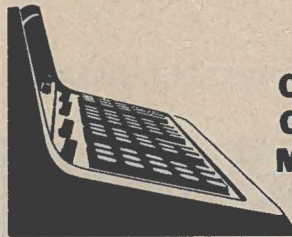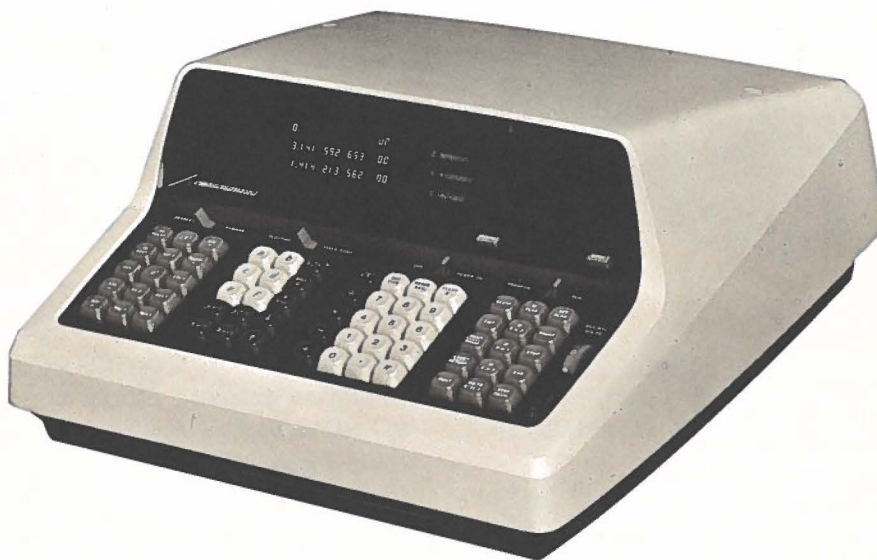HEWLETT hp PACKARD

CALCULATOR
CALCULATOR PRINTER
CALCULATOR PLOTTER
MARKED CARD READER
DISPLAY

MODEL
9100A
9100B
9120A
9125A
9160A
9150A

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9100B CALCULATOR

DESCRIPTION

The HP 9100A and 9100B are programmable, electronic calculators which perform operations commonly encountered in scientific and engineering problems. Their log, trig and mathematical functions are each performed with a single key stroke, providing fast, convenient solutions to intricate equations. Computer-like memory enables the calculator to store instructions and constants for repetitive or iterative solutions. The easily-readable cathode ray tube instantly displays entries, answers and intermediate results.

OPERATIONS

Direct keyboard operations include:

Arithmetic: addition, subtraction, multiplication, division and square-root.

Logarithmic: log x, ln x and e^X.

Trigonometric: sin x, cos x, tan x, $\sin^{-1}x$, $\cos^{-1}x$ and $\tan^{-1}x$. (x in degrees or radians)

Hyperbolic: sinh x, cosh x, tanh x, $\sinh^{-1}x$, $\cosh^{-1}x$, and $\tanh^{-1}x$.

Coordinate transformation: polar-to-rectangular, rectangular-to-polar, cumulative addition and subtraction of vectors.

Miscellaneous: other single-key operations include— taking the absolute value of a number, extracting the integer part of a number, and entering the value of π. Keys are also available for positioning and storage operations.

SPEED

Times for total performance of functions, including worst-case decimal-point placement and carrying:

Add, subtract: 2 milliseconds

Multiply, divide: 35 milliseconds

Square-root: 40 milliseconds

Sin, cos, tan: 354 milliseconds

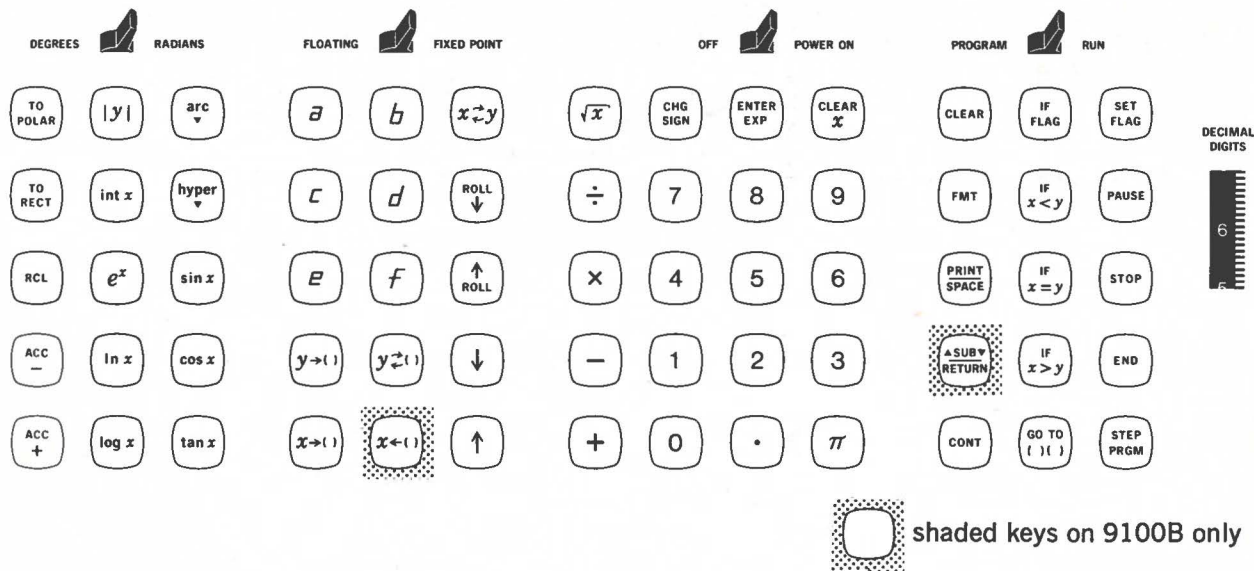Coordinate transformation: 332 milliseconds

ln x: 56 milliseconds

e^X: 141 milliseconds

NUMERICAL FORMAT

The operator can select either **FIXED** point (eg. 1234.567890) or **FLOATING** point (scientific notation; eg. 1.234567890×10^3) for display of entries and answers. The calculator's dynamic range is 10^{-98} to 10^{99} with up to 10 significant digits.

In **FIXED** point mode, the operator selects the number of decimal places desired between 0-9 on the decimal wheel. Whenever more digits are placed left of the decimal point than the decimal wheel will allow, the calculator automatically reverts to **FLOATING** point notation to allow completion of the calculation, with no loss of information.

Keyboard keys:

Row 1: TO POLAR | |y| | arc ▼ | a | b | x⇄y | √x̄ | CHG SIGN | ENTER EXP | CLEAR x | CLEAR | IF FLAG | SET FLAG   DECIMAL DIGITS

Row 2: TO RECT | int x | hyper ▼ | c | d | ROLL ↓ | ÷ | 7 | 8 | 9 | FMT | IF x<y | PAUSE

Row 3: RCL | e^x | sin x | e | f | ↑ ROLL | × | 4 | 5 | 6 | PRINT SPACE | IF x=y | STOP

Row 4: ACC − | ln x | cos x | y→( ) | y⇄( ) | ↓ | − | 1 | 2 | 3 | ▲SUB▼ RETURN | IF x>y | END

Row 5: ACC + | log x | tan x | x→( ) | x←( ) | ↑ | + | 0 | · | π | CONT | GO TO ( )( ) | STEP PRGM

☐ shaded keys on 9100B only

9100A / B KEYBOARD

PROGRAMMING

The calculators are programmed either by use of the keyboard or by magnetic cards. The program mode allows entry of program instructions, via the keyboard, into program memory. Programming consists of pressing keys in the proper sequence. Any key on the keyboard is available as a program step. The program capacity of the 9100A is 196 steps and the capacity of the 9100B is 392 steps. No language or code conversions are required.

The self-contained magnetic cardreader/recorder can record programs from program memory onto wallet-size magnetic cards. The reader/recorder can also read the magnetic cards back into program memory for repetitive use. Two programs of 196 steps each may be recorded on each reusable card. Cards may be cascaded for longer programs.

PROGRAM INSTRUCTIONS

Conditional Branching: 'IF' statements make the comparisons — less-than, equal-to, greater-than — and can be programmed to branch to any of the program addresses.

Unconditional Branching: GO TO statement can be programmed to branch to any of the program addresses. (Also used for manual addressing and correction of individual program steps.)

Subroutine: A true subroutine capability permitting instant access to subroutines from any point in a program. By using SUB/RETURN instruction, subroutines may be nested up to 5 deep. (9100B only)

Flag: Provides conditional branching dependent on manual or programmed setting of flag.

Stop: Halts program for data entry or display.

Pause: Brief display of interim results in computation.

Step Program: Operator may step through program for visual verification of instructions. A 'dual display' feature on the 9100B greatly simplifies program editing and modification. It allows the program step and the succeeding one to be displayed simultaneously.

MEMORY

Magnetic core memory includes:

3 display registers (keyboard, accumulator, temporary)

9100A has 16 storage registers with capacity for 196 program steps plus 2 constants. Total of 2208 bits of core memory.

9100B has 32 storage registers with capacity for 392 program steps plus 4 constants. Total of 3840 bits of core memory.

Capacity: Register accommodates floating point number with 12 significant digits (including 2 undisplayed guard digits) and 2 digit exponent. Alternately, register accommodates 14 program steps.

Read-Only-Memory: Contains over 32,000 bits of fixed information for keyboard routines.

GENERAL

Temperature: Operating range, 0-45°C.

Weight: Net 40 lbs. (18,1 kg), Shipping 65 lbs. (29,5 kg).

Power: 115 or 230 V ±10% (slide switch), 50-60 Hz, 70 watts.

Dimensions: 8¼" high by 16" wide by 19" deep. (210 mm. x 406 mm. x 483 mm.)

ACCESSORIES FURNISHED NO CHARGE

For 9100A: For 9100B:	09100-90001 09100-90021	Operating and Programming Manual Additional copies - $2.50 each.
For 9100A: For 9100B:	09100-90002 09100-90022	Program Library binder containing sample programs. Additional copies - $30.00.
	5060-5919	Box of 10 magnetic program cards. Additional box - $10.00
For 9100A: For 9100B:	09100-90003 09100-90023	Pad of 100 program sheets. Additional pads - $2.50 each.
For 9100A: For 9100B:	09100-90004 09100-90024	Magnetic card with pre-recorded diagnostic program. Additional card-$2.50.
For 9100A: For 9100B:	9320-1157 9320-1183	Pull out instruction card mounted in calculator. Additional card - $5.00.
	4040-0350	Plastic dust cover. Additional cover $2.50.

ADDITIONAL ACCESSORIES AVAILABLE

5000-5884	Single magnetic card, 2.00.	
09100-90000	Box of 5 program pads, $10.00.	
09100-90007	200 magnetic cards without envelopes, $80.00.	

Option 001 Pull-Out Instruction Card in French
Option 002 Pull-Out Instruction Card in German
Option 003 Pull-Out Instruction Card in Italian
Option 004 Pull-Out Instruction Card in Spanish
No additional charge for options.

PURCHASE PLANS

Purchase: HP 9100A, $4400.
HP 9100B, $4900.

Rent: HP 9100A, $260.00 per month
HP 9100B, $285.00 per month

Lease: HP 9100A, $115.00 per month
HP 9100B, $128.00 per month

Service Contracts Available

9100A and 9100B COMPARISON

ITEMS	9100A	9100B
Storage Registers	16	32
Program Steps	196	392
Price	$4400	$4900

The 9100B also includes:
An additional positioning instruction $x \leftarrow ()$ for more convenient data recall.
A dual program display for more convenient program edification.
A greater subroutine capability.

PROGRAM LIBRARY

The Program Library furnished with the 9100's include programmed solutions to practical problems in a wide range of scientific and engineering fields. It serves both as an illustration of programming techniques and as a source of ready-to-use programs. Program Library holders also receive the Hewlett-Packard **KEYBOARD**, a periodic publication which provides updating information and a forum for the exchange of programs by 9100 users. Program categories include:

Business	Mechanics
Chemistry	Physics
Electronics	Statistics
Fluid Mechanics	Structures
Life Sciences	Surveying
Mathematics	Thermodynamics

CALCULATOR PRINTER

Model 9120A

DESCRIPTION

The HP 9120A provides fast, quiet printer capability for use with the 9100 Calculators. The Printer prints the contents of any combination of X, Y, and Z Calculator display registers upon manual or programmed command. It also lists contents of the Calculator's program memory upon command. Quiet operation is obtained using a unique electrosensitive printing principle. The 9120A Printer mounts on top of the 9100 Calculators to insure easy access and minimum space requirement. Operation of the Printer is initiated either manually by a single keystroke or in a program by one program step.

PRINT CHARACTERISTICS

Printing Rate: 180 lines/min. at 60 Hz
150 lines/min. at 50 Hz

Print Format: Any combination of X, Y, Z registers can be printed by depressing the appropriate key on the 9120A panel.
Line capacity is up to 15 characters per line.
Lists contents of program on command.
Vertical printing at 5 lines per inch.
Vertical formating available on command.

Paper Required: HP electrosensitive printer paper. (Roll 250' long by 2½'' wide)

GENERAL

Temperature: Operating range 0-45°C.
Weight: Net 13 lbs. (5,9 Kg),
Shipping 24 lbs. (10,9 Kg).
Power: 115 or 230 V ±10% (Slide Switch) 50 to 60 Hz, 45 watts.
Dimensions: 4'' high by 14 5/8'' wide by 13 1/2'' deep (102 mm x 371 mm x 343 mm).

ACCESSORIES

Furnished: Package of 3 rolls HP 9270-0802 paper. (Approximately 3 month supply).

Available: 9270-0802 Pkg. of 3 rolls, $9.75; 9270-0815 Pkg. of 24 rolls, $72.00.

PURCHASE PLANS

Purchase: HP 9120A, $975.00.

Rent: $75.00 per month.

Lease: $25.35 per month.

Service Contracts Available.

CALCULATOR PLOTTER

Model 9125A

DESCRIPTION

Calculator Plotter: The 9125A provides permanent graphic solutions to problems solved by the Calculator. The Plotter plots the point, specified by the numbers in the Calculator's X and Y registers, when the format (FMT) instruction is activated. The relationship between the variables is ordinarily programmed in the Calculator which then drives the Plotter. The Calculator can also be used in the manual mode to transfer data coordinates to the Plotter directly.

SPECIFICATIONS

Plotting Area: 10 inches on the Y axis by 15 inches on the X axis. (25 cm. by 38 cm. on metric paper).

Origin: Origin can be set anywhere on the plotting surface allowing four-quadrant plotting.

Scale Factor: 500 counts per inch (200 counts per cm.) adjustable by at least ±10 counts per inch (4 counts per cm.) by front panel scale Vernier control.

Plotting Accuracy: ±0.03 inches (0,08 mm.).

Dynamic Accuracy: Deviation from straight line between two data points is less than ±0.04 inches (1,0 mm) for data points up to 5 inches (12,5 cm) apart, at constant ambient temperature.

Resettability: ±0.007 inches (0,18 mm).

Plotting Time: Minimum of 0.9 seconds from one plot point to the next. Total plotting time depends upon calculation time.

GENERAL

Temperature: Operating range 5-45°C.

Weight: Net 36 lbs. (16,3 kg), shipping 48 lbs. (21,8 kg).

Power: 115 or 230 V ±10% (slide switch), 50-400 Hz, 100 watts.

Dimensions: 8 1/2″ high by 20″ wide by 19 3/8″ deep, (213 mm. x 500 mm. x 484 mm.).

ACCESSORIES FURNISHED AT NO CHARGE

09125-90001	Operating Manual
09125-90002	Magnetic card with Diagnostic Program
4040-0477	Dust Cover
09125-90000	Pull-out instruction card contained in the bottom of the 9125A
5080-3605	Slidewire cleaner
5080-3635	Slidewire lubricant
5080-7979	Pkg. of 3 red pens
5080-7980	Pkg. of 3 blue pens
9270-1004	Graph paper, 20 sheets
9270-1024	Graph paper, 10 sheets

PURCHASE PLAN

Purchase: HP 9125A, $2475.00.
Rent: $185.00 per month.
Lease: $64.35 per month.
Service Contract Available.

PLOTTER PAPER

To gain maximum benefit from the highly-accurate 9125A Calculator Plotter, we recommend precision-ruled plotting paper. Hewlett-Packard Company offers a wide variety of papers, available through all field offices. These are 11″ by 16 1/2″ overall. Price: $4.90 per box.

Linear:

PART NO.	DESCRIPTION
9270-1004	10″ x 15″ plot area
9270-1024	25 cm. x 38 cm. metric plot area

Semi-log:

9280-0159	10″ x 2 cycle plot area
9280-0160	10″ x 3 cycle plot area
9280-0169	2 cycle x 15″ plot area
9280-0168	3 cycle x 15″ plot area

Log-log:

9280-0167	2 cycle x 3 cycle plot area
9280-0165	3 cycle x 2 cycle plot area
9280-0171	3 cycle x 4 cycle plot area

MARKED CARD READER
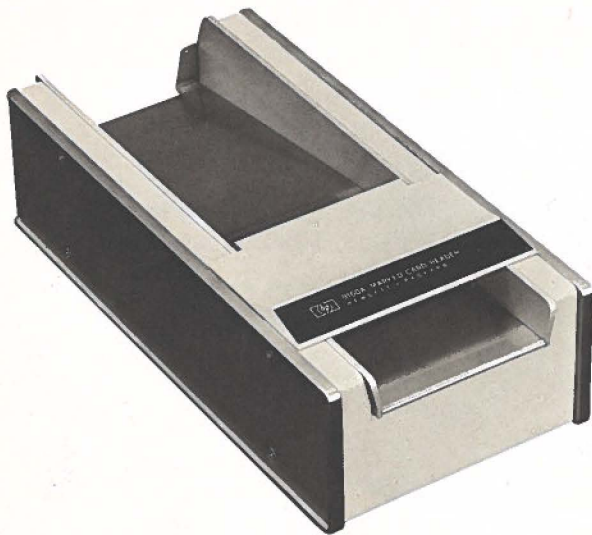
Model 9160A

DESCRIPTION

Marked Card Reader: The 9160A optically reads cards marked with a soft lead pencil. By using the standard size tab cards properly formatted, programs and numerical data can be entered quickly and conveniently. Each card can hold 28 program instructions or data. Cards can be cascaded easily.

SPECIFICATIONS

Line Width: Minimum 0.020 inch pencil mark required for reliable sensing.

Reading Rate: 20 milliseconds per character. Inserting card starts motor which pulls cards through the reader.

Codes: Column weights of marked columns are added to total the calculator key code.

GENERAL

Weight: Net 4.5 lbs., shipping 5.5 lbs.

Power: Takes power from -hp- 9100 Calculator. (Idle 2.5 watts, running 3.5 watts).

Dimensions: 3 1/2'' high by 5 1/3'' wide by 11 1/4'' deep.

Temperature: Operating range, 0-45°C.

CARDS

Furnished: Package of 100 Calculator program cards

Available: 9320-1182 Calculator program format
9320-1192 Calculator data format

Pkg. of	2,000	$15.00
Box of	10,000	$60.00

PURCHASE PLANS
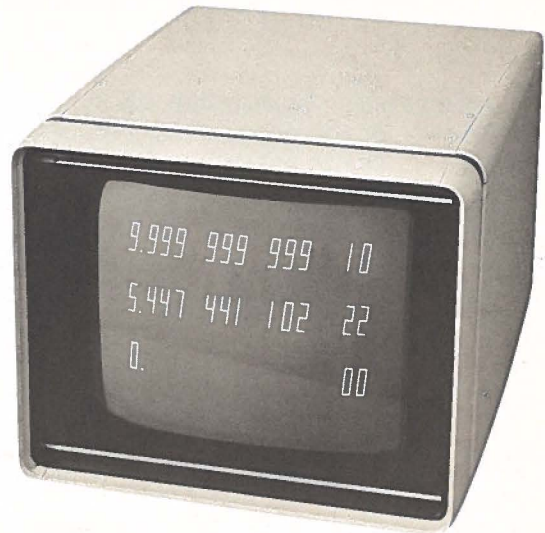
Purchase: HP 9160A, $490.00.
Rent: $35.00 per month.
Lease: $12.74 per month.
Service Contracts Available.

DISPLAY

Model 9150A

DESCRIPTION

Display: The 9150A is a large screen display of the 9100 X, Y and Z registers, which allows a large group to see the calculations. Instructors find this peripheral exceptionally valuable. They can better explain scientific concepts using the display.

Character Height: 3/8'' by 1'' high.

Brightness: Capable of being viewed in normally illuminated room.

Viewing Angle: 45° either side of center screen.

Mounting: Options available for ceiling; wall; rack; and desk top mounting.

GENERAL

Operating Ambient Temperature Range: 0-45°C.

Dimensions: 15'' high by 17'' wide by 21'' deep.

Weight: 65 lbs.

AC Input Requirements: 115 ±10% 50-60 Hz (230 V available as an option), 250 watts.

Price: To be announced.

Available: Early 1970.

For more information, call your local HP Sales Office or East (201) 265-5000 • Midwest (312) 677-0400 • South (404) 436-6181 West (213) 877-1282. Or, write: Hewlett-Packard, 1501 Page Mill Road, Palo Alto, California 94304. In Europe, 1217 Meyrin-Geneva

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