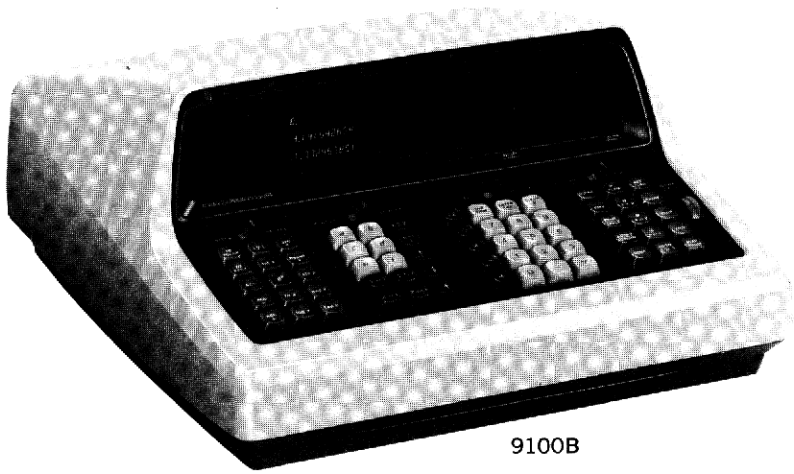
CALCULATOR

COMPUTING CALCULATOR

Scientific and engineering problem-solver

Model 9100A, 9100B



9100B

COMPUTING CALCULATOR

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.

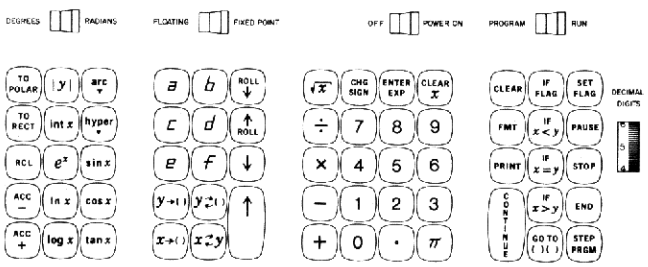
Logarithmic: log x, ln x and e^x.

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.

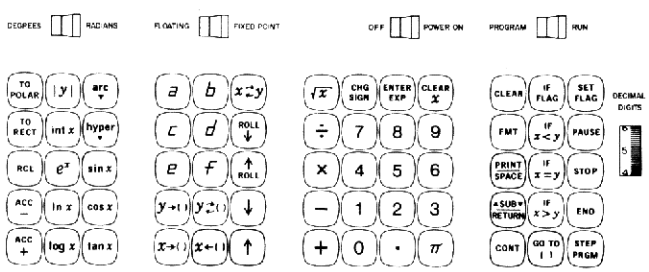
Numerical Format

The operator can select either FIXED point (eg. 1234.5678-90) or FLOATING point(scientific notation; eg. 1.234567890 x 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.

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 GO-TO-SUB/RET 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.

9100A and 9100B COMPARISON

Items	9100A	9100B[1]
Storage Resistors	16	32
Program Steps	196	392
Price	$4400	$4900

[1]The 9100B also includes:

An additional positioning instruction X←( ) for more convenient data recall.

A dual program display for more convenient program edification.

A greater subroutine capability.

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 W.

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

Accessories furnished (no charge)

For 9100A: 09100-90001 For 9100B: 09100-90021	Operating and programming manual. Additional copies—$2.50
For 9100A: 09100-90002 For 9100B: 09100-90022	Program Library binder containing sample programs. Additional copies —$30.
5060-5919	Box of 10 magnetic program cards. Additional box—$10.
For 9100A: 09100-90003 For 9100B: 09100-90023	Pad of 100 program sheets. Additional pads—$2.50.
For 9100A: 09100-90004 For 9100B: 09100-90024	Magnetic card with pre-recorded diagnostic program. Additional card—$2.50.
For 9100A: 9320-1157 For 9100B: 9320-1183	Pull out instruction card mounted in calculator. Additional card —$5.
4040-0350	Plastic dust cover. Additional cover—$2.50.

Additional Accessories Available

All of above

5000-5884 Single magnetic card, $2.

09100-90000 Box of 5 program pads, $10.

09100-90007 200 magnetic cards without envelopes, $80.

Purchase Plan

Purchase:	HP 9100A, $4400.
	HP 9100B, $4900.
Rent:	HP 9100A, $260 per month.
	HP 9100B, $285 per month.
Lease:	HP 9100A, $115 per month.
	HP 9100B, $128 per month.

Service contracts available.

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.

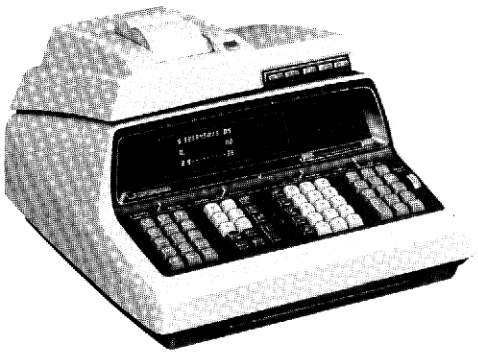
Program Library

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

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 ensure 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.



9100A/9120A

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.
Lists contents of program on command.
Line capacity is up to 15 characters per line.
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 W.
Dimensions: 4" high by 14⅝" wide by 13½" deep (102 mm x 371 mm x 343 mm).

Accessories

Furnished: package of 3 rolls HP 9270-0802 paper. (Approx. 3 month supply).
Available: 9270-0802 pkg. of 3 rolls, $9.75. 9270-0815 pkg. of 24 rolls, $72.

Purchase Plans

Purchase:	HP 9120A, $975.
Rent:	$75 per month.
Lease:	$25.35 per month.

Service contracts available.

CALCULATOR PLOTTER

Description: 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

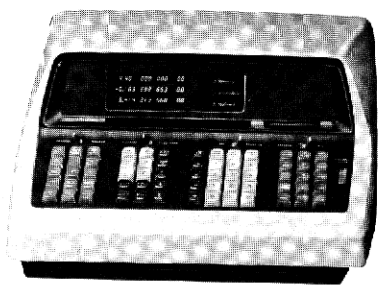
Plotting area: 10 inches on the Y-axis by 15 inches on the X-axis. (25 cm by 38 cm on metric paper.)
Origin: origin can be set anywhere on the plotting surface, allowing four-quandrant plotting.
Scale factor: 500 counts per inch (200 counts per cm) adjustable by at least ±10 counts per inch (4 counts 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.

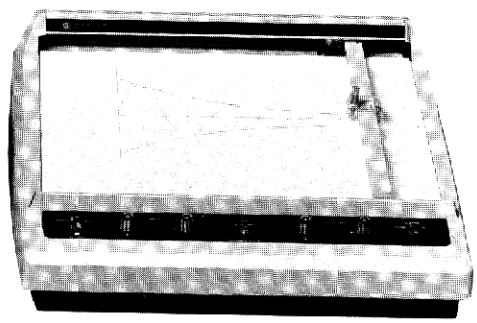
General

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 W.
Dimensions: 8½" high by 20" wide by 19⅜" 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





9100B/9125A

Purchase Plans

Purchase: HP 9125A, $2,475.00.

Rent: $185.00 per month.

Lease: $64.35 per month.
Service Contracts 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 16½″ overall. Price: $4.90 per box.

Linear:

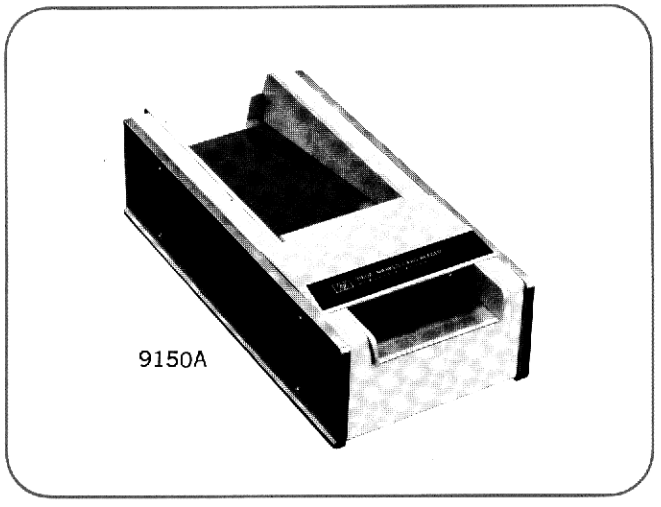
PART NO.	DESCRIPTION
9270-1004	10″ x 15″ plot area
9270-1024	25 cm. x 38 cm. metric plot area

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



Cardreader

Description: 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.

The cardreader reads marks as contrasts in light reflection. This allows the operator to mark cards quickly and without special equipment for rapid entry into the Calculator.

Specifications

Line width: minimum 0.020 inch pencil mark required for reliable sensing.

Reading rate: 20 ms 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 (2,03 kg); shipping 5.5 lbs (2,5 kg).

Power: takes power from HP 9100 Calculator. (Idle 2.5 W, running 3.5 W.)

Dimensions: 3½″ high by 5-1/3″ wide by 11¼″ deep.

Temperature: operating range, 0-45°C.

Cards

Furnished: package of 100 Calculator program cards.

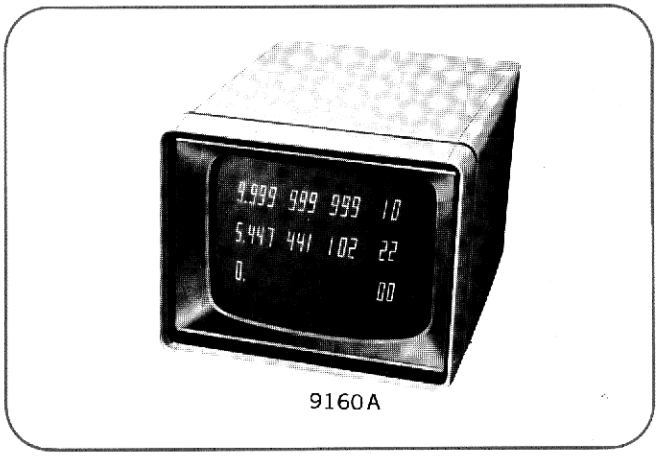
Available: 9320-1182 Calculator program format.
9320-1192 Calculator data format.
Pkg of 2,000 $15.00.
Pkg of 10,000 $60.00.

Purchase Plans

Purchase: HP 9160A, $490.00.

Rent: $35.00 per month.

Lease: $12.74 per month.
Service Contracts available.



Calculator Display

Description: The 9150A is a large screen display of the 9100's 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.

Specifications

Character height: ⅜″ wide 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 (29,3 kg).

AC input requirements: 115 V ±10%, 50-60 Hz (230 V available as an option), 250 W.

Price: to be announced.

Available: early 1970.