

HP-85 Graphics



The Graphics Revolution

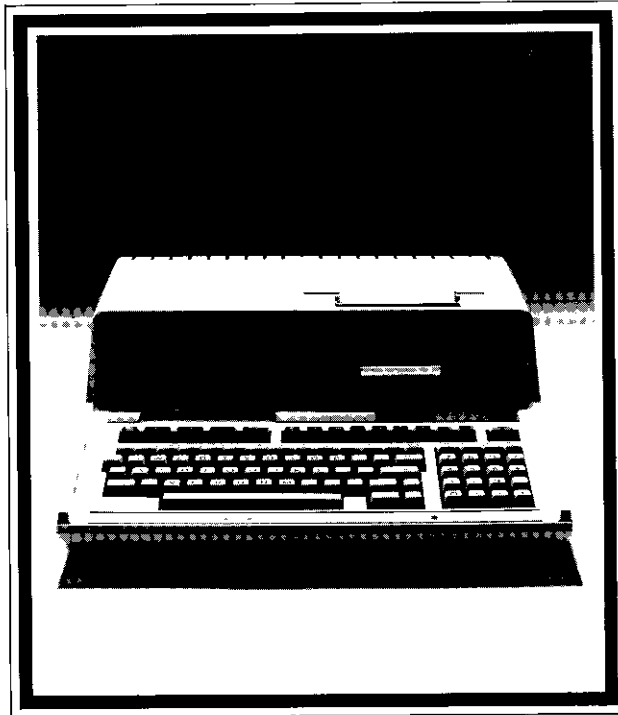
An explosion has occurred in science, industry and the classroom. People are harnessing the power of graphics to display and analyze data. If a picture is worth a thousand words, how many columns of numbers is a graph worth?

The impact of good visual presentations has long been accepted. Computers solved the problem of turning raw data into pictures easily. But widespread use of computer-aided graphics has been limited by two constraints: computer languages that were difficult to learn and use, and the high cost of computer equipment with graphics capabilities.

HP's Low-Cost Solution

Hewlett-Packard's personal computer for industry, the HP-85, has solved these problems. At a price attractive to professionals, full computer power has been bundled into a compact package. The HP-85 uses the BASIC* language — now the standard of the personal computer industry because it is easy to learn and use. The HP-85's memory size ranges from a standard 16K to 32K bytes. A typewriter-like keyboard, numeric pad and system control keys give the user quick and complete control. Data and programs are immediately available through the 210K-byte tape cartridge, while a 12.7 cm (5 inch) CRT and built-in 32-character printer provide full display capability.

And then there is graphics. Built into the HP-85 are language enhancements usually found only in larger, more expensive computers. Sixteen graphics statements provide all the tools needed to present numeric data in pictorial form.



Graphics Made Easy

The HP-85 is an interactive tool that solves complex problems. Graphics helps provide the power. All graphics statements may be executed directly from the keyboard or from within a program. Several different presentations of the same data can be produced with a little thought and a few keystrokes. Statement parameters, such as scale limits or data points, are not restricted to constants but may be numeric variables or expressions. Lines can be selectively erased and redrawn. Labels can be positioned anywhere on the screen. What's more, a graph being drawn under program control can plot data entered from the keyboard. Finally, the user has selective access to every dot on the graphics screen. That means special characters and symbols can be defined, displayed and moved intact, under program control, in any direction.

Two complete display memories are continually available. One stores alphanumeric, such as the program lines or data, while the other stores the most recent graph and labels. The use of any BASIC graphics statement automatically accesses the graphics memory and displays it. Returning to the alpha mode does not destroy the graphics display — it is saved in the graphics memory so it can be displayed again later. It will remain in memory until it is cleared or the machine is turned off. At any time, you can print a copy of the current graphics or alpha display on the internal printer with a single keystroke. The hard copy is automatically printed in the same proportions as the graphics display on the CRT.

Powerful Command Set

The following are the graphics statements built into the HP-85:

- GRAPH — Exits alpha mode and automatically accesses the graphics screen.
- ALPHA — Exits graphics mode and accesses the alpha screen.
- SCALE — x min, x max, y min, y max — Defines the internal scale limits for the x and y axes.
- XAXIS — y-intercept [, tic spacing [, x min, x max]] — Draws the x-axis, intercepting the y-axis wherever desired. The tic spacing may be defined in terms of the current scale limits. The full scale need not be reflected on the axis; minimum and maximum limits of the axis may be defined in the current scale units.
- YAXIS — x-intercept [, tic spacing [, y min, y max]] — Same definition as XAXIS, but for the y-axis.

*The HP-85's BASIC language is a fully compatible superset of ANSI standard BASIC. It is also a compatible subset of the enhanced BASIC language offered on the System 35 and System 45 Desktop Computers.

PEN numeric expression — Defines whether plotting white dots on black background, or vice versa. Also allows selective erasure of dots and lines.

PENUP — Lifts the theoretical graphics "pen" so that the plotting point can be changed without drawing a connecting line.

MOVE x-coordinate, y-coordinate — Lifts the "pen" and moves to a point on the screen defined by the x and y coordinates, specified in the current scale units.

IMOVE x-increment, y-increment — Same as the **MOVE** statement, but the "pen" moves not to a specified point, but by a specified increment from the current "pen" position. The x and y increments are interpreted in terms of the current units.

PLOT x-coordinate, y-coordinate — Either makes a dot at the specified point or draws a line from the current "pen" position to the specified x and y coordinates, defined in the current scale units.

DRAW x-coordinate, y-coordinate — Always draws a line from the current "pen" position to the point defined by the x and y coordinates, specified in current scale units.

IDRAW x-increment, y-increment — Same as the **DRAW** statement, but draws from the current "pen" position by the specified x and y incremental values. The x and y increments are interpreted in terms of the current scale units.

LABEL character string — Writes the label defined by the string expression, starting at the current "pen" position.

LDIR numeric expression — Specifies whether the label should be written horizontally or vertically. Numeric expressions less than 45° are interpreted to mean horizontal, those greater than or equal to 45° mean vertical.

BPLOT character string, number of characters per line — Enables definition of specific dot combinations which may be configured into unique characters or symbols. Those may be placed anywhere on the screen. By selectively turning on and off progressive dots on the screen, the characters may be made to move rapidly in any direction across the display.

GCLEAR [y-coordinate] — Clears the graphics screen from the specified y-value to the bottom of the screen. If no y-value is specified, the entire screen is cleared. The **PEN** command defines whether the screen is cleared to a white or black background.

A Complete Line of Professional Graphics from Hewlett-Packard

The HP-85 is only one part of the broad line of products from Hewlett-Packard with graphics capabilities. The experience of our engineers and managers has proven that graphics is an important medium for communication in the world of industry. New products with broader compatibility are being offered regularly to complement technical instrumentation and computation equipment.

The System 45 Desktop Computer offers a graphics ROM providing a powerful set of BASIC language graphics commands. For the mini-computer user, the HP1000 now offers **GRAPHICS/1000**, a versatile set of software routines that provides graphics. The HP2648A graphics terminal uses a high-resolution CRT to display graphics generated by a host computer, while the HP2647A intelligent graphics terminal has the same power, plus stand-alone BASIC programming.

Hard-copy devices are continually expanding as well. Hewlett-Packard's 9872A/S plotter sets new standards of excellence with its accuracy and four-color pen capability. At an easily affordable price, the 7225A plotter uses standard 8½" x 11" paper for fast and detailed plotting. Even printers, such as the 9876A or 2631G, provide raster-dump graphics.

Hewlett-Packard knows graphics. And the HP-85 demonstrates this knowledge by providing high performance at a new low price. You can be sure the HP-85 will grow with Hewlett-Packard in graphics power, input and output.

Hardware Specifications

Dot size:	.38 x .38 mm
Dot spacing:	.38 mm
Screen size:	12.7 cm (5") diagonal
Screen intensity:	Adjustable to 32 foot-lamberts
Resolution:	256 x 192 dots
Character cell size:	8 x 12 dots
Printer speed:	2 lines/s in alpha mode; 3072 dots/s in graphics mode

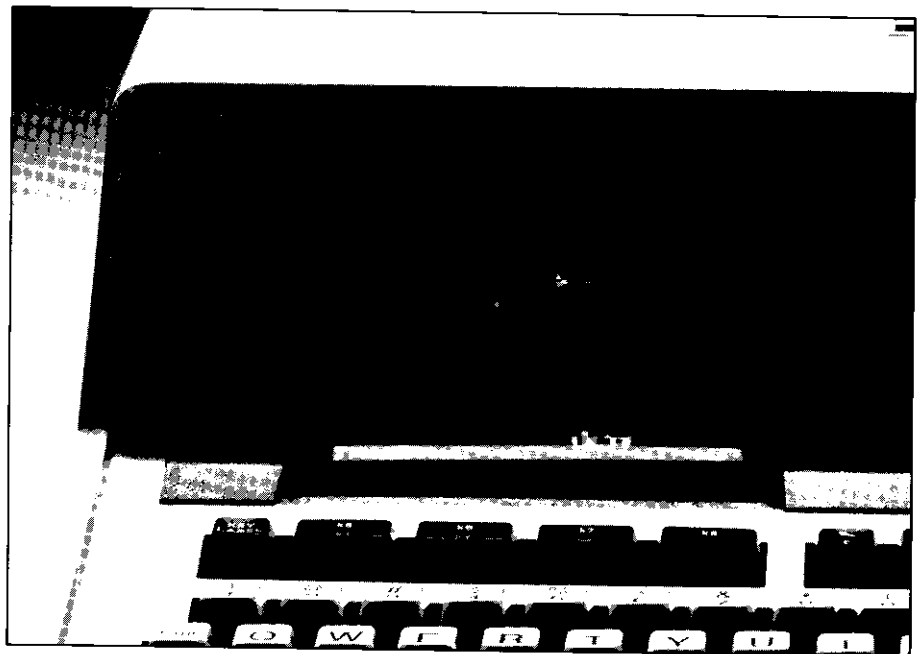


Figure 1. **BPLOT** from *Games Pac*

CARIBOU BIRTH RATE

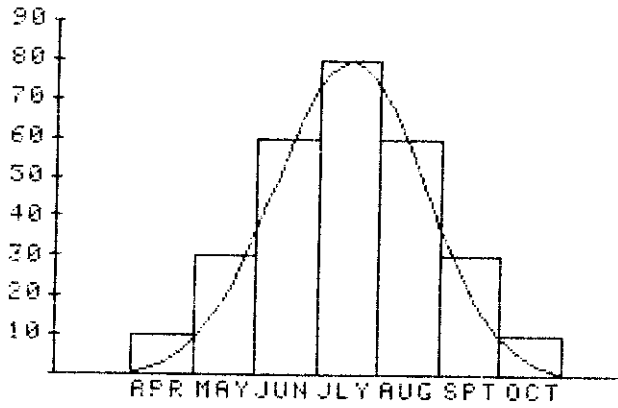


Figure 2. Histogram

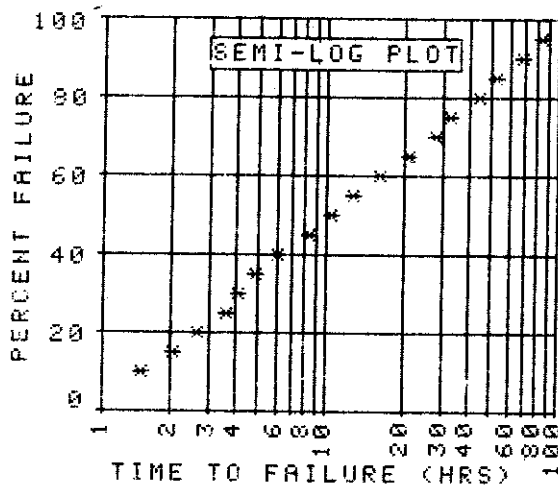


Figure 3. Probability Plot

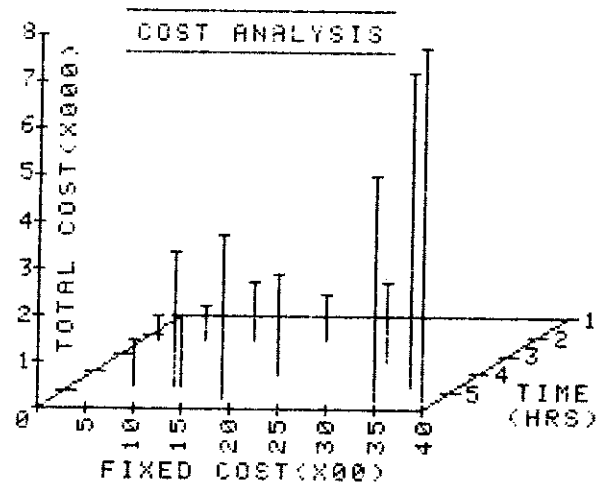


Figure 5. XYZ Plot

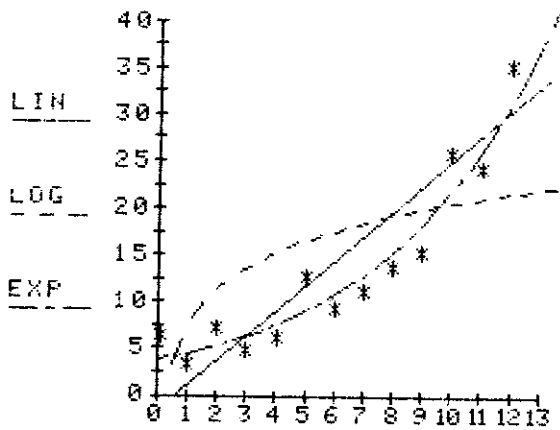


Figure 4. Scattergram

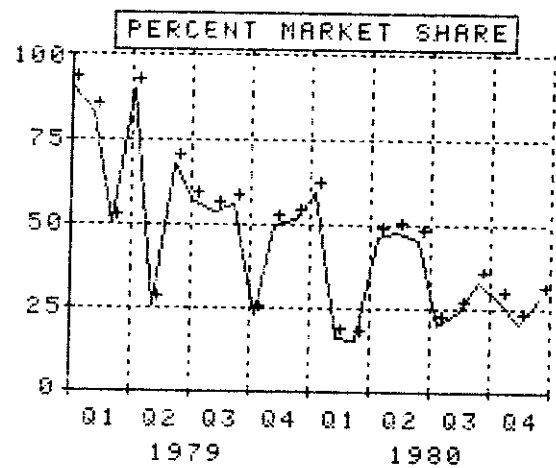


Figure 6. Time Series Plot



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Ask for an HP Desktop Computer representative.