and engineers. Assistants and technicians. Financiers, businessmen and secretaries.

The SR-60 card programmable prompting printing calculator is designed to bridge the gap between simple desktop calculators and computers. A powerful asset to business and technical operations alike.

Its business capability ranges from solving intricate financial analyses and long-range forecasting, to simpler operations like payroll and amortization.

For technical applications there are 46 scientific functions on the keyboard, while 480 program memory locations and 40 data registers are available for complicated programming.

Short problems can be key-programmed. But larger custom-designed programs are easy to write and record permanently on 2 by 10½-inch magnetic cards. The SR-60 is also supplied with a Basic Applications Library containing 10 prerecorded programs. Over 100 optional programs will also be available.

Although the SR-60 has enormous calculating power, it can be operated as easily as a simple general purpose calculator. Its left-to-right algebraic operating system (AOS) allows problems to be entered just as they're written. And on the SR-60, the answers can be displayed or printed.

Whether you are a businessman, engineer, or scientist, whenever you require special mathematical techniques, the SR-60 aids you, and your assistants, in the solution to problems.

Here is just a sampling of the kinds of problems the SR-60 can be programmed to handle:

Business

- Profit and loss statements
- Balance sheets
- Payroll
- Trend lines
- Economical ordering
- Depreciation schedules
- Crossover between straight line and declining balance
- Loan amortization
- Discounted cash flow
- Simple and compound interest
- Rule of 78's
- Annuities
- Days between dates
- Date conversion
- Bond yield

Technology/Science

- Evaluate complex functions
- Evaluate polynomials with complex coefficients
- Find real and complex roots of cubic and quadratic equations
- Solve transcendental equations
- Approximate integrals
- Find approximate solutions of differential equations
- Assists in power transformer design
- Assists in filter design
- Performs many statistical calculations

Compare these features and functions that combine to deliver capability found on prompting programmable desktop calculators costing much more.

Operating Characteristics

2 Angular modes
Fixed-length decimal fractions (0-8)
Rounding: up
down
with any integer
Limited precision key
12 Calculating digits
10 + 2 Display digits (mantissa and exponent)
40* Data memories
Memory arithmetic (+, −, ×, ÷)
Exchange x with data memory
Clear memory
Complete algebraic entry mode
10 Pending operations
11 Pending operands
9 Parentheses levels
95 Number of keys
Indirect memory addressing

* 100 with option

Input/output Characteristics

General

Internal calculating digits	12 plus sign and 2 exponents plus sign.
Display or print	10 plus sign and 2 exponents plus sign.
Numerical range	$\pm 1. \times 10^{-99}$ to $\pm 9.999999999 \times 10^{99}$
Format	Fixed or Scientific Notation
Overflow, underflow or error	Display flashes (?), or Printer prints (?)

Display

Type	Light emitting diodes
Format	5 by 7 dot matrix, 20 characters max.
Characters*	A through Z
Symbols*	Period, question mark, comma, apostrophe, dollar sign, degree, slash*

Printer

Type	Thermal electronic
Format	5 by 7 dot matrix, 20 characters max.
Paper	2½ inch thermal
Functions	print program list data register list trace paper advance

Card Reader

Read into program memory
Read into data memory
Write from program memory
Write from data memory
Auxiliary Peripherals

* Other symbols and characters are available by using the mathematical and function keys.

Calculating Capability

Log
ln x
10^x
e^x
x^2
$\sqrt{x}$
y^x
$\sqrt[x]{y}$
$\frac{1}{x}$
x!
%
Δ%
π
Int x (integer part)
2nd Int (fractional part)
$x \rightleftarrows k$ (constant)
Trig (sin, cos, tan, and inverses)
Hyperbolic (sinh, cosh, tanh, and inverses)
Deg/min/sec to decimal degrees conversion and inverse
Degrees to radians and inverses
Polar to rectangular and inverses
Spherical to rectangular and inverses
Built-in π value precision of 12 digits

Programming Capability

480* Program steps
Program read/write
Data memory read/write
Alphanumeric display
Alphanumeric print
15 User-defined keys
78 Possible labels
Absolute addressing
Indirect addressing (branching)
Subroutine capability
4 Subroutine levels
10 Program flags
Unconditional branching
8 Conditional branching decisions
Editing: Step
Backstep
Insert
Delete
Single step program execution
Independent run and halt control
½-second Pause
Auxiliary (for add-on peripherals)

* 1,920 with option.

Texas Instruments SR-60 offers tremendous capability and unmatched value. With a broad assortment of software and accessories.

The SR-60 comes equipped with customized software: A 72-page Operating Manual details all keystrokes and operations. A 96-page Programming Manual provides comprehensive, detailed information and numerous examples on how to program. A Basic Library Manual shows you how to use the 8 prerecorded programs and the 2 diagnostic tests that are contained on the 5 prerecorded magnetic cards. Three blank cards and a head cleaner to remove oxides and foreign particles from the read/write head are also included. All cards can be conveniently stored in the handy magnetic-card holder. There's a 50-sheet tablet of Coding Forms and User-Instructions to help you write your own programs. And finally, a dust cover and a 3-wire 120-volt power cord which plugs into a standard 115-volt outlet complete the package. (Note: The SR-60 can also be operated by 220-volts by placing its voltage switch in the 220 position and changing the power cord.)

The technological achievement beneath the keyboard is the reason the SR-60 offers so much programming value.

A full-function scientific calculator is a state-of-the-art product reflecting state-of-the-art technologies. It's logical, then, to look first to the manufacturer known worldwide for both—Texas Instruments.

TI has long been a leader in solid-state technology and has pioneered a series of landmark developments relating directly to calculators: The original integrated circuit. Key patents in basic MOS/LSI technology. The "calculator-on-a-chip" integrated circuit which became the heart of miniature calculators. And the basic patent on the miniature calculator itself.

TI is steeped in calculator technologies from start to finish, making all critical parts and controlling quality every step of the way. And that's the key to the exceptional quality and value of the SR-60.

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