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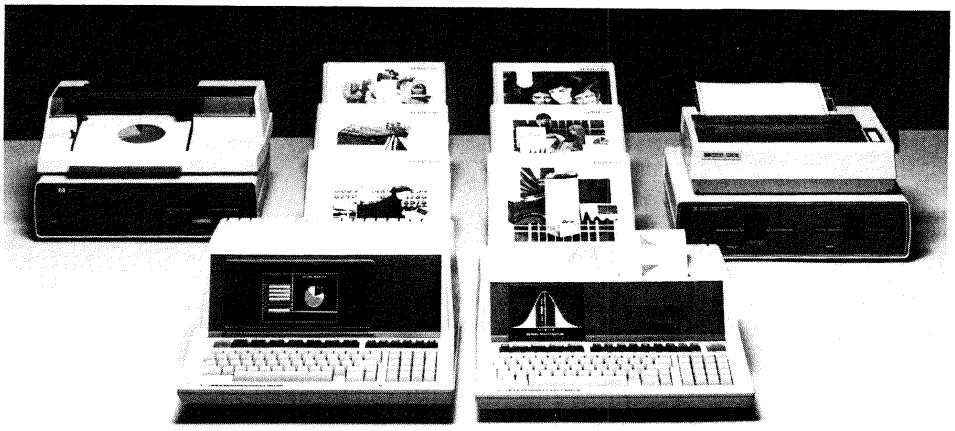
Introducing the HP-87

by Phyllis Ellendman, Technical Writer
Hewlett-Packard, Personal Computer Division



In computer families, a new arrival can be the "bigger brother" to already-existing products. Such is the case with the HP Series 80 family. On March 1, Hewlett-Packard introduced the HP-87, a powerful addition to Series 80 and a fitting complement to the HP-85 Personal Computer.

The HP-87 has been developed to meet the needs of analytical professionals whose applications require a wide screen, large user memory, disc-based mass storage, and enhanced programming capabilities in a personal computing system.

The upward compatibility designed into Series 80 allows the HP-87 to run HP-85 BASIC programs. Additional software developed by HP utilizes the HP-87's increased computing power, and an optional plug-in module converts the HP-87 into a CP/M® machine capable of running

the wide variety of CP/M software available.

The most obvious new feature of the HP-87 is its 9″ × 5″ screen. Designed to display up to 24, 80-character lines at a time, the high-resolution, low-glare screen displays both alpha text and graphics information with superb clarity.

Examine the back panel and you'll find the connector for the HP-87's integrated HP-IB (Hewlett-Packard Interface Bus). An accessory cable packaged with the computer provides everything needed to connect a disc drive unit or printer. Other HP-IB peripherals can be connected using additional accessory cables. Any of the four I/O ports can be used to install optional interface modules for non-HP-IB peripherals.

CP/M® is a registered trademark of Digital Research, Inc.

Expanded Memory

If you examine just the visible features of the HP-87, you only begin to describe the HP-87's features. Inside the machine are 96K bytes of memory—48K bytes of read-only memory (ROM) storing the machine's enhanced BASIC language and 48K bytes of random-access memory (RAM), 16K bytes of which are devoted to the CRT. That leaves 32K bytes of user memory available for programs and data. Those 32K bytes, however, are just the beginning.

The HP-87 is designed to handle highly complex problems, and big problems require large amounts of user memory. The expandability of the HP-87's user memory is one of its most impressive features. To provide memory tailored to individual needs, the HP-87 has its own set of three plug-in memory modules:

HP 82907A 32K Memory Module ($295.†)
HP 82908A 64K Memory Module ($450.†)
HP 82909A 128K Memory Module ($795.†)

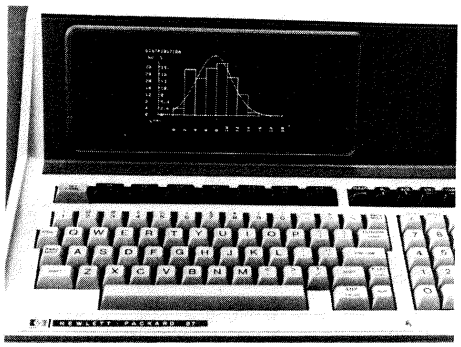
What's more, any combination of memory modules can be installed—one in each port—for a maximum user memory of 544K bytes! At power-on, the machine automatically configures internal and plug-in user memory into one contiguous block available for BASIC programs and data.

The 16K bytes of RAM devoted to the CRT are used for storing both text (alpha) and graphics information. At power-on, CRT memory can store 54 scrollable lines of 80-character text and a 400 × 240-array of dots comprising the graphics display; the A/G (alpha/graphics) toggle key allows you to view either portion of CRT memory. For situations where you have no need to view both alpha and graphics information, CRT memory can be configured to provide 204 lines of alpha information alone (alpha-all mode), or to display a 544 × 240-dot graphics screen (graph-all mode).

Enhancing Enhanced BASIC

The exceptional programming capabilities of the HP-87 reside in the 48K bytes of ROM used to store the functions, statements, and commands provided by HP enhanced BASIC. The HP-87's BASIC combines all the statements of the HP-85 mainframe (except the tape and COPY commands), the HP-85 Mass Storage ROM, and most of the features of the HP-85 Plotter/Printer ROM. Both the disc driver and printer driver are built in, so those peripherals can be accessed without the addition of plug-in ROMs.

The optional HP-87 Plotter ROM (part number HP 00087-15002) provides a plotter driver and certain plotter operations. In addition, the Plotter ROM provides statements for copying the graphics display or the alpha display, with or without the cursor, to a number of HP printers.



Additionally, a variety of programming enhancements have been designed in to the HP-87 to make it an exceptional machine for program development:

1. Variable names can be up to 32 characters long, permitting you to use mnemonic names to bolster program documentation. The HP-87 distinguishes between uppercase and lowercase letters in variable names, but not in BASIC keywords.

2. You can dimension and manipulate true one- and two-dimensional string arrays. In the example below, the variable "Stringarray$" consists of 90 elements, each of which has a maximum length of 50 characters.

```
10 OPTION BASE 1
20 DIM
Stringarray$(15,6)[50]
:
```

3. Callable line labels allow you to reference program lines by name in branching statements, so you don't need to keep track of line numbers.

```
:
100 ON KEY# 1 GOSUB
Plotline
:
400 Plotline: PLOT X,Y,P @
RETURN
:
```

4. Spaces between the line number and the first character of a statement are preserved, providing indented listings. Indenting program loops, function definitions, and subroutines allows you to visually divide large programs into manageable segments.

```
:
30 FOR I=1 TO 20
40      ISQUARED=I^2
50      DISP ISQUARED
60 NEXT I
:
```

5. Multi-parameter, user-defined functions allow a function call to pass values of more than one variable into a function.

```
:
100 PRINT USING "10X,A";
FNLetter$(String$,
Position)
:
200 DEF FNLetter$(A$[80],
B)=A$[B,B]
:
```

6. Programmers who use binary program enhancements to Series 80 BASIC have increased flexibility in designing their programs—up to five binary programs can be present simultaneously in the HP-87's memory.

7. The HP-87's character set includes an entire complement of inverse video characters and three line-drawing characters for creating tables and forms on the alpha display.

8. Three additional user-defined (soft) keys provide a total of 14 keys available for ON KEY# branching. What's more, all 14 keys function as typing aids. You can use the power-on assignments or customize the typing aids to meet your individual needs.

9. Program debugging is facilitated by the addition of a TR/NORM (trace/normal) key for initiating and cancelling TRACE ALL operations while a program is running.

10. The HP-87 recognizes an HP-85 BASIC program when it is loaded, and automatically translates the program into a form executable by the HP-87. Program lines not understood (tape and printer COPY commands) become comments. Once a translated program is stored, it is available for future use without further translation.

In addition to program compatibility, the HP-87 is disc-compatible with the HP-83/85. An HP-87 can copy and catalog HP-83/85 discs, and vice versa. Data files are completely interchangeable.

HP-87 Plug-In Enhancements

The four rear ports allow the user to install a variety of enhancement modules and interfaces. A Series 80 innovation for the HP-87 is the CP/M System, consisting of a module containing a Z-80 microprocessor and 64K of RAM, a disc containing the CP/M operating system, and documentation. With the module installed and the operating system loaded and running, the HP-87 functions as an intelligent terminal capable of running and developing CP/M software.

† *All prices in this newsletter are U.S. prices excluding state and local taxes. For information outside the U.S. please contact the sales office or dealer nearest you.*

The HP-87 has its own set of ROMs, available now or in the near future:

Plotter ROM (HP 00087-15002)
Input/Output ROM (HP 00087-15003)
Assembler ROM (HP 00087-15007)
Matrix ROM*
Advanced Programming ROM*

Plug-in devices other than ROMs and RAM are compatible with all Series 80 products. The 82936A ROM Drawer, 82928A System Monitor, the 82929A Programmable ROM Module, 82950A Modem, and all Series 80 interfaces can be used interchangeably with the HP-83/85 and HP-87 computers.

* *In development.*

Software Solutions

Each HP-87 is shipped with a demonstration disc that provides a sampling of the machine's capabilities and also contains some useful binary programs. In addition, a number of software pacs can be purchased to provide general and specific analytical solutions for scientific, engineering, and management professionals.

HP-87 VisiCalc® PLUS—With its expanded memory and wide screen, the HP-87 version of VisiCalc enables you to manipulate up to 16,002 cells of data, returning the analytical result in text or graphical format. Cells can be as large as 158 characters. The larger screen displays more of the worksheet at a time and, because display operations are performed rapidly on the HP-87, scrolling is fast too.

HP-87 Graphics Presentations Pac—With its wide sceen, the HP-87 can display an entire slide, complete with text, as it is being created. Line- and arc-drawing features make the pac perfect for creating flowcharts, organizational charts, and tables. Line, bar, and pie charts can be drawn in a variety of formats and labelled using several different type styles.

Two major Series 80 software offerings combine several HP-83/85 pacs to take advantage of the HP-87's large user memory to manipulate large amounts of data. These programs use the HP-87's wide screen to provide analytical results in clear, 80-column layouts and high resolution graphics:

Series 80 Electronics Engineering Multi Pac—The Waveform Analysis, A.C. Circuit Analysis, and Math pacs have been combined into one software offering to solve problems related to the many facets of equipment design and testing.

Series 80 Statistical Analysis Multi Pac—This combination of the General Statistics, Basic Statistics and Data Manipulation, and Regression Analysis pacs provides outstanding tools for analyzing and evaluating data. Features include one-sample and paired-sample analysis, continuous and discrete distributions, multiple linear and polynomial regression, and algebraic transformations.

In addition to the new Multi Pacs, other Series 80 pac offerings are: **Financial Decisions**, **Surveying, Games**, **Linear Programming**, and **Data Communications**. On the HP-87, the Linear Programming Pac can handle up to 200 variables with 80 constraints—an unparalleled capability in the personal computer market.

VisiCalc® is a registered trademark of VisiCorp.

An HP-87 System

The HP-87 can be purchased by itself for $2495.†, or, customers can choose one of three HP-87 systems. All three systems are self-contained; they can be set up and operated without purchasing additional hardware.

System 5 for $3995.†—an HP-87 plus an HP 82902M single flexible disc drive providing 270K bytes storage on low-cost, double density flexible discs.

System 10 for $4695.†—an HP-87 plus an HP 82901M dual flexible disc drive providing 540K bytes storage plus the ability to perform disc-to-disc mass storage operations.

System 30 for $7995.†—an HP-87 plus an HP 9135A, the fastest and highest capacity system. The HP 9135A combines a 5" Winchester (4.6 Megabytes) and a single 5¼-inch flexible disc drive to provide a total of 5 Megabytes of online storage.

For customers requiring permanent alpha and/or graphics output, a number of HP printers and plotters are available for use with Series 80 Personal Computers. And, of course, the family of Series 80 interfaces (GPIO, Serial, BCD, Parallel Printer, HP-IL, and HP-IB) provide a wide range of interfacing options.

If you appreciate the superb progamming features and flexibility of the HP-85, you'll enjoy the oportunity to view a demonstration of the even more remarkable HP-87 system. Contact your local Series 80 dealer for additional information.

(Ms. Ellendman wrote the *Introduction to the HP-87* manual and co-authored the *HP-87 Operating and BASIC Programming Manual,* the two first-class manuals that accompany the product—Ed.) ■

Three New Communications Products

by Curtis Adams, Editor

For some time now I've been extolling the virtues of electronic mail, computer conferencing, and computerized data bases. Up until now, the entrance cost has been quite high, and although we can feel some tremors, the communications earthquake hasn't hit yet. Exactly when it will hit 10 on the Richter scale no one knows, but it will probably be sooner than we think. Just last year it cost a Series 80 user about $800 to set up a communications system. Now it costs under $400, the same as the cost of a 16K Memory Module a year ago. Within the last few months the United States Postal Service announced it has entered the field of electronic mail. AT&T announced it will divest itself of its 22 local operating companies so it can enter "new fields." What "Baby Bell" has retained is its national long-line service, its manufacturing facilities, and the formidable Bell Labs, just the resources needed to sweep down on telecommunications markets.

But users are the critical resource. Users' groups form around specialized areas of interest, with members combing the networks for information and contacts and building up data bases on computer hardware, short stories, video, or whatever. A year ago, **Compu-Serve** and **The Source** had about 2,000 subscribers each. Now they have about 13,000 each. **Prestel**, the British videotex system is also 13,000 subscribers strong. Computer Bulletin-Board Systems are sprouting like weeds. Hundreds have formed with specializations ranging from the impeccable, religion, to the inevitable, micro smut.

Hewlett-Packard shows its commitment to data communications with the introduction of three new products for the Series 80 family. The **HP 82950A Modem**, which includes support software, the **Data Communications Pac**, and the **HP 82938A HP-IL Interface**. The HP-IL Interface provides communications with the world of handheld computers like the HP-41. The Data Communications Pac supports the serial interface and is capable of high-speed communications, while for communications at 300 baud over the telephone (in the United States only), the HP 82950A Modem is easier and more convenient. Just plug it in and join the information generation. The system takes over all the mundane tasks like dialing the phone and logging on. Coupled with the built-in capabilities of your Series 80 Personal Computer, what you have is a very efficient, easy-to-use, networking machine. So go forth and start your own users groups, be your own editors, and build your own personal data bases.

The HP 82950A Modem

The **HP 82950A Modem** plugs directly into one of the I/O ports in the back of a Series 80 Personal Computer and has two jacks, one for direct connection to the phone line and the other for the telephone. This configuration offers more noise immunity than acoustic couplers while still permitting voice communications. It offers features such as automatic dialing and logging on

from data files, re-dialing, auto-answer, and file transfer to and from the host. The HP 82950A Modem is the "friendly" data communications solution and the best choice for communications at 300 baud over the telephone.

At first glance, the most striking feature of the modem is its size; the HP 82950A is twice the height of the other Series 80 interfaces, though it doesn't occupy two I/O slots. The case has been contoured so that it may either be plugged into the top I/O slot or nestled in underneath either a ROM Drawer or 16K Memory Module.

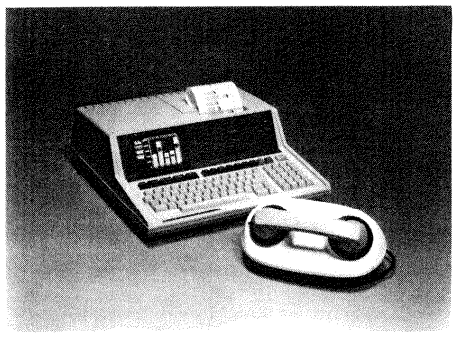
The support software for the HP 82950A bears a strong resemblance to its cousin, the Data Communications Pac. Although not identical, the softkey-guided menus of both programs are sufficiently similar that a user experienced with one product should have little problem using the other. It should be noted that these two pieces of software are not interchangeable; the Data Communications Pac will not drive the HP 82950A Modem and the modem software cannot talk to a Serial I/O card.

The support software for the HP 82950A Modem consists of three programs. GETSAV is a binary utility program to convert BASIC and assembler source programs into data files for transfer, and back again. MODCOM and IPBIN work as a team. Their operation can be broken down roughly into two categories: Data communication and modem operation. The data communication part of the software allows the user to communicate with a host and to upload and download ASCII data files that exist on mass storage. Because of its softkey-guided operation, data communication is simple and straightforward.

The modem-operation side of the software contains several features that make the HP 82950A extremely easy to use. Perhaps the most significant of these is the powerful dialing capabilities of the modem. Pressing the "DIAL" softkey, you are asked for a telephone number or a name. At this point, you can either type in a telephone number or specify a name. If a name is entered, the software searches mass storage. Information associated with that entry is read into the computer and executed. This information may include program configuration, the telephone number, and a logon sequence for the host system. Thus, by loading the modem software, pressing a key, and typing in a key-word, a user can be in communication with a host computer quickly and without fuss.

Other powerful capabilities of the HP 82950A's support software include an auto-answer mode and a re-dial operation in case a call does not go through the first time.

The HP 82950A Modem includes a phone cord, software, and owner's manual for $395 (available only in the United States). The HP-83/85 version requires a 16K Memory Module, the HP-87 version a 32K Memory Module; both require the I/O ROM for their respective machines.



The Data Communications Pac

The **Data Communications Pac** allows you to transfer data to and from data bases on large computers while still retaining the benefits of personal computing. The capabilities this pac provides can open up new applications for you—you've read about some of these in the two-part personal data communications article. Beyond those, the Data Communications Pac opens up the possibility of high-speed, local-loop applications; you can integrate your Series 80 Personal Computer into your company computer network as an intelligent terminal.

Essentially, the Data Communications Pac lets the user set up the communication parameters necessary for two computers to talk—such things as the number of bits per word, the number of stop bits, parity, handshake protocol, etc. And, a "Remote Console" mode allows you to run your HP-83/85/87 from a remote terminal. The pac provides for communication rates from 75 to 9600 baud.

In addition, the user can manually send handshake signals to the host computer and can program the output separator used to terminate each line. Lines can be simultaneously displayed and printed on either the built-in or an external printer. And data files (in ASCII string format) can be uploaded to or downloaded from the host.

Two features are available to make set-up and recovery easy. The "Configuration File" feature allows you to save frame parameters, output separators, file transfer names, and printer select codes. These configuration files can be recalled to set up your system, making communications with a given system quick and convenient.

An optional "Restart Mode" saves all the frame parameters and restarts the program should the host hang up or the program stop.

The pac includes a flexible disc and tape cartridge holding three programs: TERMEM, the Terminal Emulator, is the BASIC program that handles the man/machine interfacing; TERMEM requires IPBIN, the binary program you've heard much about before, to handle the CRT and keyboard; and GETSAV converts BASIC programs to ASCII string files for transmission to other devices and converts ASCII string files into BASIC tokens for execution.

Documentation consists of an owner's manual, timesharing application notes explaining how to use the pac with commercial networks, and a checklist to take you "step by step" through setting the options required for various situations.

The Data Communications Pac works worldwide because it is independent of the kind of modem (and hence, the phone system) used. It requires the following hardware and firmware: a 16K Memory Module for the HP-85 or at least a 32K Memory Module for the HP-87; an HP 82939A Serial Interface (Option 001); an HP 82936A ROM Drawer and either an 00085-15003 I/O ROM or an 00087-15003 I/O ROM, depending on the mainframe; and any of the commercially available asynchronous modems or acoustic couplers. Optional items include an HP 82937A HP-IB Interface, an HP 82949A Parallel Printer Interface, and a Mass Storage ROM. The Data Communications Pac itself is $200.00†, part number 00085-13044.

The HP 82938A HP-IL Interface

Communication between HP Series 80 Personal Computers and HP handheld computers is now possible with the **HP 82938A HP-IL Interface**. The interface card plugs into the personal computer, tying it into the Hewlett-Packard Interface Loop (HP-IL). HP-IL opens up a world of remote data-gathering applications with the HP-41 handheld computer. Data collected on an HP-41 can be passed up to an HP-85 personal computer and then on to an HP 3000 computer system if desired, for analysis.

HP-IL ties HP personal computers and HP handheld computers together with a large number of low-power peripherals and test instruments. The reason a new interface was created is the tremendous increase in the number of low power devices available. All currently available interfaces have high power requirements, making them unusable with battery powered equipment. HP-IL, on the other hand, relies on each device in the loop to help drive the loop, and also uses CMOS circuits to reduce power consumption to levels that battery operated devices can drive.

The 82938A HP-IL Interface utilizes a unique two-wire, loop-structure design. It is a bit-serial interface—information is sent one bit at a time—and so only needs one line to transmit data (the other wire is ground). It also utilizes a loop structure. This means that as information travels around the loop, each device receives and then transmits the information. Because of this unique

structure, the distance between each device can be up to 10 meters using zip cord, or, by using shielded, twisted-pair wire, up to 100 meters apart. This allows great flexibility in system configuration.

The first battery-operated devices to utilize HP-IL are the HP-41C and HP-41CV handheld computers. With the HP-IL interface (and an 82160A Interface Module plugged into the HP-41), it is possible to communicate between a Series 80 Computer and the HP-41. And with the addition of either the Data Communications Pac or the HP 82950A Modem, communication exists throughout the entire HP line of computers, from the HP-41 all the way up to the HP 3000.

HP-IL makes it possible to interface up to 30 devices on the loop. Hewlett-Packard has already announced the first HP-IL instrument, the HP 3468A Digital Multimeter. At $695† it is one of the lowest priced, fully-programmable digital multimeters in the world. Hewlett-Packard has also introduced a digital cassette drive, part number HP 82161A, and thermal printer, part number HP 82162A, for use with its HP-41 handheld computer.

The $295† price includes a loop cord and an Installation and Theory of Operation Manual. A Plotter/Printer ROM or an I/O ROM is required. ■

The HP 7470A Graphics Plotter

HP technology now makes it possible for all personal computer users to add the power of graphics. The **HP 7470** is HP's solution to the need for permanent, high-quality graphics at an affordable price. The small, low-cost plotter uses the same high-quality components and paper-moving technology found in Hewlett-Packard's top-of-the-line drafting plotter.

Hook up the HP 7470 to your computer and you have your own personal computer graphics system. You can plot your data in any form you choose—a line chart, a clustered or a stacked bar chart, or as segments of a whole in a pie chart. You can therefore spot trends and potential problems, compare results of several predictions, or focus on exceptions. You can easily track information in relation to historical data or summarize to get an overview.

And with hardcopy graphics, your information doesn't disappear. Data is there permanently, on paper or an overhead transparency. The information is vividly displayed in colorful charts that fit into your briefcase and go with you anywhere.

Easy To Use

When the HP 7470A is turned on, default conditions are automatically established for most plotting parameters. This means that in many cases it's only necessary to load the pens and paper or overhead transparency film in order to start plotting. To load paper or overhead transparency film, you simply push the paper or film against the paper stop and flip the hold lever. Interaction with the plotter is easy from the front panel. These controls allow manual control of paper and pen movement, pen selection, and halting the program to substitute pens or view the plot. The front panel also allows easy access to the digitizing capability and the scaling points.

Paper and Pen Movement

Using the low-inertia, microgrip technology, paper movement provides plotting capability along the X-axis. The pinch wheels and grit-covered drive wheels move the paper or overhead transparency film across the platen which accommodates either a 8½-by-11 inch (ANSI A) or 210-by-297 millimetre (ISO A4) media. Pen movement locates points along the Y-axis. Movement of both paper and pen allows the HP 7470A to plot lines at speeds of up to 38 cm (15 in.) per second. Labels and annotations are drawn at speeds of up to five characters per second. This means that charts can be plotted in minutes.

Several automatic features are included to protect the tip of the pen, which means the pen will draw sharper lines for a longer time. When housed in the stall, the pen is capped to prevent premature drying. When a PEN DOWN command is given, the pen force is damped and the pen is gently lowered to the surface of the platen.

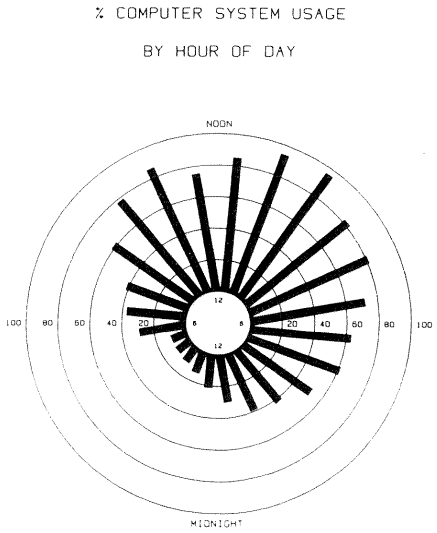
Colorful

It's easy to produce colorful graphics using the HP 7470A's two built-in pen stalls. For two-color plots, the user selects pens through a program command or by pushing controls on the front panel. For additional colors the user halts the program (manually or through program command) and snaps new pens into the stalls. HP fiber tip pens are available in 10 colors. Overhead transparency pens are available in seven colors.

Intelligent Features

The HP 7470A has five internal character sets (including three European sets) that eliminate the need to use software-generated characters.

There are more than 40 HP-GL (Hewlett-Packard Graphics Language) instructions built in that allow the HP 7470A to be programmed with simple commands to perform a variety of complex operations. For example, through simple HP-GL commands, you can select from seven dashed-line fonts, generate unique characters, and annotate in any size and direction.



High-Quality Output

The HP 7470A has an addressable step size of 0.025 mm (0.001 in). With this resolution, the HP 7470A can plot up to 1000 points in a 1-inch line. Because of the HP 7470A's outstanding resolution and repeatability, it plots straight lines and smooth circles that have an artist-drawn appearance.

- PUBLICATION QUALITY. Plots from the HP 7470A can be used in reports and publications without additional annotation or touch-ups because of the plotter's superior line quality, color capabilities, and versatile writing system.

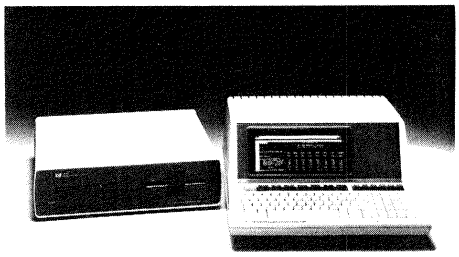
- OVERHEAD TRANSPARENCIES. The HP 7470A can make overhead transparencies in seven colors. This saves money for those who rely on a graphics service. If you have been paying $50 per transparency (a typical fee for a five-color transparency) the HP 7470A will pay for itself after fewer than 40 transparencies. (Programming labor is excluded.)
- STRAIGHT TEXT CHARTS. You will use text charts to link data plots together, and to introduce and summarize information in oral presentations.

Reliable and Simple

In addition to its many graphics features, our new plotter offers a valuable mechanical attribute—reliability. The HP 7470A's reliability stems from its mechanical simplicity.

Two interface options are available: Option 001 for RS-232-C, and Option 002 for HP-IB (IEEE 488-1978).

Best of all, the price of the HP 7470A Graphics Plotter is $1550.+ ■



Supercharge with HP Winchester Mass Storage

The new 5¼-inch Winchesters are the mass storage price/performance match for today's high-powered computers. These "hard" discs permit fast data access, high transfer rates, and very large on-line storage capacity, all for less than 1/10 cent per byte of storage. An added benefit is the heavy-usage, on-line stamina of the Winchester. The non-contact head design eliminates wear, and the drive is sealed to protect it from contaminants. And you can easily put these high-powered features to work with no modification to your existing software.

There are three models to choose from depending on your needs: the Winchester alone; the combination Winchester/5¼-inch flexible disc drive; and the Winchester with a separate 8-inch flexible disc single drive.

The **HP 9134A** 5¼-inch Winchester Disc Drive adds 4.6M byte capacity, fast 60 ms average access time, and high-speed data transfer to Series 80 Personal Computers. The HP-85's built-in tape or a flexible disc drive can be used for back-up.

The **HP 9135A** combination mass storage unit includes the 4.6M byte Winchester combined with a 270K byte 5¼-inch flexible disc drive for back-up. This combination unit provides the high-speed, large capacity of the Winchester and the benefits of removable flexible disc media, both in the same package.

How the Winchester Works

The Winchester drive is similar to a floppy drive but it has four read/write heads that move across two spinning media. The media, however, is made of aluminum that's coated with a magnetic film. The controller uses a magnetic encoding process to record and read back data on the media.

Since the media is rigid and non-removable and the heads don't touch it when they read or write data, the media can be attached to the spindle motor and spun at 3600 RPM or 10 times faster than floppies spin. This rotational speed actually creates air currents that hold the heads up off the surface of the media. The heads actually "fly" close to the surface of the media. The higher rotational speed also improves the speed with which data can be recorded and read back. Thus, the Winchester drive has a higher average data transfer rate than floppies. The rigid media and close flying heads also permit higher density recording than the thin flexible mylar material of floppy discs.

The controller for the Winchester drive has been designed to emulate the HP 9895A flexible disc so you can still use the Mass Storage ROM and add the higher performance of the Winchester drive. Therefore, the Winchester is initialized into four, 1.15 M Byte sections that act like one master 8-inch floppy disc drive and three, 8-inch floppy disc slaves.

Reliability, Speed, Capacity, and Compactness

Probably the largest benefit in adding one of the new HP Winchesters to your system is the reliability that is traditional with these units, with the magnetic medium not contacted by the heads and sealed against contamination. More exciting, however, are the reduced storage costs with greatly improved access times, transfer rates, and very large memory capacity. ■

9135A Winchester/5¼" Flexible Disc Combination Storage Unit Specifications

	5¼" Winchester	5¼" Flexible Disc
Formatted Capacity:		
Bytes per unit	4.6M	270K Single
Bytes per record	256	256
Records per track	30	16
Tracks per cylinder	4	2
Disc Transfer Rate	46K bytes/sec	6.8K bytes/sec
HP-85 Data Transfer Rate	500 bytes/sec	380 bytes/sec
Disc Access Time	3 msec/cyl	5 msec/cyl
(cylinder to cylinder)		
Average Access Time	173 msec	187 msec (motor on)
		435 msec (motor off)
(within one volume)	60 msec	
Unformatted Capacity	6.38M bytes	420K bytes
Rotational Speed	3600 rpm	300 rpm

More New Products and Lower Prices!!

The HP 82905B Printer

The HP 82905B dot matrix printer can print doublesized characters for titles with added emphasis and a special high-density print style outputs 80 columns of "correspondence quality" print for memos and reports. Mechanically, the HP 82905B and HP 82905A are identical; they differ only in the ROM code that determines printer features, such as emphasized printing and the Roman character set. The HP 82950B also uses HP-compatible escape and control sequences. That is, the commands to enter printer features are the same as on the HP 267X Series and the HP 2631B Printer. Software developed for those printers will drive the HP 82905B and produce similar results.

The price of both printers is now only $795.†

Other Price Reductions

As of January 1, 1982, the list price of the HP-85 Personal Computer is $2750,† and the price of the HP 82903A 16K Memory Module is $195.† Two years of manufacturing experience has lowered our production costs to the advantage of all.

Lastly, the price of the HP 82901M Dual Flexible Disc is now reduced to $2200.† ■

Data Structures and Data Management —Part 2

by Charles L. Pack

In the first installment, we defined some terms associated with data bases and went on to discuss sequential files, indexed sequential files, and random access to sequential files. Here in part 2, we'll go on to discuss linked lists, circular buffers, on-line versus batch updating techniques, and backups.

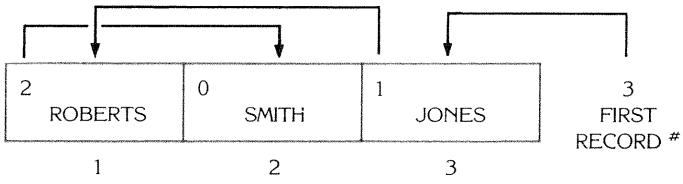
Linked Lists

A linked list is a type of file in which the records exist in a random order, usually the order in which they were entered by the operator. A list is a series of contiguous items in memory or on a file, usually arranged in some particular order. In this case, the order is achieved by a pointer field, sometimes called a chain or a link, in each record.

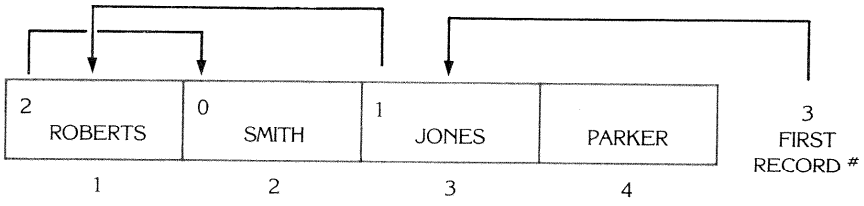
This pointer is the number of the next record in the sequence (not necessarily the next contiguous record). The pointer in the last record would be zero, indicating the end of the file. Since the first record in the sequence is not necessarily the first contiguous record, a pointer field must exist somewhere, perhaps at the beginning of the file, to identify the first record in the sequence.

To access the file in sequence, first read the initial chain pointer. Then get the first record directly using the random read, and process it. Use the chain pointer in the first record to directly read the second record, and so on until a zero chain pointer is encountered.

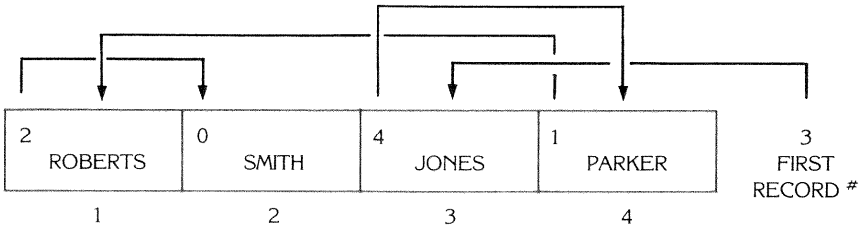
To add a record to the sequence, first add the record to the end of the file. Then determine where in the sequence the new record is to be inserted. This can be done by following the chain pointers and comparing the search keys, logically similar to the way it would be done with a straight sequential file. "Inserting" the new record in the chain is done like this: Put the record number of the new record in the chain pointer field of the record that is to be just before the new record in the sequence. Put the number of the record that is to be just after the new record in the sequence in the chain pointer field of the new record. That's all there is to it! *(See diagram 4.)*



a) Linked list before update. Jones, Roberts, Smith. Smith is last.



b) Add Parker to end of file.



c) Make Jones point to Parker instead of Roberts. Now make Parker point to Roberts.

Diagram 4. Adding a record to a linked list.

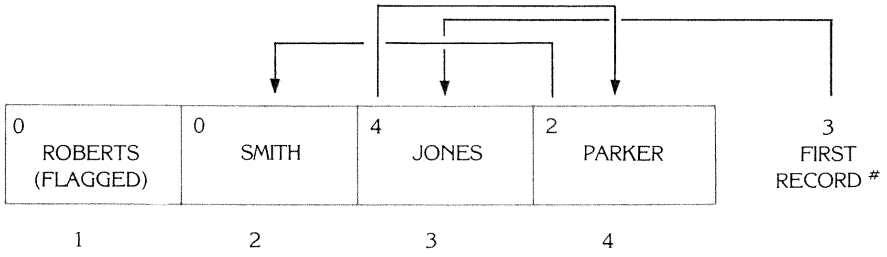


Diagram 5. Deleting Roberts from linked list.
a) Make Parker point to Smith instead of Roberts. Now nothing points to Roberts.
b) Flag Roberts for later deletion. Its forward pointer may optionally be set to zero.

To delete a record, reverse the above process, removing any chain pointer references to that record. The record will still exist in the file but will not be accessible (unless the records are read contiguously). Usually the record is marked by "flagging" it, or setting some field to a value indicating the record is deleted from the sequence. *(See diagram 5.)*

There can be a number of enhancements to this type of file structure. An additional chain pointer field can be added to all records to allow reading backwards in the sequence. A file organized in this manner becomes a doubly linked list. More chain pointers can be added to allow two or more different sequences. And there is nothing to prevent a file from being organized simultaneously as a sequential file and a linked list.

Advantages to the linked list structure include easy updating in place (without having to copy the file), and the ability to access the file in two or more different sequences without having to re-sort the file. A disadvantage of the linked list structure is that deleting records leaves "garbage" in the file; adding records continuously will cause the file to get full even if other records are deleted. There are two ways to get around this problem. One way is to replace deleted records with new added records; each time a new record is to be added, the program searches for "holes" in the file where the new record can go. But what if the records are of varying lengths, and you can't replace a deleted short record with a new longer one? Then, the file must be compacted or re-organized.

Compacting a file is the process of "squeezing" the file downwards toward the beginning to get rid of deleted records. *(See diagram 6.)* This can usually be done in place, without copying the file. Re-organizing a file is the process of copying it onto a new file, leaving out deleted records and possibly re-sequencing the records. Re-sequencing the records is accomplished by reading them according to the chain pointers, and then writing them out sequentially. *(See diagram 7.)* This would reduce the access time because the physical distance between records is reduced.

An appropriate use for a linked list would be a name and address file. Names would not normally be entered in any particular order, but might need to be accessed in order by last name, first name, for example.

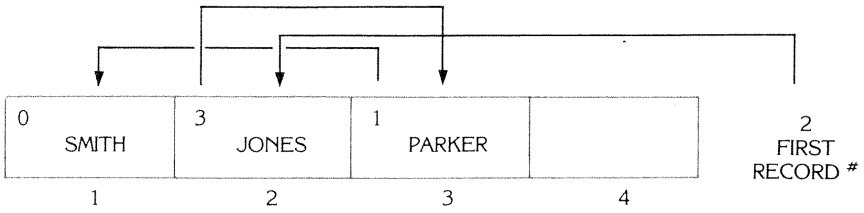


Diagram 6. Compacting the linked list. Record 4 is available for expansion.

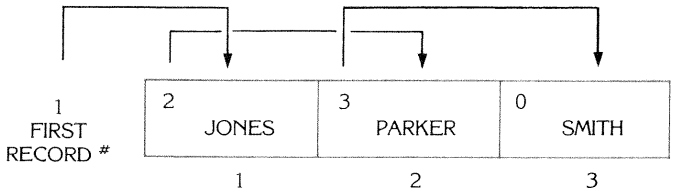
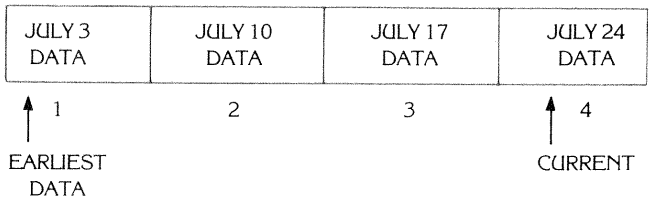
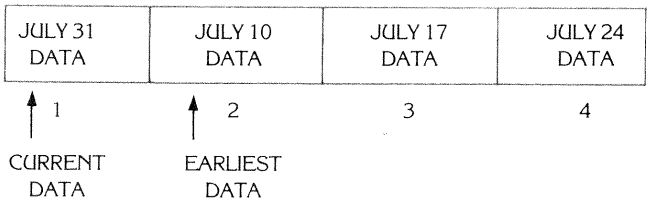


Diagram 7. Re-organizing the linked list. It is now a sequential file.



a) Circular buffer before update. We want to add July 31 data.



b) Circular buffer after update.

Diagram 8. Circular buffer with four elements.

Circular Buffers

A buffer is usually an area that is used for temporary storage of data. The main difference between a buffer and a file is that a buffer has a fixed length and doesn't expand and contract like a file. A buffer can be used as a sequential file with a fixed number of records. An appropriate use for a buffer would be storing the last 52 weeks of Dow Jones closing information.

Since a buffer is of fixed size, when it gets full any further addition of data necessitates a corresponding deletion. There is a very easy way to accomplish this. Simply replace the earliest data each time new current data is added. Since the most current data can be anywhere in the buffer, a pointer (record number) must be kept to identify it. The earliest data will always immediately follow the latest data if the buffer is full. To read the file sequentially, if the buffer is not full, simply start at the beginning. If the buffer is full, start one record after the latest one, and when the end is reached, "wrap" back around to the beginning of the buffer. That's why it's called a "circular" buffer. When the record number equals that of the latest record, you are finished. *(See diagram 8.)*

A circular buffer can exist in memory, on tape or on disk. A tape or disk file that is a circular buffer can be updated using direct record access; if it is in memory it can be accessed as an array. The advantages of a circular buffer are very easy updating in place, fast sequential access, and easy programming logic. The main disadvantage, of course, is its fixed size. The circular buffer technique is ideal for stock market analysis or other applications in which data is "time-stamped" and file size can be fixed.

On-Line vs. Batch Updating Techniques

In Part 1, a distinction was made between "on-line" and "batch" updating. On-line updating of files is always more convenient because the operator can immediately analyze the effects of the update and correct any deficiencies. The entire updating process can be fully interactive

with the operator. But where file security is important, or access needs to be limited, the on-line update isn't so desirable. Suppose the data base is a corporate general ledger representing all assets and liabilities of the firm. An operator using on-line updating techniques could have a field day "doctoring" the books! Furthermore, the probability of introducing errors into the data base is increased because the same person is both entering and verifying the updates.

Maximum benefit of data base security can be achieved using a batch update, at the loss of some convenience. First, a coding clerk or other person responsible for data base management enters or otherwise provides update data on pre-printed forms. Next, a data entry clerk enters the data into an update file. This used to be done with a keypunch machine onto a punched card file, but now it can be done directly with a personal computer, such as the HP-87, onto a disk file. Then, a different clerk verifies the data by entering it again and comparing it to the original updates. Any errors are corrected by the data entry clerk and re-verified by the verify clerk. Now a computer operator runs the update program, processing all the updates as a "batch". At this time, a "proof listing" should be printed, showing all changes made to the master file. This should be kept to serve as an audit trail.

The principal advantage of a batch update is better data base security because the co-operation of several persons would be required for any "doctoring." Furthermore, accuracy is improved because the person doing the verification is not the person doing the data entry. Any errors can be traced back to the proof listings.

Backups

The importance of maintaining backups of any file system cannot be over-emphasized. In spite of the reliability of modern computers such as the HP-85, humans have an affinity for inadvertantly creating disaster. Consider the following situations:

1. A corporate general ledger file is updated in place, with an on-line interactive update program. Later it is discovered that the updates were for July 1980, not July 1981. All the updates are wrong, and there are a lot of them.
2. A backup is being created by copying one disk onto another. During the process lightning hits a nearby power line, and a voltage spike makes the old master disk unreadable. The new disk is also unreadable because it isn't completed, and its catalog hasn't been updated.
3. A fire destroys the building housing the computers. All hardware and software are lost.

I believe in maintaining at least 3 generations of each data base, each generation on a separate volume. The volumes are typically flexible discs numbered 1, 2 and 3. The disc envelopes are labelled C (child, or current), F (father) and G (grandfather). Whenever a backup is done—by copying the current disk onto the previous grandfather—the disks are rotated in their envelopes. *(See diagram 9.)* After the backup, the discs in the F and G envelopes are moved to another building.

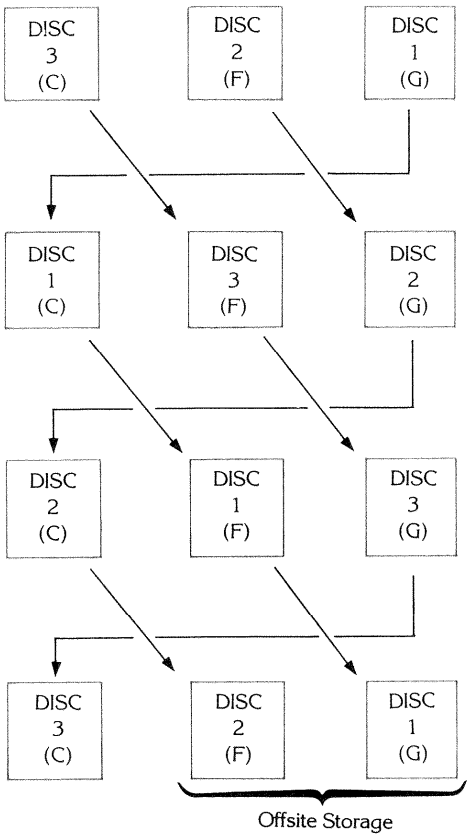


Diagram 9. Backup scheme

New HP Series 80 Customer Training Courses

by Liz Aust and Bill Faus
Hewlett-Packard, Personal Computer Division

Need to come up to speed quickly with Series 80 Input/Output programming or Series 80 Assembly Language? Hewlett-Packard offers two new training courses for you. Hewlett-Packard Customer Training Courses are taught by HP Systems Engineers at fourteen training centers in North America, and at sales offices worldwide when there is sufficient demand.

The Series 80 Assembly Language Course (HP 35047A)

This intensive three-day course introduces Assembly Language programming on Series 80 computers to experienced high-level language programmers (FORTRAN, BASIC, etc.). Previous Assembly Language experience is not required.

The Objective

The objective of the Assembly Language Course is to acquaint you with everything you need to know to write binary programs on Series 80 Personal Computers, including the CPU architecture, the CPU instruction set, the operating system, and I/O programming of the internal peripherals.

Prerequisites

Beyond extensive high-level language programming experience, the only prerequisite for this course is three months of operating and programming experience with a Series 80 Personal Computer. (Or the HP Series 80 Beginner's Course. See below.)

When you register for the course, the Training Center will send you a pre-course study guide with exercises. Completing all of the pre-course work will help you get the most out of the course.

The Series 80 General I/O Course (HP 35046A)

Your Series 80 computer is endowed with a complete complement of interfaces: HP-IB, Serial, GPIO, BCD, HP-IL, and Modem. Simply plug in the ROM drawer (containing the I/O ROM) and the interface module or modules in any of the four slots in the back, and your Series 80 computer becomes a full-featured I/O controller.

The Series 80 General I/O Course is designed to get you up and running quickly by providing short, intensive classroom training from an HP I/O expert. This three-day course covers the general interfacing techniques that can be used with any Series 80 I/O module and explains the most commonly used features of the HP-IB, Serial, GPIO, and BCD interfaces.

What about the I/O ROM?

You will learn to use the 30 BASIC commands provided by the I/O ROM which allow you to perform data transfers, data conversions, interface control, interrupts, and end-of-line branching. In addition you will get "hands-on" experience installing, configuring, connecting, and operating each of the above interfaces. Over half of the class time will be spent in labs working with "live" equipment.

Who Should Sign Up?

Any one with at least three months full-time programming and operating experience with a Series 80 computer. If you are considering an HP Series 80 I/O System for a particular application, this is a good way to learn how the I/O modules can be used for control, storage, and data acquisition.

Ordering Information

Each three-day course costs $480.† To order an HP Series 80 Customer Training Course, contact your local Hewlett-Packard Sales Office. You can even arrange to have a course taught at your office or plant!

The Series 80 Beginner's Course (HP 35048A)

Hewlett-Packard also offers The Series 80 Beginner's Course. This intensive two-day course introduces the fundamentals of operating and programming a Series 80 computer. The Beginner's course is also available through the Sales Office and costs $260† ($220 if you bring your own computer). ■

The Dow Jones News/Retrieval Service

by Curtis Adams, Editor

As promised, in this issue we'll take a close look at the **Dow Jones News/Retrieval Service** and what makes it unique. It's not just the stock ticker—it has many excellent data bases, like stories from *The Wall Street Journal* back to June, 1979, and it provides an extremely powerful search capability to let you extract what you need. Dow Jones News/Retrieval Service does not, however, offer communication services like electronic mail or an electronic bulletin-board.

To put things in perspective, let me point out that Dow Jones is a technological leader in satellite and electronic communications. It was the first company allowed to own and operate satellite earth stations, and it began the interactive News/Retrieval service back in 1974.

Dow Jones & Company thinks of its service as a "productivity tool," especially for today's overworked white-collar executive who generally has too much paperwork, too much reading, and too little time to make effective, accurate, well documented decisions. The News/Retrieval Service provides, in a single place, access to current business news and financial data on:

1. Companies—your own, your customers, your prospective customers, and your competitors—over 6,000 companies are included
2. Industries—approximately 180 industries in all
3. Broader Subject Categories—the federal government, foreign countries, headlines of the hour, Dow Jones averages, monetary news, mergers and acquisitions, executive changes, etc.

With the touch of a few keys you can scan a weekly economic summary, the headlines of major news stories from the current day's *The Wall Street Journal*, earnings estimates on over 2,400 companies, current stock prices (just 15-30 minutes delayed from the floor of the Exchange), even sports and weather reports.

The big advantage of information networks in general is that you can receive just the information you want, immediately. Get material for a report, a recommendation, a speech you'll be delivering two weeks from now, or a last minute project you need to complete by this afternoon. If you're tied up in meetings or away on a trip, you can catch up quickly by getting just the information you need.

When news breaks, *The Wall Street Journal* reporters send it to their wire service, and within 90 seconds, it is available to you on News/Retrieval. By 3:00 p.m. Eastern time, you can retrieve much of the news that will appear in tommorow's *The Wall Street Journal*. This advance notice lets you do something about it a day ahead of others.

If you're an investor, the News/Retrieval Service will enable you to expand the number of stocks you watch as well as help you modify your approach to making investment decisions by cutting down on the time it takes you to get key information. Some of the data bases that will help you are highlighted below.

Dow Jones Quotes

In addition to the Dow Jones averages, you can also access current prices (minimum 15-30 minutes delay from the floor of the Exchange) on stocks, options, and corporate bonds, as well as current day updates for U.S. Treasury issues, mutual funds, national OTC quotes, foreign bonds, and government securities.

For investors who want to investigate how a particular issue has done in the past, historical stock quotes for common and preferred stocks and warrants are also readily accessed. Users can call up quarterly and monthly stock prices—including highs, lows, and volumes traded back to 1978.

Media General Financial Services

Dow Jones provides easy access to detailed corporate financial data on approximately 3,200 companies, reporting on revenues, earnings, dividends, price-earnings ratios, and stock price performance relative to market indicators. **Media General** provides customers with information on all companies listed on the New York and American Stock Exchanges, as well as more than 800 major over-the-counter companies. This information is updated weekly. Also offered is composite information on approximately 180 industries.

DISCLOSURE II

This data base provides information on company business and financial information from Securities and Exchange Commission filings, much of which is not found in annual reports. It includes corporate profiles, balance sheets, income statements, line-of-business segment data, fiveyear trends for sales, income and earnings per share, names of officers, directors and subsidiaries, the complete corporate record, and a full 2-year list of documents filed with the SEC.

Corporate Earnings Estimator

Every week Dow Jones News/Retrieval Service provides a consensus of corporate earnings estimates by analysts at 45 major stock brokerage firms. Over 2,400 companies are covered. It offers investors the critical earnings forecast information often available only to large institutions.

Wall $treet Week

The service also provides transcripts from the *Wall $treet Week* television program. You can access electronic transcripts of the program to review shows you might have missed or research and document particular subject areas covered in previous programs.

Weekly Economic Update

Compiled by Dow Jones News/Retrieval writers and editors, this data base provides a broad wrap-up of the past week's economic events and a glimpse of the month to come. There are five separate sections in the survey:

- Executive Summary—a capsule review of the past economic week
- Economic Week—a day-by-day review of economic news and developments
- Statistical Highlights—important economic indicators issued in the past week
- Commentary—insight from leading experts into the economic outlook
- The month ahead—A calendar of key economic indicators to be released during the upcoming weeks

You can access each section separately or retrieve the entire Update.

Money Market Services

Each week, subscribers have access to **Money Market Services, Inc.**'s Weekly Economic Survey. Money Market Services polls economists and money market dealers at forty or more of the nation's top financial institutions, bringing into focus reviews and forecasts of the economy.

Menu Concept

Dow Jones News/Retrieval Service has implemented a Master Menu to provide a quick easy way to access these data bases. The Master Menu is a complete online listing of the information contained in the service, along with easy instructions on how to use it. Just type // and the data base code as it appears in the Master Menu, and you'll be ready to receive the information you desire. Or, if you need help in understanding how to use a data base, just type // and the data base code and HELP, and the instructions will appear on your screen.

Free Text Search

Combing through 3 years of back issues of *The Wall Street Journal* and *Barron's* for specific information could be a formidable task, but free text search software enables you to search the data base using any words, phrases, dates, or numbers contained in the headlines or text. Powerful search statements can be formulated by linking words or phrases together as we shall see.

Dow Jones News/Retrieval Service uses the standard free text search software of **Bibliographic Retrieval Services, Inc.**. This software

incorporates the best features of many online retrieval programs to provide searchers with one of the most advanced online searching systems currently available.

With it, you can quickly search for articles that have to do with:

- Energy
- Energy AND Exxon
- Energy AND Exxon AND Reagan
- Energy AND Exxon AND Reagan AND Alaskan Pipeline

You can be as specific as you want using any combination of words over any period of time.

The two basic tools of free text search are TERMS and OPERATORS. A term is a piece of information you use in a search, like Energy. An operator lets you place conditions on the terms and links terms together. There are two kinds of operators, logical (**AND**, **OR**, and **NOT**) and positional (**SAME**, **WITH**, and **ADJ**). Logical operators are illustrated in the diagram below. As for the positional operators:

- **SAME** retrieves all documents containing the terms in the same paragraph
- **WITH** retrieves all documents containing the terms in the same sentence
- **ADJ** retrieves all documents where the terms are directly adjacent to each other

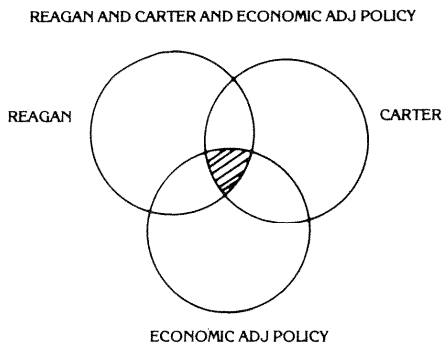
Operators are processed in the following order:

( )
ADJ
WITH
SAME
AND NOT
OR

Paying attention to this hierchy, you can construct search statements like

```
ECONOMIC ADJ POLICY AND
(REAGAN OR CARTER)
```

When you're online, the free text search software assign numbers to your search statements and displays the results of a search immediately after the statement is entered—`RESULT 6`, or `RESULT 25`.



Suppose the search statement above is statement number 1 and you get back `RESULT 1354`. You would probably want to narrow down the search. You can do so by date by typing `..LIMIT/1 DD WL 801001,801231` where `..LIMIT/` is a limit command, `1` is the search statement number, `DD WL` is the date of the publication Within the Limits of, and the six-digit numbers are the dates (YYMMDD).

To view the documents you can type something like

```
..PRINT 2 HL,DD,TX/DOC=1-5.
```

I won't deny that this is cryptic, but it is powerful. What the statement says is "display on my terminal part of the results of search statement number two." The part you'd get would be the headlines (HL), the date (DD), and the text (TX) of the five most recent documents (DOC=1–5).

Let me mention just two more features. To search for all words associated with a word root, type the root and a dollar sign. To view a complete list of roots, type ROOT and the root.

```
1_: TELE$
RESULT 1001

2_: ROOT TELECO
TELECO$
R1    TELECO                    7 DOCUMENTS
R2    TELECOM                 126 DOCUMENTS
R3    TELECOMMUNICATION        18 DOCUMENTS
R4    TELECOMMUNICATIONS      340 DOCUMENTS
```

The root numbers in the left column can be used in searches:

```
3_: SATELLITE$ AND R4
RESULT 2
```

Sometimes it is helpful to know which terms are generating greater or fewer responses. The `SET DETAIL` statement displays the results of each word or root in a query.

```
1_: ..SET DETAIL = ON
SET COMMAND HAS BEEN EXECUTED. RETURN TO CONTINUE.

2_: (CABLE OR SATELLITE) AND (TELECONFER$ OR
TELECOMMUNICATIONS)
CABLE                  371 DOCUMENTS
SATELLITE              215 DOCUMENTS
TELECONFER$
TELECONFERENCING         2 DOCUMENTS
TELECOMMUNICATIONS     319 DOCUMENTS

RESULT 43
```

There's quite a lot more, but this should give you an idea of what kinds of things are possible when you have good search software.

Data Base	Prime Time Rate (Per Minute) Academic and Option A	Prime Time Rate (Per Minute) Personal	Non-Prime Time Rate (Per Minute) Academic, Personal and Option A
NEWS	.67	$1.00	$ .20
QUOTES • Current	.67	.75	.15
• Historical			
CORPORATE EARNINGS ESTIMATOR	1.00	1.00	1.00
DISCLOSURE ONLINE	.83	.83	.83
		(plus $3.00 per 10K extract)	
FREE-TEXT SEARCH	1.33*	1.33	1.33*
MEDIA GENERAL	1.00	1.00	1.00
MONEY MARKET SERVICES	1.00	1.00	1.00
SPORTS REPORT	.67	1.00	.20
WALL STREET JOURNAL HIGHLIGHTS ONLINE	.67	1.00	.20
WALL $TREET WEEK TRANSCRIPTS	.50	.50	.25
WEATHER REPORT	.67	1.00	.20
WEEKLY ECONOMIC UPDATE	.67	1.00	.20

* *.67 academic.*

Usage costs—Tax Deductible

Three different pricing schemes are available from Dow Jones News/Retrieval Service. There's one for personal computer users that has a $50 start-up fee and no minimum monthly charge—you pay only for connect time. There is another for academic customers who pay only for connect time and in addition, can access free text search at half the normal rate.

Business customers can choose Option A. Option A, for high-volume usage, is more cost-effective for users who will access prime time news more than 150 minutes per month. It includes a $50.00 monthly availability fee per location (office). The table above shows costs as of December first, 1981.

Special Offer

Dow Jones News/Retrieval Service will waive the $50 start-up fee for HP Series 80 users until July first! To subscribe, you can call Dow Jones News/Retrieval Service toll free at 1-800-257-5114 (1-609-452-1511 in New Jersey). They'll also answer any questions you may have. To take them up on their special offer, ask for **Bob Teicher**, **Rick Bremble**, or **Nancy Simonet**.

Coming Next Issue

In the next issue of *BASIC EXCHANGE*, we'll focus on the **Compu-Serve** network. Those of you who already have accounts on Compu-serve can reach me by electronic mail at 70000,776.

Also in the next issue, look for an article on using **DIALOG**, the largest technical data base in the world. Yes, you can access that information too with your Series 80 Personal Computer, again with no start up charge and no monthly minimum. ■

HP Wants Your HP-85 Applications

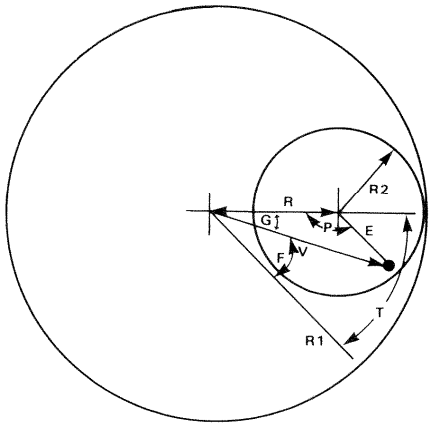
Are you using your HP-85 in a unique way? We're always eager to hear about interesting uses of custom software and applications in all fields. Send your name, phone number, and a brief description of your application to Personal Computer Division/ 1010 N.E. Circle Blvd./ Corvallis, OR 97330/ Attention: Steve Ruddock. HP-85 owners who submit applications judged the most interesting will each receive the Series 80 Application Pac of their choice. ■

Spinning in Circles

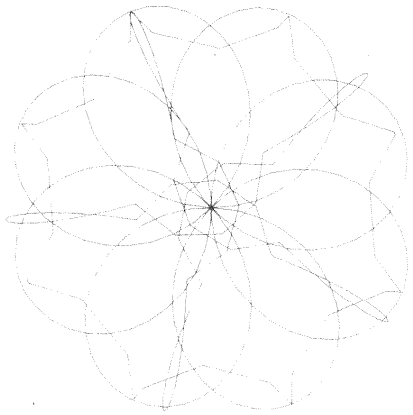
The graphic design for this issue is **David L. Overman** of Silver Spring, Maryland's undertaking. He's confident it would be a front runner in a "most amount of play from the least amount of code" contest. The program generates figures traced by a point on a circle rolling within a larger circle.

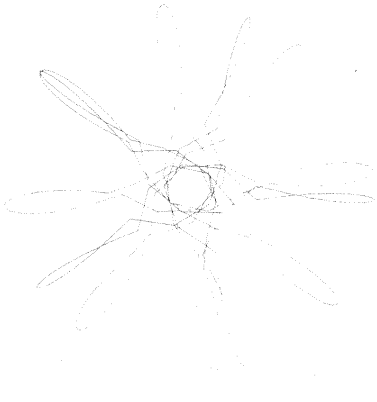
The equations defining the locus appear in lines 80-110 of the program with the variables as shown in the diagram. The designs shown here were created by superimposing separate plots (remove the GCLEAR in line 60) with the following values:

105,63,55		105,63,55
40,35,5	and	40,25,19
40,5, 5		




```
10 DISP "ENTER R1,R2,E";
20 INPUT R1,R2,E
30 R=R1-R2 @ S=R+E
40 SCALE -4*S/3,4*S/3,-S,S
50 ON ERROR GOTO 140
60 PENUP @ GCLEAR
70 DEG @ T=0 @ D=12
80 P=180-T*R1/R2
90 V=SQR(E*E+R*R-2*E*R*COS(P))
100 F=T-ASN(E*SIN(P)/V)
110 X=V*COS(F) @ Y=V*SIN(F)
120 PLOT X,Y
130 IF T#0 AND Y=0 AND X=S THEN
    BEEP @ GOTO 150
140 T=T+D @ GOTO 80
150 MOVE -X*.8,-.7*S
160 END
```





■

Users' Library

New Catalog

The Series 80 Software Catalog has a new look! The latest version is a sleek bound edition rather than loose-leaf. It has been three-hole punched for convenience and is now divided into two categories, Contributed Programs and Application & Software Supplier Pacs.

Library members will receive a totally new catalog with each printing; no lost or misfiled pages, no update filing necessary. Non-members can obtain copies for $10.00† from their local HP dealer or directly from the Users' Library.

Two Bar Code Generation Programs

The Users' Library has two programs for translating HP-41C/CV programs into bar code for use with the HP 82153A Wand. The instructions are entered through the HP-83/85 keyboard and stored on tape or disc. Program number 900-0051, "Creating HP-41C/CV Bar Code using an HP 7225A Plotter" plots the bar code. Program number 900-0028, "HP-41 Bar Code Generation Programs" prints both data and direct execution bar code on an external printer. The only documentation for the latter is the booklet *Creating Your Own HP-41 Bar Code,* part number 82153-90019, and can be purchased for $12.50† from your local dealer. Both programs must be purchased recorded ($6.00 plus media cost) and require the "FORMSB" binary program (900-0023).

Personal Data Management

Jim Donnelly has written another program that's sure to soar up into the top ten. Program number 000-0064, "Personal Data Management Package," assists you in manipulating small amounts of data in a useful, friendly fashion. Using three programs called *CREATE, ACCESS,* and *REPORT,* you can define your data files, enter and update information in the files, and generate printed reports from the files.

The *CREATE* program prompts you for information about the amount and type of data to be stored in a file and then creates the file on the mass storage device.

The *ACCESS* program allows you to enter data into the file and to examine or modify information in the file. In addition, *ACCESS* has the ability to **TRACK** records with certain characteristics. For instance, if the file has a field called "PRICE", you can specify that you only want to see records where the price is greater that $1200. To do so, just type `TRACK PRICE > 1200`. The *ACCESS* program also supports a command called **TOTAL** allowing you to obtain the total for the contents of a field through all the records in the file, subject to the current **TRACK** condition. In addition, *ACCESS* provides a multifield sort capability—a **FIND** command allows you to conduct searches through files for records meeting specific **TRACK** conditions as well as the condition imposed by the **FIND** command itself.

The *REPORT* program provides a friendly method of generating formatted reports on a printer. The program prompts you as to the specifications of the report and then prints the report to a printer or a data file. *REPORT* will generate sub-totals on breaks, grand totals, print page numbers, and auto-format the columns in the report. In addition, the format for the report may be stored on the mass storage device for future use with that data file.

Each field in a record is characterized by its data type and data length. There are four data types: alphanumeric data, numeric data (integer only), numeric data (dollars), and extended data. The extended data type is one of the most powerful features of the package. Data here is computed by the software to be the result of two previous fields in the record. For instance, the field "TOTAL SALE" might be the product of "QUANTITY" and "PRICE". This provides a wide range of capability in asking questions of the data file without ever leaving the *ACCESS* program. The operations supported are +, −, *, /, and %. This field may be viewed but not altered while running *ACCESS.* It is kept up to date automatically and may be the object of any **FIND**, **TRACK**, or **TOTAL** command.

The program requires the following:

HP-85 Computer
16K Memory Module
Printer/Plotter ROM
Mass Storage ROM
Advanced Programming ROM
FORMSB binary program (900-0023)

An external printer is not required but is nice for reports. The program will work with the internal tape drive, but since the data structure is not designed for optimum speed, the wait for the tape drive gets to be very long as the data files increase in size.

The data files maintained by this package are intended to be small. The following specificiations represent the largest amount of data that may be handled.

Field name	1-15 bytes
Field data	50 bytes
No. fields/record	10
Record length	255 bytes
No. records/file	1000

A well written guide with examples is included. The price? $12.00† plus media cost. This is the best excuse yet to buy an **Advanced Programming ROM**.

Top Ten

While these ten programs represent only 3 percent of the programs in the library, they account for almost 20 percent of the sales. If the new catalog leaves you in a quandary over what to order, consider these.

Rank	Program No.	Title	Author
1	900-0022	DGTSAV (Binary)	**Ole Anderson**
2	900-0024	IPBIN (Binary)	**Ole Anderson**
3	900-0043	Screen-Mode Text Editor	**Curtis Adams**
4	900-0025	Teletype Emulator	**Bill Grace**
5	900-0037	Variable X-reference	**James Donnelly**
6	900-0039	GENFED: A File Editor	**J. H. Randall**
7	900-0044	SOURCE COMM	**Curtis Adams**
8	000-0053	Critical Path Analysis	**anon.**
9	900-0027	MINDOC: A Word Processor	**J. H. Randall**
10	900-0038	Line Number X-reference	**James Donnelly**

Remember that the binary programs IPBIN and DGTSAV are included in the Data Communications Pac and also come with the HP 82950A Modem, and the variable and line number cross reference functions are provided by the Advanced Programming ROM. ■

Questions & Answers

Q. Autostart from disc?

A. Both the HP-83 and the HP-87 will automatically load and run a program on disc at power-on, but the HP-85 requires a special tape program to do so. The program's name must be "Autost" and the program consists of just one line: `10 CHAIN "NAME"` (where NAME is the name of the program on disc). Then, to autostart from disc: 1) Insert the disc containing "NAME" and turn on the disc drive. 2) Insert the tape containing "Autost" and turn on the HP-85.

Q. Simulated string arrays?

A. **Dr. Harvey Rosen** of Cleveland, Ohio, has described a programming technique that can be used to simulate string arrays. Essentially he divides a string into a number of substrings of equal length. If `A$` is the string variable name and there are to be `N` elements each `M` characters

long, you would first dimension A$ to N*M. Then to address the I'th element, you would specify A$[I*M-M+1,I*M]. I*M-M+1 is the character position where the substring begins and I*M is the character position where the substring ends.

For example, suppose you need an array of 5 elements (N), each element 10 characters long (M). The following program reads and prints all 5 elements.

```
10 DIM A$[50]
20 M=10
30 FOR I=1 TO 5
40 READ A$[I*M-M+1,I*M]
50 NEXT I
60 DATA "HELLO","GOOD-BYE","YOU
   ","ME","US"
70 FOR I=1 TO 5
80 PRINT A$[I*M-M+1,I*M]
90 NEXT I
100 END
```

This technique uses memory relatively efficiently because the programmer can tailor the size of the "array" and the substring length to fit his data. String arrays, as they are implemented in the Advanced Programming ROM, are even more memory efficient. The length of each element, instead of being fixed, varies and is just long enough to accommodate its string element.

Q. Standard serial interface and data communications?

A. If you have a standard serial interface and want to try data communications, which requires the Option 001 serial interface, all you have to do is change the cable. Order the Option 001 Cable Assembly, part number 8120-3247, from your local dealer or HP sales office. It costs $52.50.† Using an adapter cable won't work because the standard serial interface can't detect a carrier.

Q. Series 80 Users' Newsletter?

A. A new quarterly newsletter for users of Hewlett-Packard Series 80 Personal Computers is now available. Called "News80s", the newsletter provides independent reviews of HP Series 80 hardware and software, feature articles, a beginner's column, and short programs and hints.

Subscriptions are available from Dale Flanagan, News80s, P.O. Box 1329, Redondo Beach, CA 90278, for $10 per year. A sample issue of the newsletter is available for $2.00.

The sample issue has information about the newsletter, a review of the HP Assembler ROM, a beginner's column called "For/Next", and some short programming hints.

News80s plans to publish four times a year, in February, April, August and November.

Q. CBBS phone numbers?

A. Every time I give out a number to call for a list of Computer Bulletin-Board System telephone numbers, the number is no longer in service. The problem is that these lists are hard to maintain. Undaunted, I've put such a list in my files on **The Source** and lowered the security level so you can read it. You still can't write to it, so if you find some numbers that are no longer active or know of some new numbers, let me know. To access the file type TY (12)TCX248>CBBS. The numbers are ordered by area code. There's also a code that identifies those systems with special interest information (amateur radio, medical data, astronomy, fantasy, commodity trading, etc.). There are over a hundred numbers and these systems can all be accessed free!

Q. How can I find other HP users on The Source?

A. We have our own category in POST now! To reach other HP users, just type the POST command and when you're prompted for the category, type HEWLETT-PACKARD. Then you can read messages left by other HP users or leave one of your own.

Q. HP-85 variable allocation?

A. Whether or not variables are stored "allocated" can significantly affect how much tape or disc space a program requires and the time between when your program or subprogram loads or chains and when it executes. Knowing when variables are stored allocated and when they're not enables you to minimize waiting times and conserve mass storage space when you construct your programs.

The process of allocating variables is simply setting aside a place in memory for each variable. Then, when a running program needs to subtract 20 from variable C1, it knows right where to go in system memory to get a numeric value for C1.

When you finish writing a program and press (RUN), the delay that precedes program execution is time taken up by the variable allocation process. You've no doubt noticed that some programs (those with lots of variables or long string variables) take longer to do so than others.

Pause a program and you can read the value of a variable by typing in the name. Edit the program and type in a variable name and—NULL DATA. The variables are deallocated whenever a program is edited and allocated whenever a program is run or stored.

When you dimension or declare common variables at the beginning of a program, you're setting aside that much room in system memory for those variables. You can determine exactly how much space the variables occupy by loading the program and typing PLIST 9999 and then pressing (INIT) and again typing PLIST 9999. The difference between the two numbers displayed after the PLIST operations is the storage space the variables require.

Now let's get down to the details of what happens when you LOAD programs, CHAIN programs, and CALL subprograms. When you load a program, the program and the variables are moved into system memory. When you chain a program that has variables in common, just the program is transferred into system memory. Consequently, the loaded program executes right away while the chained program first allocates variables and then executes.

I've pointed out before (V1N1) that storing programs with variables in common can be used to advantage—considerable storage space can be saved by doing so. This advantage is a trade off against the time the user must wait while the variables allocate.

Subprograms, supported by the Advanced Programming ROM, do not store variables allocated. When a subprogram is called, some seconds pass while the variables are allocated. When lots of variable space is involved, up to 10 seconds may pass. Sometimes you can choose to forgo the wait by, instead of calling a subprogram, chaining a program that doesn't have any common statements. In this case, the variables are stored allocated. Sometimes this is not to your advantage because chaining wipes out the calling program, a more massive operation than calling and scratching a subprogram, which doesn't effect the calling program.

In the HP-83/85, variables are stored allocated in programs without common statements and stored unallocated in subprograms and programs with common statements. The HP-87 acts differently—it allocates variables on-the-fly. The first time the program runs across a variable, it allocates space for it. The advantage of this scheme is that mass storage space is conserved and there is a less noticable delay before a program runs. The first pass through a program takes longer than subsequent passes—there is no getting completely around the time it takes to allocate variables.

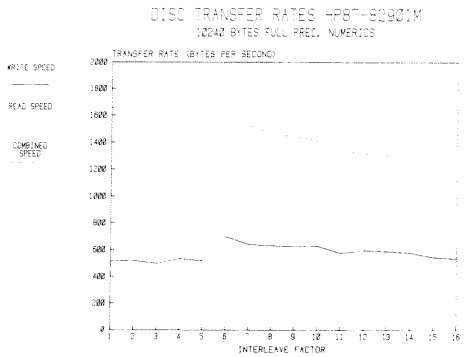
One more note in passing. Some of you are sure to ask "If enough space is allocated for variables by the dimension or common statement, why do I get a memory overflow error when I run my program"? Buffers! Every time you open a buffer with an ASSIGN# statement, another 284 bytes of storage is required (256 bytes of data plus overhead). If you're close to the wire, this can be enough to cause a memory overflow.

A temporary storage buffer is also opened by a READ statement, the length of which is determined by the length of what you want to read in. If, for example, you dimension Z4$ to 10,000 and do a READ# 1,Z4$, 20,000 bytes of storage is involved. If, instead, you read Z4$ in 256 byte substrings, only 10,256 bytes of storage are involved. Not only is system memory conserved by using the substring approach, but programs run faster to boot! And the next topic, by **Keith Marchington**, PCD, shows how, in the case of the HP-87, disc transfers can be speeded up by a factor of 2.5 by using 252 byte substrings.

Q. Optimizing Data Transfers?

A. The interleave factor with which a disc is initialized has a significant affect on disc performance. The graph below shows how disc transfer rates vary with interleave factors. The highest average transfer rate occurs at interleave factor six, but different applications can benefit from different interleave factors. For example, if an application mostly reads the disc, then an interleave factor of 1 or 16 could provide significant increases in program execution speed. In the majority of cases, six is optimal. The HP-87

defaults to this value, but four is the default interleave factor used by the HP-83/85. The Winchester disc is always initialized to 10 regardless of what you specify in the INITIALIZE statement.



String Transfers

Because the size of a string can vary, Series 80 Personal Computers check to see that running over a physical record boundary doesn't occur. To do so, though, the computer has to check every byte as it goes out—a slow process.

You can release the HP-87 from having to make this check by ensuring that strings sent to the disc do not cross a physical record boundary. Simply make each string sent 252 bytes or less. If a string is 252 bytes long, then it, and its three bytes of overhead, will total 255 bytes and won't extend beyond a physical record boundary. Of course, when writing strings in this manner, you must also ensure that each string sent starts at a physical record. If all of this is done, a speed increase of about 2.5 times can be achieved (on the HP-87 only).

Example

Suppose a string A$ is 10000 characters long. It could be printed to the disc like this:

```
10 PRINT# 1 ; A$
```

But since the string is longer than a physical record, the HP-87 is going to spend time checking for record boundaries every time it ships a byte of information. To prevent it from doing this, you could use a loop like this:

```
10 FOR I = 1 TO 10000
DIV 252
20 PRINT# 1,1 ;
A$[ I*252-251,I*252]
30 NEXT I
40 PRINT# 1 ;
A$[10000-(I-1)*252]
```

In this example, each string that is sent out is at most 252 bytes. The computer never has to bother with physical record boundaries and can transfer the data at maximum speed. Granted this is more complicated than simply saying PRINT# 1 ; A$ but for applications that are disc bound (i.e. they spend most of their time accessing the disc while you sit and wait) this type of programming can significantly reduce your waiting and increase the amount of work done. ■

What Is Computer Graphics? Part 3

by Craig Schmidt, Product Marketing Engineer and Virginia Pollack, Senior Technical Writer Hewlett-Packard, San Diego Division

This is the third in a four part series of articles to familiarize you with computer graphics. In the previous two articles we reviewed the history of computer graphics, raster and vector graphics, line graphics, bar graphs, pie chart and good graphics form. In this article we will look into how you can convert your data into graphics form including coordinate systems, color graphics, graphics display units, and scaling.

What is Computer Graphics: Part III takes a more technical approach to computer graphics to help you in understanding what makes up a graphics device. We hope this article will aid you in understanding the internal characteristics of graphics devices, so important when selecting the best graphics product for your needs.

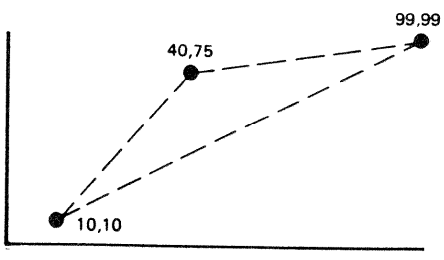
Coordinate Systems

Computer graphics relate a piece of data to a corresponding physical location on the plotting surface. This relationship is always numeric. Even in applications where the graphics have no numeric interpretation, such as the generation of an organization chart, the graphics are placed at a location on the plotting surface by specifying the pen location numerically.

The plotting surface is viewed as a two-dimensional Cartesian coordinate system and, in simple applications, the origin or intersection of the X- and Y-axes is located at the bottom left corner of the plotting area. You can specify any point on the plotting surface as a coordinate pair (X,Y) where the X-coordinate denotes the point's distance along the X or horizontal axis and the Y-coordinate denotes the distance along the Y or vertical axis.

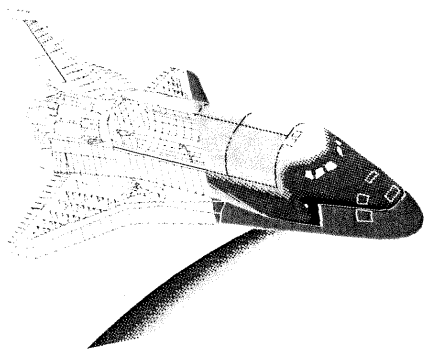
The X- and Y-axes, the origin, and the pairs (10,10) (40,75), and (99,99) are represented below. The three X,Y coordinate pairs represent three points. Connecting any two of these points creates a line and the three lines create a triangle.

Expanding on this, we can represent any figure or figures as a sequence of X,Y pairs, including line graphs, bar graphs, and pie charts.



Color as a Dimension

Recent developments in color graphics have made it possible to add a third or fourth dimension or variable to a plot using color. You have all seen photographs of a hot steel sheet or rod. You know how hot the steel is by its color. Similarly, color variation can be used in graphics to indicate altitude, material density, or any other variable. This use of color is most effective in raster graphics where subtle variations in color can be created. As time passes, color will become more important as a dimension; indeed, it might be called the coming dimension in computer graphics.



Resolution, Repeatability, and Accuracy

The terms resolution, repeatability, and accuracy are important physical measurements that affect plot quality. Resolution concerns the distance between distinct plotter locations. The resolution of a plotter can be no better than the smallest possible move of the pen for a vector device, or the distance between adjacent dots for a raster device. Hence, resolution provides a measure of how smooth lines will appear in a chart, or how round a circle will be, on both raster and vector devices. If the resolution of a plotter is one centimetre, then the points represented in centimetres by (3,1.6) and (3,2.1) are the same location since the Y-coordinate 1.6 is rounded up to 2 and the Y-coordinate 2.1 is rounded down to 2. If the resolution is one millimetre the same two points are five pen movements apart (1.6 to 2.1 cm in 1 mm steps). The resolution of today's vector plotters is much finer than centimetres. The HP 7225B Plotter has a resolution of 0.032 mm (0.000125 in. for those of you who have not mastered metric measure). This means there are 800 plottable points in a one inch line.

Repeatability concerns a vector plotter's ability to return to precisely the same point each time it is commanded to do so. It is affected by both the mechanical operation of the plotter and the uniformity of the pen or pens. Accuracy concerns the relationship between the commanded and actual length of a line. If the plotter is told to draw a two inch line, does the completed line measure two inches? Repeatability

is one factor of accuracy; other factors are related to mechanical tolerances. How do these specifications affect you? That depends on your application. A photoplotter used in the manufacture of printed circuit boards must have extremely high resolution and accuracy. Resolution is always important since it affects line quality. Diagonal lines look perfectly smooth on a high-resolution device, but like a staircase when drawn by a device with less resolution.

Units of Measure

Hewlett-Packard uses the term "absolute plotter unit" (APU) to mean the smallest possible move by the plotting device. On a raster device it is one dot. Thus the graphics raster of the 9845 CRT, which has 455 × 560-dots, has 455 APUs in the vertical direction and 560 APUs in the horizontal direction. A move of one APU in the horizontal direction is to the next raster dot to the right. An HP 7225B Plotter has 6300 APUs in the horizontal direction and 8900 in the vertical direction. One APU is 0.032 mm which is about 1/10 the width of a standard pen.

Just as all Latin scholars know that all Gaul is divided into three parts, all graphic programmers using HP's AGL (A Graphics Language) know that all plotting surfaces have 100 GDUs in their shortest dimension. A GDU or Graphic Display Unit is a relative unit of measure. It varies in length from device to device and, on a given device, it changes each time you redefine the plotting area. You can be sure however, that the shortest side of the plotting area will contain exactly 100 GDUs. A square plotting area will have 100 GDUs in each direction. The length of the longest side of a rectangular plotting area will vary from 100 on upward. If a plotting area is twice as long in one direction as the other, the long side will have 200 GDUs.

By defining this coordinate system that is not related to a specific device, programs can produce graphs on any graphic device without modifications to the program.

Scaling

The process of converting from APUs (Absolute Plotter Units) or GDUs into units suitable to an application is called scaling. The earliest plotters allowed plotting only in plotter units. If your data was in millions of dollars per year for a period of years, you would have to calculate how many plotter units in the X-direction would represent one year and how many in the Y-direction represented one dollar. The computer which drove the plotter was easily able to do this kind of calculation but this was hardly friendly, simple programming. Now most plotters and graphic systems have built-in scaling. You need only say what range of values you wish a certain axis to cover and the plotter or computer will take care of the rest. You might divide the plotting area into 12 units in the X-direction representing months and into 100 units in the Y-direction representing units sold, and ask the plotter to move one unit in any direction. How many discrete pen movements that move takes is of no concern to the programmer. Some plotters only allow integer scaling. The plotter can then only distinguish integer values and all data must be converted to integers.

In Closing

At this point your head is probably swimming with all these technical facts and measurement techniques. Well, relax. This information was intended to help you ask the right questions and understand the answers when selecting the best graphics product for your needs.

In the next article, the last in this series, we'll go into a discussion of those questions which should be asked when selecting a graphics plotting device and a description of the various graphics plotters Hewlett-Packard offers. We hope this article will aid you in evaluating the graphics device which will best meet your needs for the presentation of information in clear and concise graphics form. ■

BASIC EXCHANGE
Spring 1982 Vol. 3 No. 1

Information about new hardware and software, new policies, programming and operating suggestions, further reading, and feature articles. Published four times a year for owners of Hewlett-Packard personal computers.

Reader comments and contributions are welcomed and should be addressed to the editor.

Hewlett-Packard Company
1000 N.E. Circle Blvd.
Corvallis, OR 97330 U.S.A.

Hewlett-Packard S.A.
7 Rue du Bois-du-Lan
P.O. Box, CH-1217 Meyrin 2
Geneva-Switzerland

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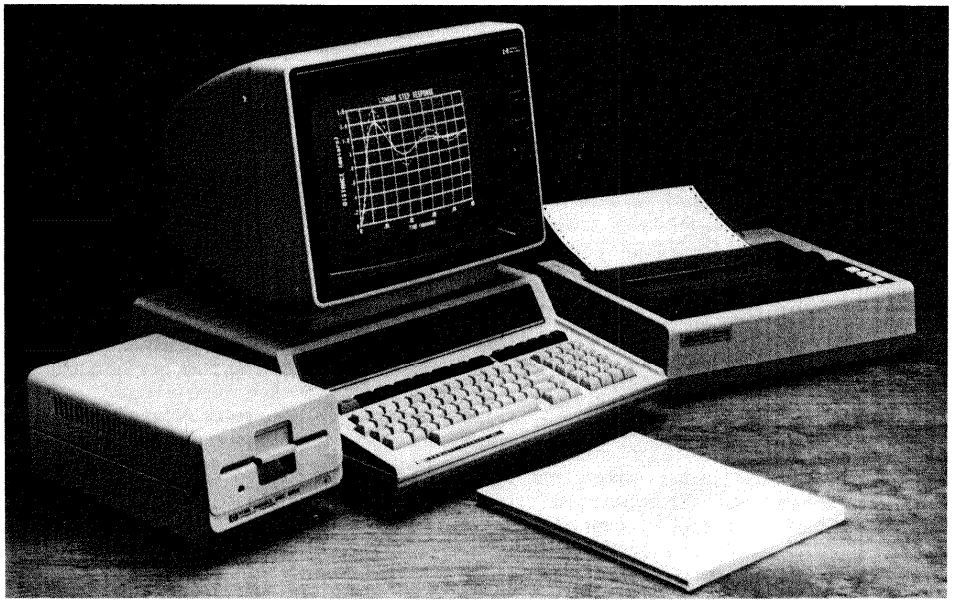
- Voice Recognition
- Using Dialog

HEWLETT PACKARD

basic EXCHANGE

PERSONAL COMPUTER DIVISION FALL 1982 VOL. 3 NO. 2

Two New Personal Computers



Imagine a personal computer with unmatched power—with memory expandable to unprecedented dimensions, with an extremely sophisticated BASIC programming language, and with the ability to command hundreds of available peripherals and enhancements. We call it the HP-87, and we introduced it just last March. Now, imagine the same capabilities in a modular computer with an extremely popular entry price—introducing the **HP-86**.

Starting with an HP-86, you can build a truly personal computation tool to enhance your productivity. Because an HP-86 system is modular, you can add just those pieces that meet your needs.

Now the Series 80 family of computers offers a full selection of products to match any professional's needs—from the all-in-one HP-85 for portable computing power, to the modular HP-86, to the expandable HP-87XM (for extra memory).

The HP-86 has the biggest selection of software ever available on a personal computer, thanks to HP PLUS and software compatibility. The HP-86 is 100% software-compatible with the HP-87, and is upward-compatible from the HP-85. Available software includes word processing, file management, spreadsheet analysis, small business accounting, and communications, as well as more specialized software for everything from linear programming to project management. That's the kind of software you need to be more productive.

The HP-86 shares the other strengths of Series 80 computers as well. Graphics are easy, either on the display or with a plotter for hard copy. Like the HP-87, the HP-86 can run CP/M® software with the addition of the optional CP/M system. And all Series 80 computers have a talent for connecting to peripherals, instruments, or machinery in applications like laboratory automation or machine tool control.

The HP-86 does have some unique features of its own. The HP-86 offers a choice of display monitors, including a large 12-inch display. The HP-86 has 64K bytes of user memory, which can be expanded to as much as 576K bytes. Instead of the HP-IB interface found on the HP-87, the HP-86 has four built-in interfaces, including a video interface, a Centronics-compatible printer interface, and two HP 9130A Disc interfaces. It still has four expansion slots for other interfaces, enhancements, or extra memory.

We invite you to build an HP-86 system for yourself—a system which will enhance your performance as a professional.

The HP-86 retails for $1795†, the display monitor retails for $325 (12-inch) or $295 (9-inch), and the HP 9130A disc drive retails for $860.

HP-87XM—The Premier Personal Computer

The HP-87A made a big splash in the market place back in March with its built-in HP-IB, high-quality display, and the ability to expand to 544K of user memory. Now with the HP-87XM, things have gotten even better. The HP-87XM comes standard with 128K of built-in user memory. You can run all HP software with 128K and in most cases, that's all the memory you'll need for your own applications. By building in 128K of memory, we've opened up an expansion slot. Now you can have the most expandable personal computer available. The HP-87XM retails for $2995. ■

CP/M® is a registered trademark of Digital Research, Inc.

† All prices in this newsletter are U.S. prices excluding state and local taxes. For information outside the U.S. please contact the sales office or dealer nearest you.

New Series 80 Software

File Manager

File Manager is an HP-83/85 applications pac that allows you to create a file structure and enter data into it. Then searching, sorting, reporting, and plotting functions can be performed within that structure. It's a stand-alone pac that can handle up to 1000 records of up to 1000 bytes each. The number of on-line files is dependent only upon the capacity of your disc.

Ease of Use

File Manager is entirely softkey driven. All active commands are displayed at the bottom of the screen. You can execute any command or start any process with the push of a button.

The HP-83/85 File Manager allows you to create and define your own data file structure by letting you create a special data entry form.

You can easily change the structure of your data file and/or the data as your needs change.

There are several versatile output formats. You can output your reports in a line or column format. You can plot the data as a pie, line, fitted curve, or bar graph.

You can search through data on up to 10 conditions. Only the records which meet your specifications are returned.

Then you can sort the records that met the search criteria. The sorts can be alphabetical or numerical, in ascending or descending order. This allows your data to be presented in a logical, easily understood form.

File Manager can find and display any record in a file in seconds. You can perform complex searches and sorts in minutes to get information that previously required days of work.

Reliability

File Manager stores important information on the disc at regular intervals to prevent its loss. If you accidentially press the wrong key or the power goes off, the program can recover most of the data you have entered.

File Manager checks the data type (alphanumeric, numeric) as data is entered. If the type is not correct, the program beeps, writes an error message on the screen, positions the cursor at the beginning of the line where the error occurred, and lets you correct it. Although the software cannot check the accuracy of all your data, it can help minimize the possibility of errors.

Softkeys and Procedures

The following is a brief description of the major procedures:

CREATE—starts the process of creating and defining your own filing structure. The error-trapping and information-recovery aspects of the program are extremely helpful here. If, for example, the file you have defined will not fit on your disc, the program will tell you and let you redefine the size of your file.

REDEFINE—the file and/or record structure can be changed with this function. Elements can be changed, added to, or deleted from the record structure, and even the number of records can be changed. This permits you to change your filing system as your needs change.

REPORT—here you define your search and sort criteria to get the records that answer your questions. REPORT uses the data searched out and sorted to generate line or column reports or to print labels. This section lets you specify how the data is to be printed, so you get the information in a form you can use.

PLOT—takes the information you obtain from search and sort and uses the data for line, bar, fitted curve, or pie charts. This section lets you use graphics to represent your information in an effective visual way.

FIND-REC—this section is similar to REPORT in that it will search out specific records. It lets you call up a single record or search for related records. Then you can examine the records one at a time and print them if you want. It's useful for quick checks.

UPDATE—lets you enter additional data into your records, to modify data that is already in the records, or to delete any of the data in those records.

BACKUP—lets you copy your data files onto a different data disc while the program is running.

CAT—shows a catalog of all the HP-83/85 File Manager data files on the data disc. It is very useful because it lets you look at the contents of your data disc while the program is running.

EXIT—returns to the previous level of the program and eventually exits the program. This function makes it very easy for you to stop the program or to leave the section you are in without losing your data or doing anything to the program.

HELP—explains the function of all the softkeys on that screen. This explanation is on a new screen which can be printed out for later reference. You can return to the original screen simply by pushing the "RETURN" softkey. No changes will have occurred in the program while you were in HELP.

PURGE—deletes data files from the disc.

SHOWFILE—provides a reminder of the structure of your file and the records in it. It shows you the total number of records, how many have been filled with data, and how many have no data.

The VisiCalc® Link

The output section of this software also has an option that allows you to print the sorted information out to a string data file on the disc. A utility included with File Manager translates the string data file into a VisiCalc-formatted data file. Other programs can be written to access the string data file, too. This opens your data up to many, many other applications.

VisiCalc® is a registered trademark of VisiCorp.

Hardware Requirements

File Manager runs on the HP-83 and the HP-85 using either the HP 82901M or the HP 9135 disc drive. It requires the Printer/Plotter, Mass Storage, and Advanced Programming ROMs, HP-IB Interface Card, and the 16K Memory Module. An external printer and plotter are optional.

Ordering Information

File Manager is $200† (product number 88103A). The software is available on 5¼" and 3½" flexible discs.

WORD/80

WORD/80 is a complete word processor for generating memos, letters and reports. The product consists of two parts:

An *Editor* to create, type, print, and store documents.

A *Formatter* to format and print files created with the *Editor*.

The *Editor* features on-screen editing. Special function keys are utilized to select editing capabilities and to access selections for formatting settings. Features include:

Margin and tab settings;
Word wrap;
Global search and replace;
Blocks selectable by lines or by columns;
Block copy and deletions;
Block moves (cut and paste);
File merging and dynamic file size;
Output to printer, display, and disc.

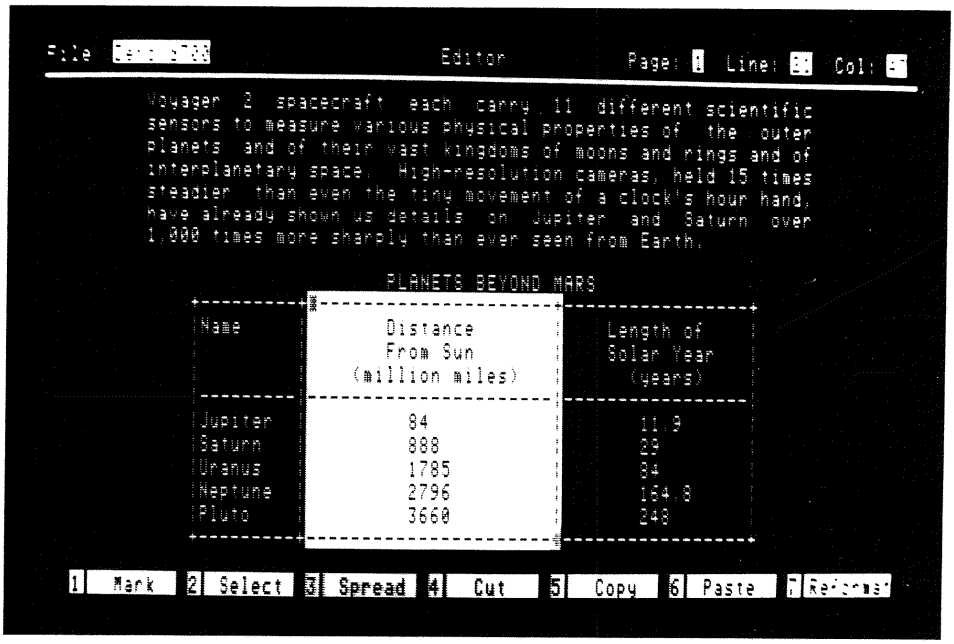
The *Formatter* provides extensive capabilities for document formatting. Some of its capabilities are:

Indentation;
Variable spacing between lines;
Page headings and footings;
Page numbering;
Numbered and unnumbered section headings;
Table of contents printouts of section headings and page numbers;
Underlining, emphasized printing, and printer control codes;
Integration of graphic displays and text;
Chained processing of files;
Support for alternate and foreign character sets.

Hardware Required: HP-86/87, 96K total RAM, Single Disc, Printer for hard-copy output.

Part Numbers: 00087-13319 (3.5 in Disc)
00087-13519 (5.25 in Disc)

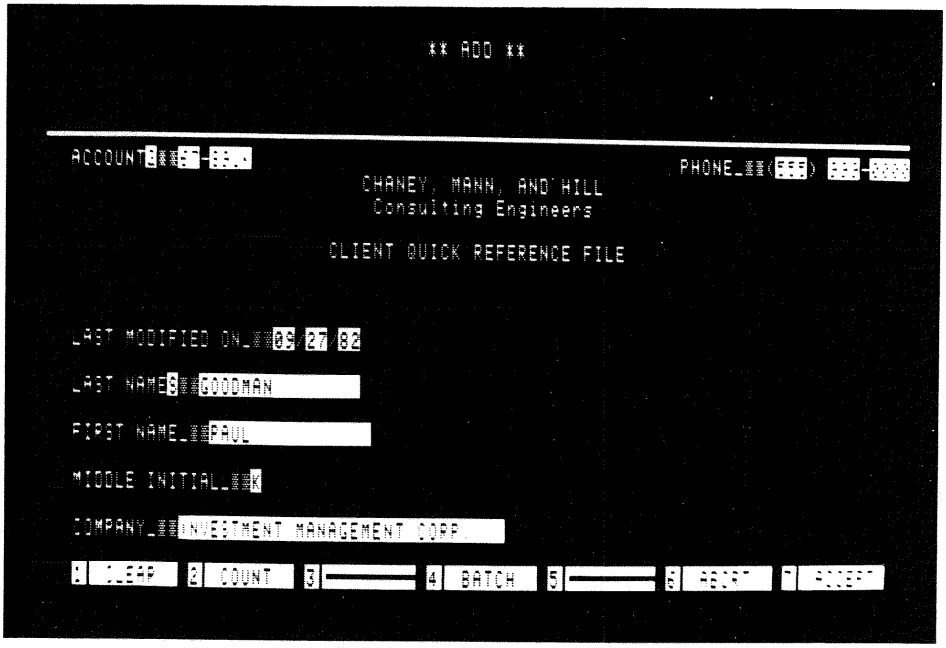
Price: $250.00†



Sample Screen from ***WORD/80***

FILE/80

FILE/80 is a solution oriented file management system that provides an efficient method of managing files and producing useful output from the information contained in data files.



Sample Screen from ***FILE/80***

The product is divided into four functionally oriented sections:

1. CREATE and QUERY: Used to create data files and to access, add, modify and delete information or records from files.
2. OUTPUT CREATION: Used to create output—formats reports, labels, and form letters. Once created, the formats may be stored in a sorted order for future use.
3. OUTPUT GENERATION: Used to actually produce the output that was formatted with OUTPUT CREATION.
4. UTILITIES: Used to redefine a data file after it has been created, i.e., increase the size, add records, or change the format.

Multiple-Indexed Keys, which are selected by the user, offer rapid record retrieval. One unique primary key with up to four fields and four secondary keys with one field each may be identified. Typical record retrievals using these keyed fields are accomplished in seconds.

Hardware Required: HP-86/87, 96K total RAM, Dual Disc, Printer for hard-copy output.

Hardware Required: HP-86/87, 96K total RAM, Dual Disc, Printer for hard-copy output.

Part Numbers: 00087-13320 (3.5 in Disc)
00087-13520 (5.25 in Disc)

Price: $250.00†

HP-86/87 BASIC Training Pac

The new **HP-86/87 BASIC Training Pac** is based on the highly successful HP-85 BASIC Training Pac. The software provides a self-teaching, tutorial approach to learning the operation of the HP-86 or HP-87 and the HP BASIC programming language. By using the HP-86/87 BASIC Training Pac, some users can become familiar with their personal computers more quickly than by reading only the operating manual.

Part Numbers: 00087-13301 (3.5 in Disc)
00087-13501 (5.25 in Disc)

Price: $95.00†

Readers' Applications

Thanks to all of you who responded to our request for interesting Series 80 applications. The many responses received prove that your programming initiative, combined with Series 80 power and friendliness, result in solutions to a broad range of problems.

Series 80 application pacs have been given to the three *BASIC EXCHANGE* readers below, in recognition of their interesting applications. We would like to continue to hear about your uses of Series 80 Personal Computers. From time to time, we'll be awarding more application pacs.

Business Management Model

by William J. Butler, Jr.

A major concern of many companies is the best way to cope with fluctuations in sales. If sales are rising, the demand can be met by hiring additional workers and/or using overtime. Existing inventories could also be used. Conversely, if sales are declining, workers may be laid off or underutilized, and inventories may be accumulated. Each of these actions involves expense. The object is to hold these expenses to a minumum; but which actions to take and when to take them presents a formidable problem.

The program can be used as a management model to find the optimal production and employment schedules for a typical business system. Results are particularly useful to manufacturing companies subject to seasonal and/or unexpected changes in sales and inventories.

Input to the program consists of the company's operational costs, current status, and sales projections for the next 15 months. The program computes the optimal production rates, inventory levels, employment levels, overtime/underutilization for these employees, and resulting costs for the system for the next 15 months. If the company's current employment, inventory, etc. is not optimal, then the solution finds the best transition to the optimal schedule.

The model was first developed by Fred Hanssmann and Sidney W. Hess in "A Linear Programming Approach to Production and Employment Scheduling", Management Technology, 1:46-52, 1960.

After the user has entered the data, the program sets up a Linear Programming system to solve the problem. The LP system is solved by a modified Revised Simplex algorithm, and the solution is used to construct and output the optimal schedules.

Another useful feature of the program is that it lets you solve best-decision problems under "what happens if ..." conditions.

What-if Changes	Program Parameters
interest rates	inventory costs
labor contracts	employee pay
new equipment	productivity
economic cycles	sales predictions

Powerhouse Performance

by Bradford Sherman

I thought you might be interested to hear how the **PG&E Hydrogeneration Department** is using the HP-85 to help evaluate powerhouse performance.

In order to determine efficiency, water duty, head loss, etc., it is necessary to measure the amount of water flowing through the powerhouse as accurately as possible. This is done by injecting a fluorescent dye of known concentration, C, at a known rate, Q, into the water and then measuring the fluorescence of the dyed water after complete mixing of the dye and water has occurred. The diluted concentration, C2, is proportional to the fluorescence and the flow of the water, Q2, is calculated as $Q2 = C * Q/C2$.

The fluorescence is measured with a Turner Designs Fluorometer that outputs an analog voltage. The analog voltage is converted to a digital value by a panel meter connected to the HP-85 using the BCD Interface. Temperature is of critical importance and is measured using a probe that outputs an analog voltage that is converted to a digital value by another panel meter connected to the HP-85.

The HP-85 is used to graphically display the fluorometer voltage versus time so that we can tell when the dyed water has arrived and stabilized at the sampling point. Once the voltage has stabilized, the computer performs data logger/analyzer functions by reading the voltage and temperature once every second and adjusting the voltage by a temperature correction factor. At the end of the sampling period, the HP-85 prints out the mean temperature corrected voltage, mean temperature, and standard deviations for each.

When the sampling process is completed, the HP-85 is used to reduce all the relevant data, calculate turbine efficiency, waterduty, headloss, etc., and print out both tabular and graphical results. By allowing us to calculate the results on the same day of the test, we can isolate errors in the test and correct them immediately rather than having to set up equipment and obtain powerhouse clearances all over again at some later date.

Fully-automated Offshore Surveying

by Allan A. Vasaris

Commonwealth Associates, Inc. uses an HP-85 as the heart of a fully automated offshore surveying system. The HP-85 handles all data acquisition, post-processing, and communication functions for a variety of offshore activities such as charting, sampling, and placement of buoys and other objects.

During data acquisition, the HP-85 controls equipment positioning using the BCD interface for data entry and computing X- and Y-coordinate locations (position) by solving a distance-distance intersection. Depth sounding equipment is controlled through a second BCD interface and this data is recorded on the internal tape drive, together with positioning information and time as provided by the system clock. When specific tracks must be followed in the field, the HP-85 provides steering information in graphic form on the built-in CRT and includes digital values for left/right offset, distance traveled and distance remaining on the track. Additional functions performed by the HP-85 include the generation of "fix marks" on the depth charts using an "ON TIMER" interrupt, real-time CRT plots for precise navigation during buoy drops, printing of times corresponding to automatic fix marks, automatic sensing of depth scales, audible and visual alarms for steering errors outside of specified track tolerances and printing of mission log information on the internal printer. All of these operations (control, read, compute, test, display, print and record) are carried out continuously at a rate of one reading each second.

Post-processing of data includes check plots generated on the HP-85 screen and printed using the "COPY" feature as well as hard-copy printing of all data acquired in the field. These functions often are performed onsite and provide the data verification and data security needed for this type of application.

The HP-85 is also used to provide communication of field data to the home office. For this function, the HP-85 is reconfigured with an HP 82939A Serial Interface and a telephone modem. Data is then sent to another HP-85 at the home office that is connected to an auto-answer modem and running software written for this application. The home-office HP-85 not only provides a low-cost host for receiving data, but is also used for additional data checking and reformatting prior to transmitting the data to Commonwealth's interactive graphics system for final plotting. This is accomplished at a transfer rate of 9600 bps through a direct connection with an HP 82939A Serial Interface.

In general, the versatility and reliability designed into the HP-85 is put into practice in this application. It continues to perform well and provides very cost-effective solutions to this and many of our other computing needs. ■

Personal Data Communications On CompuServe

by Curtis Adams, Editor

As promised in the last issue, we'll now take a look at **CompuServe**. CompuServe is an "information utility" that provides news, financial information, games, electronic mail, and bulletin-boards. Many of you have written asking for a comparison between the various networks with the underlying question being "which one should I get an account on?" My feeling is that you will want to have accounts on several networks—they each have something unique to offer. Otherwise your computer is like a television that gets only one channel.

"But the data bases I need aren't there yet." On a network like CompuServe, the particular data bases available are of less importance than the contacts you can make. Using bulletin-boards, you can easily find people with similar interests and needs. Depending on how specialized your interests are, out of the 25,000 CompuServe users and 20,000 users on THE SOURCE℠, you may locate only five people. But then your *personal data base* will begin to grow exponentially as more and more useful information is referred your way.

Bulletin-boards let you reach people, and electronic mail lets you share files, and point each other to new resources. These are key to getting a handle on the vast amount of information available on computer networks. We've already discussed electronic mail as it is implemented on THE SOURCE, now let's look at bulletin-boards as they are implemented on CompuServe. The figure above is a printout obtained while on line in CompuServe's bulletin-board. (The "*" is a prompt for user input.)

```
CompuServe              Page PCS-7
Please enter HELP if you
need instructions.


*HELP

The CompuServe Information Service National
Bulletin Board is an information exchange
medium.
The following commands are implemented:
        SCAN      READ       INDEX      VIEW
        COMPOSE   POST       EDIT       ERASE
        CHECK     EXIT       AGE        OFF
Commands may be abbreviated to the first 3 letters.
For additional information about a command, type:
HELP command
For example:    HELP SCAN


*INDEX

82  SALE messages
32  WANTED messages
72  NOTICE messages

*SCAN NOTICE BBS

   #       From:    Date:     Keyword:

  25    70165,176  23-Oct-82  BBS/SALE
  49    70075,703  19-Oct-82  BBS
 167    70405,1512 17-Oct-82  NASA-BBS??
 197    70160,240  17-Oct-82  *BBS-LIST*
 307    70210,117  16-Oct-82  NY.BBS
 312    70505,1102 17-Oct-82  BBS

*READ NOTICE 307

 ****************************************
 * Poughkeepsie, NY's Bullet/Plus System *
 * is online with the following features *
 *                 ****                  *
 *      20 different games to play!      *
 *   A data base with over 350 BBS's!    *
 *       A weekly puzzle contest!        *
 *     60 programs in the download!      *
 *              And more!!               *
 *                 ****                  *
 *  C A L L :  9 1 4 - 2 9 7 - 0 6 6 5   *
 *          24 Hours / 7 days            *
 ****************************************

** 307 [70210,117]  16-Oct-82 NY.BBS

*HELP POST

The POST command places messages on the Bulletin Board.
You must have used the COMPOSE command to create a message
in your workspace.  The POST command is entered as follows:
       POST SALE KEYWORD
       POST WANTED KEYWORD
       POST NOTICE KEYWORD
where the KEYWORD is used to classify the message.
Messages will remain on the Board for 14 days.


*COMPOSE

New file 089MCN.TMP created - ready

Any HP Series 80 users out there? Please contact me. Thanks.
Curt Adams
/ex


*POST NOTICE HP SERIES 80 USERS


*SCAN NOTICE HP

   #       From:    Date:     Keyword:

 349    70001,776  28-Oct-82  HP

*READ NOTICE 349

Any HP Series 80 users out there? Please contact me. Thanks.
Curt Adams

** 349 [70001,776]  28-Oct-82 HP
```

More Information

It's risky publishing prices in this fast-moving business. Right now you can get a CompuServe account for about $20.00. Connect time costs about $20 an hour during the day and about $5 an hour at night in the continential United States. More exact prices and international rates can be obtained directly from CompuServe Information Services, Inc./ 5000 Arlington Centre Blvd./ Columbus, OH 43220/ U.S.A. Their phone number is (614) 457-8600. ■

THE SOURCE℠ is a service mark of Source Telecomputing Corporation.

The HP PLUS Program

HP PLUS is a program designed to promote independently developed software solutions for Hewlett-Packard computer systems. The objective of the program is to increase the amount of quality software available. If your business is developing software for personal computers, HP PLUS is a program worth considering.

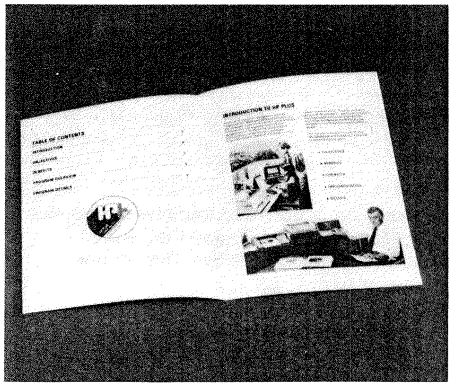
Benefits

The HP PLUS program promotes development of software that complements Hewlett-Packard's products. It also offers many benefits to software suppliers:

- Exposure to HP Customer Base—HP PLUS gives you a way to get your software in front of an ever-increasing number of HP Series 80 owners. Increased visibility means sales to you!
- Association With The HP Image—Hewlett-Packard's long-standing reputation of quality will complement your efforts to maintain a reputation for high-quality products and support.
- Promotion through Software Catalog, Brochures, Etc.—HP will publish summaries of supplier software in the Series 80 Software Catalog. In addition, selected software will be described in brochures, advertisements, etc.
- Development System Discount—Approved suppliers will be entitled to a discount on a Series 80 system to aid them in their software development.
- Support of the HP Sales Force—The HP sales force will actively support suppliers with selected quality software.

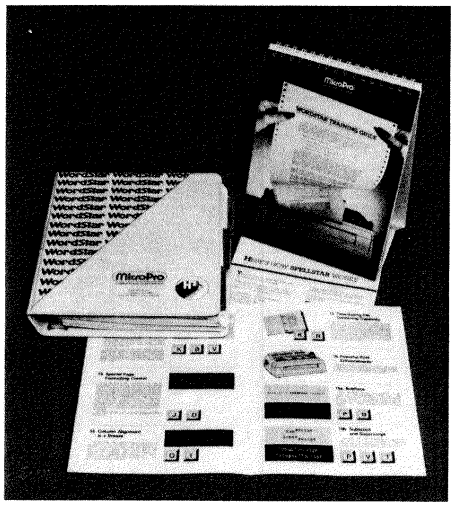
To obtain a packet describing the details of the HP PLUS program for Series 80 Personal Computers, please write:

HP PLUS ADMINISTRATOR
Hewlett-Packard
Personal Computer Division
1010 N.E. Circle Blvd.
Corvallis, OR 97330 ■



HP PLUS Software Spotlight

HP PLUS is a Program for Locating User-proven Software. The following products are among the first to be included in the HP PLUS program.



WordStar™ for the HP-86/87

WordStar is a CP/M based, screen-oriented, word-processing system—the initial entry and alterations are displayed directly on the screen. With WordStar most formatting functions take place immediately, so a true print image is displayed on the screen; what you see is what will be printed.

- Document size is limited only by disc capacity, not by system memory. Portions of text are brought into system memory as required.
- Paragraphs may be entered at high speed—when a word hits the right margin, it is automatically moved to the next line (word wrap). The line just completed is justified (if selected) and redisplayed.
- Search and replace operations can be done on the whole file, ignoring case if desired.
- Page breaks are shown on the screen, making printing for review unnecessary (with minor limitations).
- It is possible to scroll horizontally for documents more than 80 columns wide.
- Pages can be formatted vertically and horizontally.
- Printing options include specifying starting and ending page numbers, use of form feed characters, and printing exact, unformatted, file contents.

To bring you up to speed quickly, WordStar includes a Training Guide; a quick reference card; and a set of adhesive key-top labels to show WordStar functions right on the keyboard. WordStar's features meet most any text editing requirement, and its help sections make it just right for beginners.

WordStar™ is a trademark of MicroPro International Corp.

Accounting Software for the HP-85

DATA-FLEX™ is a recently introduced accounting software package that includes general ledger, accounts receivable, and payroll. It is a friendly system which has been designed for companies with up to 200 employees. The software is menu-driven and has been designed for simplicity, efficiency, and flexibility. An accounts payable module will be available in the future. Some of the features are:

General Ledger

- Up to 400 accounts with 4300 transactions per month
- G/L Transaction Journal, Monthly Trial Balance, Detailed Trial Balance.
- Formattable Balance Sheet and Profit and Loss Statement
- Eighty-Column Reports

Accounts Receivable

- Up to 500 customers with up to 5000 transactions per month
- Monthly Charge Generation, Aged Trial Balance, Customer Statements
- Eighty-Column Reports, Address Label Printing

Payroll

- Up to 200 employees with up to 1600 timesheets per cycle
- FICA tax capability, W-2 printing, tax-table maintenance program
- Manual and automatic checks, check printing capability
- Job cost report, MTD and YTD payroll reports
- Variable over-time rate

DATA-FLEX is very adaptable to small businesses such as engineering consulting firms, high-technology firms, and start-up operations. It is available directly from **Racing Services, Inc.**.

DATA-FLEX™ is a trademark of Racing Services, Inc.

Tax Planning for the HP-86/87

From **Aardvark Software, Inc.**, HP now offers two software packages developed by CPAs for sophisticated tax planning by private individuals and professionals.

The "Professional Tax Plan" is a comprehensive program developed specifically for professional tax consultants to aid in providing clients sound tax-planning advice. It's not a tax preparation program but rather a program to develop a strategy to minimize tax liability prior to completing tax returns. Mid-year revisions and annual updates are provided to assure accuracy and thoroughness.

The "Personal Tax Plan" lets home users calculate the federal tax effects of their income. The program allows users to easily enter tax information and perform "what if" type calculations.

Project Management on the HP-86/87

MILESTONE™ is a CP/M based project management and time scheduling product that uses PERT and CPM techniques to increase productivity. PERT is an acronym for Performance Evaluation and Review Technique. It treats projects as a series of *events* in a time sequence, and is considered an excellent tool for tracking project progress. CPM is an acronym for Critical Path Method. In contrast to PERT, CPM treats projects as a series of *activities* and is used in project planning.

MILESTONE is useful for small project management. It helps project leaders clarify the tasks at hand and helps them communicate ideas and schedules. Small business owners, as well as project coordinators in large companies, will find MILESTONE extremely useful.

More Accounting Software for the HP-85

TAJ™ (The Accounts Journal™), marketed by **Production Data Systems**, fully integrates all the journals needed in small business accounting: general ledger, accounts receivable, accounts payable, and payroll. When a transaction is entered, all relevant journals are updated immediately.

Some accounting software for personal computers requires the user to enter the transaction into one journal, and then change discs or tape and enter it again for other journals. When figures are entered more than once, the chances of making a typing error increase, and the books may be out of balance. With TAJ, the user enters the transaction only once, greatly reducing the chances of making an error.

TAJ was designed to match the way small businesses conduct accounting, so most users will have to make only minor changes in accounting procedures to use the software. TAJ provides the reports a small business needs for consistent, well-presented financial statements and analyses.

In addition to updating the four ledgers, versions of TAJ perform job-costing and translate data into pie and bar charts.

Data Base Management on the HP-86/87

The main purpose of any business data processing is to provide useful information to managers. **dBaseII™** is a system for microcomputers that rivals data base management systems used on mainframe computers. It uses an extremely fast technique for retrieving records and can handle up to 65,000 records per file.

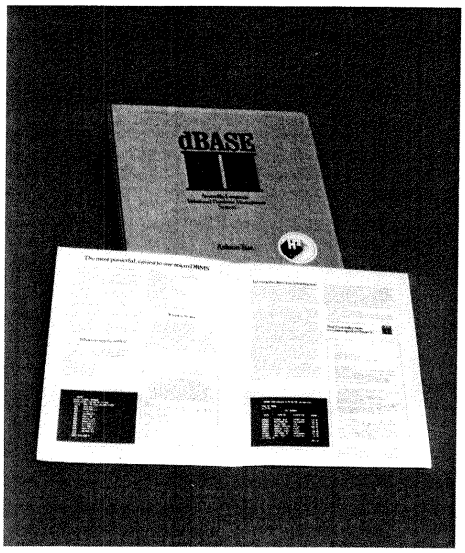
With dBaseII the power of the HP-86/87 can be extended to perform jobs that were previously reserved for larger mainframes. Here is a partial list of applications:

General ledger, all forms of business accounting
Journal of accounts
Accounts payable
Sales tax records and calculations
Check management and writing
Investment data
Inventory control, valuation, and reporting
Job costing, preparation of bill of materials
Document indexing/cross referencing
Appointment scheduling
Mailing labels
Form letters

Data base creation and entry is quick and convenient. Once a data base has been created, it can be worked with on line, interactively or under the control of a user-written programs. Programs are written using English-like dBaseII commands. Most commands are verbs, supplemented with programming structures that make it easier for non-programmers to assemble clear programs.

The ability to manipulate data is one of the most powerful features of dBaseII. Records can be accessed sequentially or by a sorted index file. The files themselves can also be sorted. Accessing a record in the maximum size file (65,000 records) takes only seconds.

There are two manuals for dBaseII. The first is a tutorial/reference manual that was written by a user—not a programmer! It describes in non-technical terms the features, commands, and use of dBaseII with specific examples. The second is a reference manual of in-depth explanations that can be used as a quick reference guide for those who are familiar with the product.



DATEBOOK II™ for the HP-86/87

DATEBOOK II is a CP/M software package for the HP-86/87 that enables you to manage time with an electronic appointment book. The software package has a large enough appointment capacity for doctors' offices, legal firms, business executives, and other professional offices where time management is critical to efficiency.

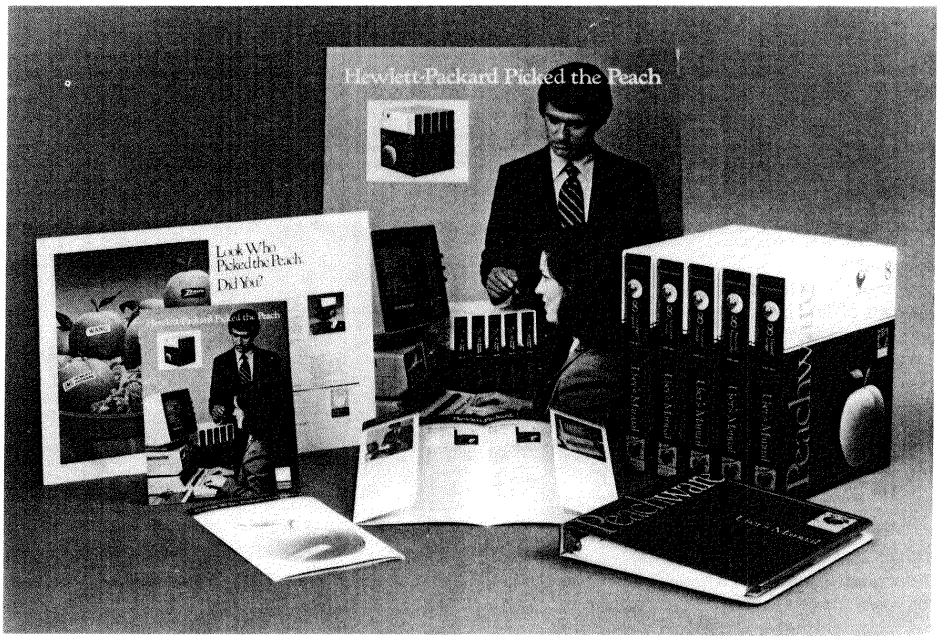
DATEBOOK II ends unnecessary scribbles and erasures in paper appointment calendars. A clean printout of appointments can be obtained at the beginning of each day or on demand. Paging through the book in search of a specific opening is no longer necessary. You can instantly find an appointment slot when clients call, and precious time is not wasted by improperly recorded cancellations. Appointments can automatically be scheduled, cancelled, modified, moved, or held until they can be rescheduled. You can search for openings by specific time of day, day of week, or day of the year, display all scheduled appointments for any person and print the day's appointments. It can also be used to schedule conferences at a time when it is most convenient for the scheduler and the attendees.

MILESTONE™ is a trademark of Organic Software, Inc.

The Accounts Journal™ and TAJ™ are trademarks of Production Data Systems.

dBaseII™ is a trademark of Ashton-Tate.

DATEBOOK II™ is a trademark of Organic Software, Inc.



Peachtree Software for the HP-86/87

8 Series Accounting Software

Peachtree Software Incorporated, an industry leader in microcomputer software, has customized their 8 Series Accounting Software for the HP-86/87. Written in HP BASIC, these five linked packages—GENERAL LEDGER, ACCOUNTS RECEIVABLE, ACCOUNTS PAYABLE, INVENTORY CONTROL, and PEACHPAY™ PAYROLL SYSTEM—provide complete accounting control for the small businessperson or business manager. Each package can run separately or in combination to provide a comprehensive accounting system.

Peachtree offers friendly, menu-driven programs that take advantage of the HP-86/87's special-function keys. Each accounting package has a common program design, includes a built-in data recovery program, operator and controller password security, automatic disc backup capability, and extensive audit trail and control reports. Complete documentation with blank input forms and built-in sample data help the user come up to speed quickly. And, Peachtree supports both floppy and hard disc drives.

9 Series Office Productivity Software

Peachtree Software Incorporated has also formatted their CP/M Office Productivity Software for the HP-86/87 and HP 125. PeachText™ Word Processor, Spelling Proofreader, Mailing List Manager, and PeachCalc™ Electronic Spreadsheet are all available directly from Peachtree (404-239-2045).

WRITE/IDEA for Series 80

WRITE/IDEA is a text editor for the HP-85 or the HP-86/87 marketed through the HP PLUS program by **Threshold Software, Inc.** It:

- turns your computer into a portable word processor
- provides quick, convenient, single-touch editing commands
- features full cursor control, global search/replace, block moves
- text centering and justification
- provides flexible format commands for professional-looking documents
- works with all Series 80-compatible printers and the HP 7470A Plotter

It's a flexible, sophisticated, easily-mastered word processing system. Let's zoom in on some of its features to see how this editor differs from others.

Everything you type is saved as one long string, so that what you see on the screen is a wrapped-around version of what will be printed later. The benefit here is that you can enter text quickly, ignoring the screen width. You don't ever have to press (END LINE) at the right margin. Instead, you specify the end of a paragraph by pressing the (CONT) key. You would also use the (CONT) key to cause lines to be skipped when the text is printed out.

Tabs—the (SCRATCH) key tabs the cursor over from the last end-of-paragraph mark. There are nine tabs at 8, 16, 24, ... 72 unless you set them otherwise. For decimal tabbing (where the decimal points line up), you can press (END LINE) after tabbing and typing a number.

Text Size—displayed at the bottom of the screen is the number of words typed and the number of words remaining before the memory is full.

File Replace—to replace many words all at once, you can create a file of substitute pairs. You would create this file using WRITE/IDEA and store it with an "X" in the file name to mark it as a replacement file. In operation you would write a letter using the first words in the pairs (like name1). Then you would enter Replacement File mode and provide the replacement file name. The replacements will be made and you can edit or print the text in memory.

After printing a "personalized letter," you can substitute the keywords back into the text, so you can use another replacement file on the same letter. WRITE/IDEA uses the replacement files in reverse when you put a minus sign in front of the file name. If you wanted to send the same letter to many people, it would become tedious replacing, printing, and un-replacing key words. However a Master File can be created to automate this procedure. The Master File simply contains file names. During execution, the system sequentially gets the files, uses them as replacement files if the file name contains an "X", prints them, and un-replaces them until the end of the Master File is reached. If a file name doesn't contain an "X", it will replace the file in memory, so you can use the master file to print multi-page/multi-file letters with or without replacement. ■

PeachPay, PeachText, and PeachCalc are trademarks of Peachtree Software Incorporated, an MSA Company.

Software Supplier Summary

DISTRIBUTED

Name	HP Part No.*	Supplier	Operating System
Professional Tax Plan†	00087-16005	**Aardvark Software, Inc.**	CP/M
Personal Tax Plan†	00087-16006		
General Ledger	00087-16010	**Peachtree Software, Inc.**	Series 80
Accounts Receivable	00087-16011		
Accounts Payable	00087-16012		
PeachPay Payroll	00087-16013		
Inventory Control	00087-16014		
TAJ I-85 (The Accounts Journal)	00085-16001	**Production Data Systems**	Series 80
WordStar	00087-16001	**MicroPro International Corp.**	CP/M
MailMerge	00087-16002		
SpellStar	00087-16003		
dBASE II	00087-16004	**Ashton-Tate**	CP/M
Milestone	455 80A OPT 650	**Organic Software, Inc.**	CP/M
Datebook II	455 81A OPT 650		

REFERENCED

TAJ I-87	**Production Data Systems** 2386 Fair Oaks Blvd. Suite 210 Sacramento, CA 95825 (916) 484-0155	Series 80
Data-Flex Payroll, Accounts Receivable, and General Ledger	**Racing Services** 1555 River Park Dr. #213 Sacramento, CA 95815 (916) 929-1517	Series 80
ADS—Inventory, Payroll, Accounts Receivable, Accounts Payable, and General Ledger	**ADS Business Software** 3016 Franklin Rd. S.W. Roanoke, VA 24014 (703) 774-9270	CP/M
SuperCalc	**Sorcim Corporation** 405 Aldo Ave. Santa Clara, CA 95050 (408) 727-7634	CP/M
Chemical Engineering Pac I (HP-85) Flow Network Analysis (HP-87)	**Kelix Software Systems** 425 Daventry Dr. Baton Rouge, LA 70808 (504) 769-6785	Series 80
Analysis & Design of Digital Filters & Discrete Time Systems Linear Systems Analysis & Feedback Compensator Design	**Parametrics, Inc.** 1129 W. Oak Ft. Collins, CO 80521 (303) 221-3163	Series 80
3-D Projections, Earthwork, Contour Mapping, Topography, and Profiles & Cross Sections	**PacSoft** 733 Seventh Ave. Kirkland, WA 98033 (206) 827-0551	Series 80
HP-86/87 Site Computation and Development	**Land Innovation** PO Box 50662 Dallas, TX 75250 (214) 234-6636	Series 80
WRITE/IDEA 85 WRITE/IDEA 86/87	**Threshold Software** 1832 Tribute Road, Suite E Sacramento, CA 95815 (916) 920-8189	Series 80

** 5¼" media part numbers. See the Series 80 Price List for 3½" media part numbers.*

† Also available on the p-System. See the Series 80 Price List for part numbers.

Go FORTH

by Tom Houser, Hewlett-Packard Personal Computer Division

If you want to get the most performance from your system without using a compiled or assembly language, take a look at FORTH. Version 3.3 is now available from the Series 80 Users' Library (#900-0040), replacing version 1.4.

FORTH was designed by Charles Moore in 1970 for controlling telescopes. Now it's installed in over 25,000 computers worldwide. It offers a unique combination of features:

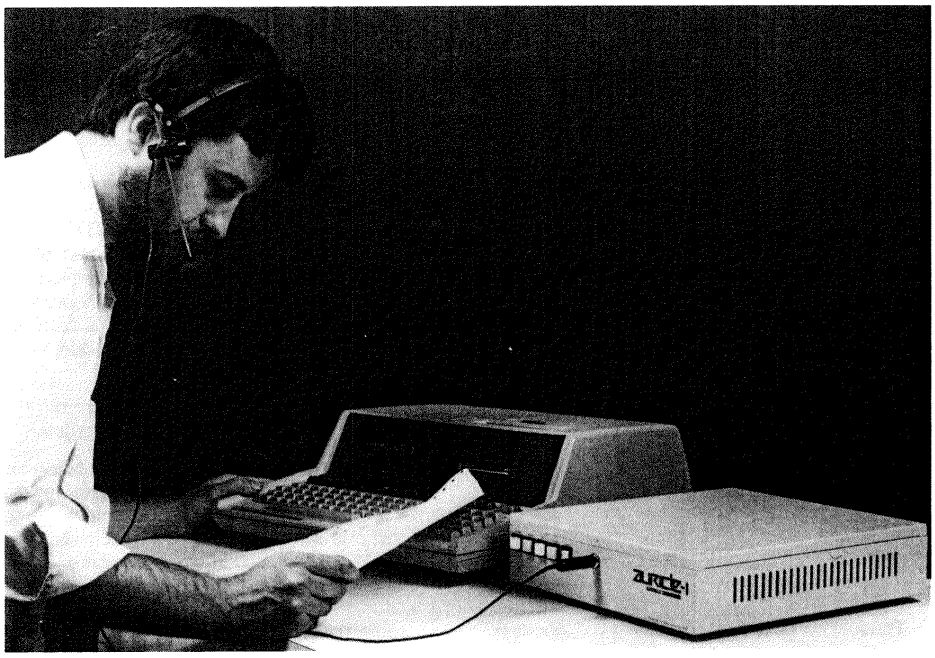
1. It's easy to learn; unlike most programming languages, the syntax is simple and regular.
2. You can create large programs by building on previously written programs in a hierarchical fashion. You can develop the "primitive" functions first and test them interactively. They tend to be quite small, so they can be thoroughly tested. Languages with these features are known as extensible programming languages.
3. Lacking some of the qualities of other extensible languages such as LISP, FORTH redeems itself by being very fast and space efficient.
4. FORTH provides an interactive, interpretive environment for developing applications. It permits a programming style different from that of a procedurally-oriented language such as Pascal.

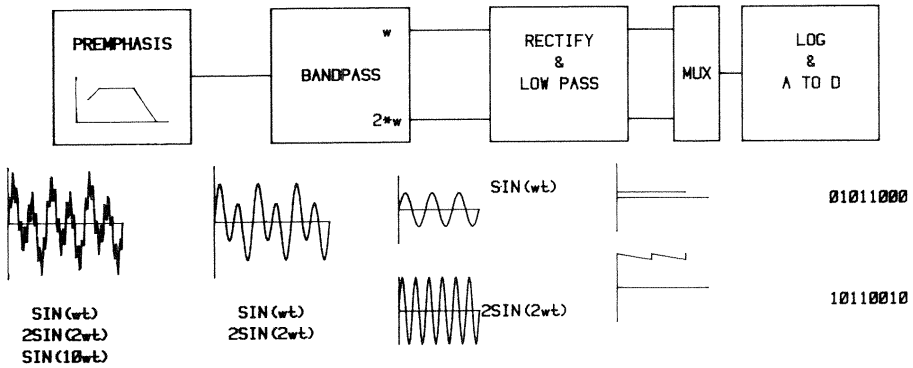
Joe Pehoushek, an HP-85 user in Cincinnati, Ohio writes "HP-85 FORTH, a version of FIG-FORTH, allows you to tap into the HP-85 system functions, saving time and energy by capitalizing on existing assembly language functions. To do so, you only need to refer to the GLOBAL file listing of system addresses found in the Assembler ROM Manual. There are two excellent references for learning more about FORTH, the August 1980 issue of *BYTE*, and 'Starting FORTH', by Leo Brodie, published by Prentice-Hall. I would encourage you to try FORTH. Although it seems difficult, it is quickly learned because of its interactive, building-block nature." ■

Voice Recognition

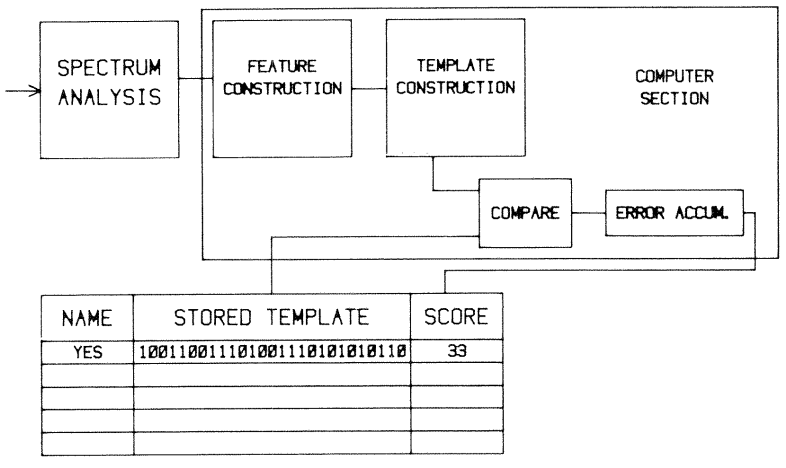
Threshold Technology, Inc. has recently introduced a voice recognition system for Series 80 Personal Computers. Threshold's **Auricle-1** is a self-contained system that allows you to incorporate voice control in your BASIC programs.

The Auricle-1 is speaker dependent—each user "trains" it by repeating words three times. Then, during program execution, the Auricle-1 can respond to up to 80 words.





SPECTRUM ANALYSIS



A TYPICAL SYSTEM

How It's Done

A voice recognizer consists of a spectrum analyzer and a computer. Spectrum analysis is a real-time analog filtering process that breaks the voice signal into 16 bands of energy, spaced across a 5 Khz bandwidth. First though, the high frequencies are eliminated by low-pass filtering. Then each of the 16 channels is rectified and low-pass filtered again with very long time constants. These long time constants smooth the data while preserving the important features of speech. Finally, the data is log compressed and converted to an 8-bit value.

During training, features are extracted and "templates" are constructed and stored as reference patterns. During recognition, a comparison is made, and the word with mimimum mis-match is selected.

Applications

Hands-busy data entry. Imagine an operator in the QC department visually inspecting a printed circuit board, performing a "spoken" inspection:

"AP 200671" (the serial number)
"enter"
"solder mask"
"location"
"U 1 5"
"scratched"
"next"

He never has to set the board down, his eyes never have to leave the "defect." The data is entered directly into the computer, minimizing errors like transposing numbers.

Data entry by people unskilled in using keyboards. A good example might be entering inventory transactions into the computer on the night shift, where operator turnover is high. Just one 30-minute training session stores 80 words for a new operator. The operator can then speak the records into the system as:

"item number", "1", "7", "capacitor", "quantity", "1", "0", "8", "8", "to project", "7", "7", "4", "next"

After speaking the line entry, a visual check could be made for validation, and if everything were correct, the operator would speak "enter".

Computer use by the handicapped. Those who can't type can still produce written output at about 60 characters per minute by training "alpha" (a), "bravo" (b), ... "zulu" (z), "space", "point", "carriage return", etc.. They can load programs, enter text, edit errors, and print results, all using voice input.

Programming

The binary program that comes with the Auricle-1 provides BASIC keywords that can be used in BASIC programs. For example, a program to train and recognize the 10 digits could be coded as:

```
10 FOR I=0 to 9
20 A$=VAL$(I)
30 ADDWRD A$, "SAY "&A$,1
40 NEXT I
50 A$=RECOGNIZE (1)
```

```
60 DISP A$
70 GOTO 50
80 END
```

You can create "voicekeys" as follows:

```
10 ADDWRD "ACT", "SAY AC
TEST",2
20 ADDWRD "DCT", "SAY DC
TEST",2
30 ADDWRD "FCT", "SAY
FUNCTION TEST",2
40 ADDWRD "TCPT", "SAY
TEST COMPLETE",2
50 A$=RECOGNIZE (2)
60 IF A$="ACT" THEN GOSUB
200
70 IF A$="DCT" THEN GOSUB
300
80 IF A$="FCT" THEN GOSUB
400
90 IF A$="TCPT" THEN GOSUB
600
100 GOTO 50
600 END
```

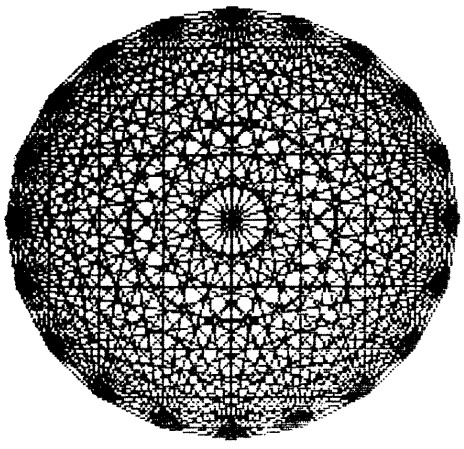
For More Information

Contact Threshold Technology Inc./20823 Stevens Creek Blvd./ Cupertino, CA 95014/ U.S.A.

The Auricle-1 retails for 2480^{+}, but Threshold Technology is offering a special 90-day promotional price for BASIC EXCHANGE readers of $995 (U.S. only). The price includes the Auricle-1, Microphone, Operator's Manual, and Binary Program. Quantities are limited to one per customer. ■

Straight-line Design

Richard Falk of Hillsborough, California contributed the graphic design for this issue.



There's a good chance you've seen this design before; it's kind of a classic. If you wondered how it was done, here's the program.

```
10 RAD
20 SCALE 0,255,0,191
30 PEN 1 @ GCLEAR
40 CLEAR @ DISP "NUMBER OF POIN
   TS";
50 INPUT N
60 FOR T1=0 TO 2*PI-.001 STEP 2
   *PI/N
70 FOR T2=T1+2*PI/N TO 2*PI-.00
   1 STEP 2*PI/N
80 MOVE COS(T1)*95+127,SIN(T1)*
   95+95
90 DRAW COS(T2)*95+127,SIN(T2)*
   95+95
100 NEXT T2
110 NEXT T1
120 BEEP 200,200
130 END
```

■

Miscellaneous News

Free Connect Time

The HP 82950A Modem and the Data Communications Pac now come with an hour of free connect time on **THE SOURCE** and an hour of free connect time on **Dow Jones News/Retrieval Service.** Instructions for obtaining passwords to use these trial subscriptions are enclosed with the products.

EASY-LINK^{SM}

Series 80 users who have communications capabilities can now use Western Union's new electronic mail service called "EASY-LINK". The service provides store and forward messaging for subscribers of TELEX I, TELEX II, and international TELEX services from Western Union. You can send a TELEX or TWX right from your desk or your home using telephone lines! For more information, contact Western Union. In the United States, call **Mr. R.J. Destefano** at (201) 825-6225 or write Western Union Telegraph Company/One Lake Street/Upper Saddle River, New Jersey 07458/U.S.A.

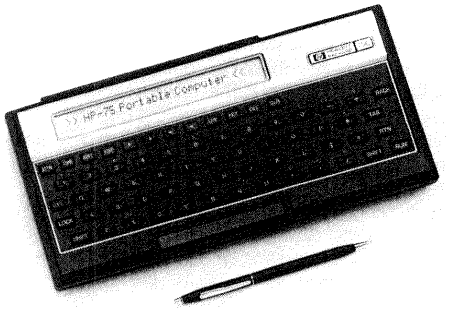
Computer Journal of PPC

PPC is a non-profit corporation dedicated to personal computing that has been supporting HP calculators for close to ten years. With the advent of *Computer Journal of PPC*, the club is now supporting Series 80 Personal Computers and the new HP-75. For a free sample issue, send a self-addressed, stamped envelope (9- by 12-inches with 3-ounce postage) to PPC/2545 W. Camden Place/Santa Ana, CA 92704/U.S.A. There is a one-time, eight-dollar membership fee and a subscription fee of 25 dollars per year for the Computer Journal and 25 dollars per year for the Calculator Journal.

***BASIC EXCHANGE* Volume 4, Number 1**

The editor will be on leave for the next three months, so the next issue of *BASIC EXCHANGE* will follow approximately six months behind this issue. In that issue, we'll take a look at the new **HP-75C Portable Personal Computer** and the new **Series 200, Model 16 Personal Technical Computer**, as well as new hardware and software products for Series 80 Personal Computers. ■

The HP 9816, based on the Motorola MC68000 microprocessor



The HP-75C BASIC Computer

Series 80 Mass Storage Transfer Rate Chart (K Bytes Per Second)

	HP-83/85		HP-86/87	
Mass Storage Type	**Data**	**Programs**	**Data**	**Programs**
Internal Tape	.08	.66	N/A	N/A
HP 82901	.37	2.7	.62	2.9
HP 9895	.45	3.9	1.1	4.1
HP 9134	.5	5.7	1.25	6.2

EASY-LINK^{SM} is a service mark of Western Union Telegraph Company.

Users' Library

Did you know that almost all of the programs in the Series 80 Users' Library in Corvallis are also available from the Library in Geneva, Switzerland. Readers in Europe should order from Geneva (address on back cover) to get quicker service.

Most of the English-language programs in the European Users' Library are also available from Corvallis. A great example is Polynomial Curve Fit by **Dr. Henrique E. Adler** of Porto, Portugal. This program became a best-seller in *KEY NOTES*. It was written by **Dr. Adler** for the HP-67 and then re-written for the HP-85. *POLFIT* is program number 95176 in the European Users' Library and costs 50 Swiss Francs (cartridge or disc included). It's program number 300-0051 in the Series 80 Users' Library and costs six dollars.

POLFIT approximates a function defined by a set of equally or unequally spaced data points by a polynomial of up to 9th degree. It uses a least squares method and Legendre Polynomials for computing the polynomial coefficients, the squared-error sums for all degrees, and the real mean error. It provides a fully automatic plotting routine, automatic choice of the "best" degree, an optional smoothing routine, a choice between two integration methods, and routines for quick computation of optimized polynomials of different degrees and for projections. Input data are saved so new runs with different conditions can be easily made. Output options include tables or graphs. It accommodates a maximum of 150 data points.

The second user-contributed program we'll review in this issue was written by **Dr. David Kosowsky** of Needham Heights, Massachusetts. Called *Series 80 Text Editor,* it's a revision of and a substantial improvement over the popular *Screen-Mode Text Editor* (900-0042). It permits the simple creation and editing of text with lines that are 32 or 64 characters long. The 64-character option is for use with an external printer. All the normal editing features built into the HP-85 are available during text entry. In addition, you can insert, delete, and number lines; display, read, print, and pack text; and move blocks of text. The program manipulates a full page of 60 lines at a time.

Series 80 Text Editor is program number 900-0072 in the Series 80 Users' Library. **Dr. Kosowsky** has also written *HP-87 Text Editor,* which adds tabs, underlining, file merging, and string searching. Taking advantage of the HP-87's (and the new HP-86's) larger memory capacity and screen size, it manipulates lines that can be up to 72 characters long and can work with up to five pages without file storage. It offers a very useful set of features. Both *HP-87 Text Editor,* (program number 900-0073) and *Series 80 Text Editor* cost $6.00. They both require binary programs, *IPBIN87* and *IPBIN,* respectively. You may already have them. If not, they're available for $12.00 each from the Series 80 Users' Library.

No More Subscriptions

You no longer have to subscribe to the Users' Library in order to purchase programs at "member" prices. The library now offers everyone the *Series 80 Software Catalog* for $12.95† ($20.00 outside the U.S. and Canada). The Catalog is a complete guide to the software available for Series 80 Personal Computers. Contributed programs may be purchased from the Library by anyone at what were previously member prices.

Names and addresses of those who purchase the Catalog will be retained so that they can be notified whenever a new edition is printed. If you're currently a member, you'll retain your membership benefits until your subscription expires, including free copies of the Catalogs.

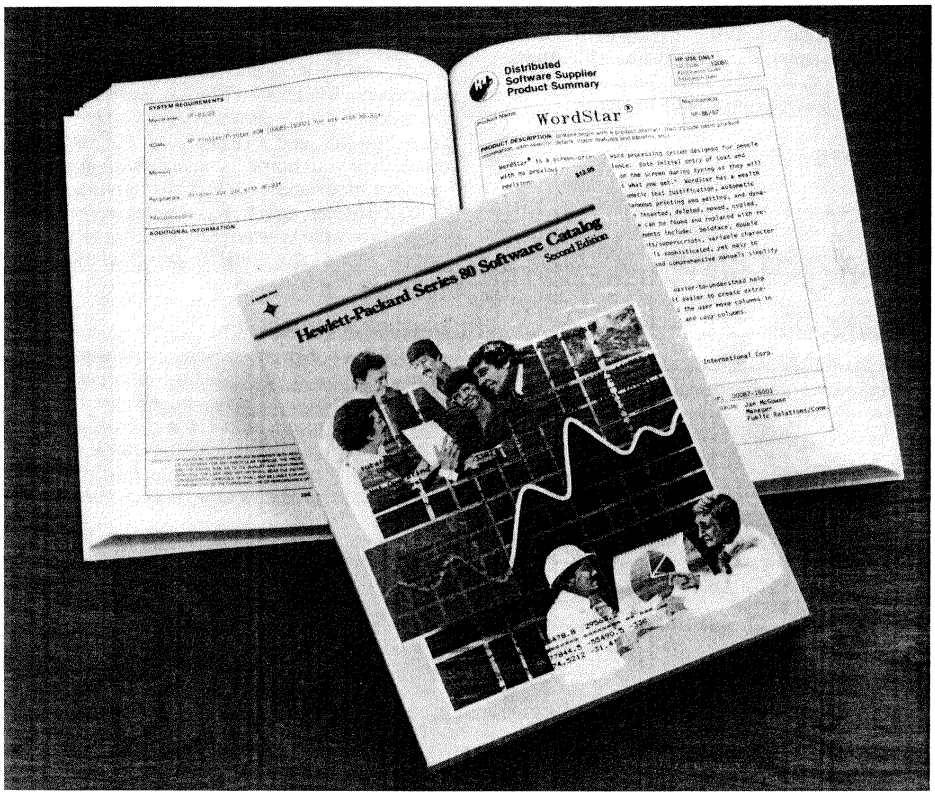
Those of you who would like to purchase the *Series 80 Software Catalog* may do so by sending $12.95 to:

The Series 80 Users' Library
1010 N.E. Circle Blvd.
Corvallis, OR 97330

If you want to charge your purchase to a major credit card, you may phone in your order by calling toll free 1-800-547-3400.

Price Changes

The price of a data cartridge has been raised to $25.00† and the price of a 5¼-inch flexible disc to $15.00. BASIC programs still sell for $6.00 and Binary programs for $12.00. Remember that between 25 and 30 programs can be recorded on a cartridge or disc. If you order as many programs as possible at one time, you will minimize the recording cost per program. Please do not send media with your program orders. ■



Dialog: The Joys and Woes of Free-Text Searching

by Shari Morwood, Information Specialist, Hewlett-Packard

Dialog Information Services, Inc. puts over 150 databases at your fingertips convering almost anything imaginable from microcomputers to coffee, from medicine to professional people seeking employment. The Dialog research project was formed at Lockheed Missiles & Space Company to facilitate the retrieval of references for researchers. Now it's a powerful tool that can become valuable to you.

The data available is so vast it's almost inconceivable. Each database has idiosyncrasies of its own and sometimes special searching characteristics. To know more than one or two databases intimately is difficult. Figure 1 is a list of available databases.

What to Expect

The greatest misconception about Dialog is that it contains the full text of articles. Generally, Dialog has 3 types of databases:

—bibliographic
—directory
—numeric

Bibliographic databases contain references to journal articles primarily. Information includes: author, title, journal citation and an abstract. An example is file 8, COMPENDEX. In printed form, file 8 is better known as *Engineering Index*. Generally, in a bibliographic database one can search by author, journal title, or keywords both "free-text" and "controlled vocabulary". Free-text means you think up the words and controlled vocabulary means there is a thesaurus of controlled terms. That is, articles are indexed using precisely the same terms. For example, an article on stream pollution would be indexed under river pollution.

The directory-type database contains lists. As an example, the Encylopedia of Associations, which corresponds to the printed version of the same name, has 15,000 records on types of groups. You can search by subject, state, specific name or topic. You might want to find all agricultural associations headquartered in North Dakota.

Numeric databases contain actual data. For example, BLS Consumer Price Index, file 175, contains time series of consumer price indexes calculated by the U.S. Bureau of Labor Statistics. The records in this database contain consumer price indexes for various geographic areas and population categories.

Accessing the System

You can access Dialog using your Series 80 Personal Computer and either the HP 82950A Modem or the Data Communications Pac, the serial interface, and a 300 or 1200 baud modem.

Users in the U.S., Canada, Europe and some other non-U.S. cities can access the system through TELENET, TYMNET, or UNINET data communications network services. Users may also choose to dial direct to Palo Alto, California (where the Dialog computers are located) or utilize other services like TWX, international TELEX, WATS or FTS.

ABI/INFORM
ADTRACK
AGRICOLA 79-present
AGRICOLA 70-78
AIM/ARM
AMERICA: HISTORY & LIFE
AMERICAN MEN & WOMEN OF SCIENCE
APTIC
AQUACULTURE
AQUALINE
AQUATIC SCIENCES & FISHERIES ABS
ARTBIBLIOGRAPHIES MODERN
ASI
BHRA FLUID ENGINEERING
BI/DATA FORECASTS
BI/DATA TIME SERIES
BIOGRAPHY MASTER INDEX
BIOSIS PREVIEWS 77-present
BIOSIS PREVIEWS 69-76
BLS CONSUMER PRICE INDEX
BLS EMPLOYMENT, HOURS & EARNINGS
BLS LABOR FORCE
BLS PRODUCER PRICE INDEX
BOOK REVIEW INDEX
BOOKS IN PRINT
CA SEARCH 67-71
CA SEARCH 72-76
CA SEARCH 77-79
CA SEARCH 80-81
CA SEARCH 82-present
CAB ABSTRACTS
CAREER PLACEMENT REG/EXPERIENCED
CAREER PLACEMENT REG/STUDENT
CATFAX: DIR OF MAIL ORDER CATS
CHEMICAL INDUSTRY NOTES
CHEMICAL REGS & GUIDELINES SYSTEM
CHEMNAME
CHEMSEARCH
CHEMSIS 67-71
CHEMSIS 72-76
CHEMSIS 77-81
CHEMSIS 82-present
CHILD ABUSE & NEGLECT
CHRONOLOG® NEWSLETTER
CIS
CLAIMS™/CHEM 50-62
CLAIMS™/CITATION pre-47
CLAIMS™/CITATION 47-70
CLAIMS™/CITATION 71-present
CLAIMS™/CLASS
CLAIMS™/UNITERM 50-62
CLAIMS™/UNITERM 63-70
CLAIMS™/UNITERM 71-present
CLAIMS™/U.S. PATENTS 63-70
CLAIMS™/U.S. PATENT ABS 71-present
CLAIMS™/U.S. PATENT ABS WEEKLY
COFFEELINE
COMPENDEX
COMPREHENSIVE DISSERTATION INDEX
CONFERENCE PAPERS INDEX
CONGRESSIONAL RECORD ABSTRACTS
CRIMINAL JUSTICE PERIODICALS INDEX
CRIS/USDA
DIALINDEX
DIALOG PUBLICATIONS
DISCLOSURE II
DOE ENERGY
DUN'S MARKET IDENTIFIERS 10+
ECONOMICS ABSTRACTS INTERNATIONAL
EIS INDUSTRIAL PLANTS
EIS NONMANUFACTURING ESTAB
ELECTRIC POWER DATABASE
ELECTRONIC YELLOW PAGES-FINANCIAL
ENCYCLOPEDIA OF ASSOCIATIONS
ENERGYLINE
ENERGYNET
ENVIROLINE
ENVIRONMENTAL BIBLIOGRAPHY
ERIC
EXCEPTIONAL CHILD EDUCATION RES
EXCERPTA MEDICA 74-79
EXCERPTA MEDICA 80-present
EXCERPTA MEDICA (IN PROCESS)
FEDERAL INDEX
FEDERAL REGISTER ABSTRACTS
FIND/SVP REPORTS & STUDIES INDEX
FOOD SCIENCE & TECH ABSTRACTS
FOODS ADLIBRA
FOREIGN TRADERS INDEX
FOUNDATION DIRECTORY
FOUNDATION GRANTS INDEX
FROST & SULLIVAN DM²
GEOARCHIVE
GEOREF
GPO MONTHLY CATALOG
GPO PUBLICATIONS REFERENCE FILE
GRANTS
HARFAX INDUSTRY DATA SOURCES
HEALTH PLANNING & ADMINISTRATION
HISTORICAL ABSTRACTS
INPADOC
INSPEC 69-77
INSPEC 78-present
INSURANCE ABSTRACTS
INT'L PHARMACEUTICAL ABSTRACTS
INTERNATIONAL SOFTWARE DIRECTORY
IRIS
ISMEC
JOURNAL OF ECONOMIC LITRATURE
LANGUAGE & LANGUAGE BEHAVIOR ABS
LEGAL RESOURCE INDEX
LIFE SCIENCES COLLECTION
LISA
MAGAZINE INDEX
MANAGEMENT CONTENTS
MARC
MEDLINE 66-74
MEDLINE 75-79
MEDLINE 80-
MENTAL HEALTH ABSTRACTS
METADEX
METEOROLOGICAL/GEOASTROPHYS ABS
MICROCOMPUTER INDEX
MILLION DOLLAR DIRECTORY
MLA BIBLIOGRAPHY
NATIONAL FOUNDATIONS
NATIONAL NEWSPAPER INDEX
NCJRS
NEWSEARCH
NICEM
NICSEM/NIMIS
NONFERROUS METALS
NTIS
OCEANIC ABSTRACTS
ONLINE CHRONICLE
ONTAP CA SEARCH
ONTAP CHEMNAME
ONTAP DIALINDEX
ONTAP ERIC
ONTAP PTS PROMT
PAIS INTERNATIONAL
PHARMACEUTICAL NEWS INDEX
PHILOSOPHER'S INDEX
PIRA
POLLUTION ABSTRACTS
POPULATION BIBLIOGRAPHY
PSYCINFO
PTS F&S INDEXES 72-78
PTS F&S INDEXES 79-present
PTS INTERNATIONAL FORECASTS
PTS INTERNATIONAL TIME SERIES
PTS PREDALERT
PTS PROMT
PTS U.S. FORECASTS
PTS U.S. TIME SERIES
RAPRA ABSTRACTS
REMARC
RILM ABSTRACTS
SCISEARCH 70-73 (subscribers) (nonsubscribers)
SCISEARCH 74-77 (subscribers) (nonsubscribers)
SCISEARCH 78-80 (subscribers) (nonsubscribers)
SCISEARCH 81- (subscribers) (nonsubscribers)
SOCIAL SCISEARCH (subscribers) (nonsubscribers)
SOCIOLOGICAL ABSTRACTS
SPIN
SSIE CURRENT RESEARCH
STANDARD & POOR'S NEWS
STANDARDS & SPECIFICATIONS
SURFACE COATINGS ABSTRACTS
TRADE AND INDUSTRY INDEX
TRADE OPPORTUNITIES
TRADE OPPORTUNITIES WEEKLY
TRIS
TSCA INITIAL INVENTORY
ULRICH'S INT'L PERIODICAL DIRECT
U.S. EXPORTS 78-present
U.S. POLITICAL SCIENCE DOCUMENTS
U.S. PUBLIC SCHOOL DIRECTORY
WATER RESOURCES ABSTRACTS
WELDASEARCH
WORLD AFFAIRS REPORT
WORLD ALUMINUM ABSTRACTS
WORLD TEXTILES

Costs

The most nerve-wracking thing about beginning on Dialog is the expense. The on-line connect charges range from $25/hour for ERIC (educational materials) to $300/hour for Claims

(tm)/Uniterm (chemical and chemically-related patents). You can perform the .COST command to see how much you're spending.

```
? .cus1
        28oct82 15:45:17 User11275
   $5.51  0.058 Hrs File45 10 Descriptors
   $0.46  Tymnet
   $1.25  5 Types
   $7.22  Estimated Partial Cost
```

Besides the per hour connect charges, on-line types or off-line prints (printouts) are charged at rates varying from $.10 to $50 per full record printed. Since connect time can be expensive, off-line prints can be a real benefit. Off-line prints means you use your personal computer to log-on and search the databases, but after locating what you want, you have the prints done on Dialog's printer and mailed to you. If you're transmitting at 300 baud (about 30 characters per second), it's probably cheaper to use theirs if you can wait two or three days to receive the printout.

Dialog requires no start-up or minimum fees. You are charged only for the time you're on line. The hourly rates seem expensive, but when you compare trying to find and scan the printed indexes for the same coverage, you can literally achieve in minutes what it might manually take you weeks to do.

Getting Started

How do you know where to begin? Admittedly, if you sit down and try to master all of the documentation before you begin, you will be overwhelmed. A good start would be to take a one and one-half day Dialog seminar. These are offered regularly in Palo alto and in other major U.S. cities as well as Canada and Great Britain. Dialog would be happy to give you information on training sessions. The cost is about $135 and well worth the investment.

Another worthwhile investment is the *Dialog Lab Workbook*. This book is intended for someone with some knowledge of the system. Generally used for in-house training in libraries, the Workbook could be helpful to a new searcher. Some patience on your part will be required for you to successfully complete the book. But, the time invested will help you save on-line time (and therefore dollars) in the long run.

So, you should probably begin in a training session. After that, the best way to start is to dig in. Think about what your subject is and where it's likely to be indexed. Sitting down and thumbing through the *Dialog Database Catalog* (supplied when you sign up) often reveals a database dedicated to your topic. There are separate files on aquaculture, book reviews, child abuse, coffee, electric power, foods, history, mental health, metals, national foundations, pharmaceutical news, plastics, physics, specifications and standards, and welding (to name only a few).

Search Strategy

Your searching strategy will depend on the subject and whether you want to be comprehensive or just find a few good articles. Here are some general guidelines.

```
? B411:SF COMPSCI:S OPTICAL (W) COMPUTER?
          28oct82 15:16:38 User11275
    $0.55  0.022 Hrs File1*
    $0.18  Tymnet
    $0.73  Estimated Total Cost


File411:DIALINDEX(tm)
     (Copr. DIALOG Inf.Ser.Inc.)

File6:NTIS - 64-82/Iss25
File8:COMPENDEX - 70-82/sep
File12:INSPEC - 1969 thru 1976
File13:INSPEC - 77-82/Iss20
File239:MATHFILE - 73-82/Nov
        File Items Description
        ---- ----- -----------
         (6)
                16 OPTICAL (W) COMPUTER?
         (8)
                62 OPTICAL (W) COMPUTER?
        (12)
                51 OPTICAL (W) COMPUTER?
        (13)
                46 OPTICAL (W) COMPUTER?
       (239)
                 0 OPTICAL (W) COMPUTER?
? B6:S OPTICAL (W) COMPUTER?
          28oct82 15:19:59 User11275
    $1.96  0.056 Hrs File411 10 Descriptors
    $0.45  Tymnet
    $2.41  Estimated Total Cost


File6:NTIS - 64-82/Iss25
(Copr. NTIS)
        Set Items Description
        --- ----- -----------
          1    16 OPTICAL (W) COMPUTER?
? T1/5/4-6
1/5/4
Hierarchical Representation of Three-Dimensional Objects

Stanford Research Inst Menlo Park Calif    (332500)

Annual rept.
AUTHOR: Agin, Gerald J.
D2141A4    Fld: 9B, 62F    GRAI7712
Dec 75    31p
Contract: N00014-71-C-0294
Monitor: 18

Abstract:  This report summarizes research on methods for representing
within a computer the shapes of common objects that a robot or intelligent
computer would have to deal with. Such a representation should be capable
of supporting man-machine communication based on words and on pictures. It
should also provide a basis for direct interaction of a machine with its
environment, using sensors such as television or a range finder. As a
vehicle for exploring these kinds of interaction we used a hierarchical,
polyhedral representation to model electromechanical machinery. One feature
of the method used was that the spatial relationships of one part to
another could be characterized by 'attachment points' located on each
object. Symbolic descriptions were translated into geometric descriptions
in terms of planes, edges, and points, from which visible outlines and
occlusion relationships could be derived.

Descriptors: *Computer graphics, *Optical images, Computerized simulation,
Lasers, Television systems, Man computer interface, Hierarchies, Robots,
Artificial intelligence, Vision, Computer communications, Range finding,
Mathematical models

Identifiers: NTISDODXA

AD-A037 723/4ST    NTIS Prices: PC A03/MF A01

1/5/5
Image Processing by Computer

Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
AUTHOR: Hanuise, G.
D0241L2    Fld: 9B, 62F    STAR1422
Nov 75    38p
Rept No: ONERA-NT-1975-10; FR-ISSN-0078-3781
Monitor: 18
Misc-Report Will Also Be Announced as Translation.
In French; English Summary.

Abstract: The important increase of the role of the image, considered as a
two-dimensional set of points containing information, brought to light a
number of problems on coding before transmission, filtering, image
restitution, and information selection. Numerical methods may be used for
```

1. Write one sentence on what you want to find.

   You may want to look at different lighting alternatives for your workplace but the ultimate goal is appropriate lighting levels in the work place. Think of ways this subject might be indexed:

   recommended lighting levels
   workplace
   work environment
   manufacturing
   office

2. Check appropriate thesauri (for controlled vocabulary terms) for databases you choose to search.

3. Figure out ways of combining the terms you've selected to yield appropriate results.
4. Watch for "ing" and "s" word endings—generally, take the endings off and use Dialog's creative searching truncation feature. You can think of it as recommended lighting levels but the author might enter it as light level. Using the truncation symbol (?) you'll catch those cases: light? (w) level? Remember that these databases are generally international in scope, so watch out for British spellings. You can truncate for words like vapor or vapour by typing vapo?r. Watch for words like centre, aluminium and so forth.

Let's continue our lighting in the workplace example:

```
select light? and workplace
```

This means the citation must have both *light* or *lights* or *lighting* and *workplace.* By truncating light however, you could also pick up *lightning.*

You may choose a free-form approach to searching (go on line and see what's there) or a more formalized approach, developing a strategy off line and typing it in. I recommend always putting something down on paper before you dial. You'll save money.

Even experienced searchers get into problems occasionally. I remember one time searching scientific databases for information on "air showers" as in a semiconductor cleanroom to keep the air free of dust particles. To my chagrin, when the printed results came, they were all about cosmic air showers bombarding the earth.

Totally eliminating "false drops" (unwanted references) is not possible. Take, for example, a search on the IEEE-488 interface bus. As I thumbed through the printout, the references were perfect, until I came to one about a school bus. I didn't stop and analyze how that one reference crept in, but it could have said "new fuel saves $488 a year for school bus".

Bluesheets

The "bluesheets" are the most valuable part of the Dialog documentation. Once you decide which file to search, you can structure a search strategy on paper and sit down at the machine with the bluesheet for that file for reference.

Dialindex

With so many databases to choose from, how does one know which database to use? The Dialindex file (file 411) was created to help you determine which files will best suit your needs. You can inexpensively peruse files to see if they contain the information you need. You can specify which files will be searched or you can merely specify medical files, business text files, etc.

Dialorder

Once you find all of these wonderful bibliographic citations, unless you have a hefty library at your disposal, you still don't have the article. That's where Dialorder comes in. Some people are in the business of supplying photocopies of journal articles. Right after finding an item you want, you may order it—on line from the Dialorder vendor of your choice. The vendor mails a copy of the article to you and bills you directly. As of May there were 70 Dialorder vendors to choose from.

SDI Service

Sometimes one is an expert in a particular field and a retrospective search isn't desired. But, if you would like to keep up with new things as they are published, you can set up an SDI profile. SDI (selective dissemination of information) searches will run each time a file is updated. For a flat fee, you will receive in the mail, the printout matching your profile.

Conclusion

To sum up Dialog, there really are no rules. Have some fun with it. As you work with it, you'll develop shortcuts, you'll know the command language better so you won't have to consult your manual so frequently.

Here are a few guidelines:

1. Try something ... be willing to accept a few mistakes.
2. Be prepared ... if necessary, do your homework. Prepare your search strategy before logging on.
3. Read the manual.
4. Have fun.

For more information, contact Dialog at one of the telephone numbers below:

U.S. (except California)	(800) 227-1960
(California)	(800) 982-5838
Australia (New South Wales)	02-264-6344
Europe (England)	(0865) 730 969
Canada (Ontario)	(416) 593-5211
Japan (Tokyo)	(03) 463-4391

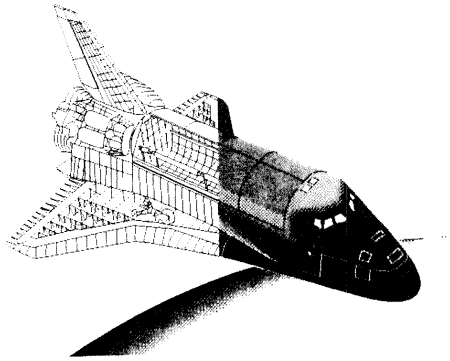
```
? B15;SS TELECOMMUTING OR OFFICE(2W) FUTURE

File15:ABI/INFORM - 71-82/Sep
(Copr. Data Courier Inc.)
        Set  Items Description
        ---  ----- -----------
          1     12 TELECOMMUTING
          2    321 OFFICE(2W) FUTURE
          3    331  1 OR 2
? C1AND2

          4      2 1AND2
? T4/5/1-2
;
4/5/1
82020818   ID No: 82020818
  Plugging into the Electronic Office Revolution
  Jones, Christopher G.; Timm, Paul R.
  Manage  v34n3   22-25   Jul 1982  ISSN 0025-1623  Jrnl Code: MAN

  Availability: ABI/INFORM
  Doc Type: JOURNAL PAPER
  Four major forces are thrusting us toward automation: 1. increased
complexity of business, 2. stagnant productivity levels. 3. increased
information needs, and 4. technological advances. Two major trends are
having a big impact on the modern office: 1. increased use of
high-technology equipment, and 2. a movement toward telecommuting. In the
past, the 5 typical functions of office practices - input, process, output,
distribution, and storage - were performed using separate equipment for
each task. High-technology office equipment has integrated many of these
functions into one machine. Technology not only changes how office work is
done, but where it is done, through telecommuting. Computers are making it
possible for employees to do their work at home, using home computer
terminals to communicate over telephone lines. Although many people fear
or are confused by the office of the future, plugging into the latest in
office technology may provide the new competitive edge. Chart.

  Descriptors: Office automation; Causes; Trends; Information; Technology;
Electronic; Cottage industries

4/5/2
81020561   ID No: 81020561
  Computers and the Future
  Dalal, Jagdish R.
  Jrnl of Systems Mgmt  v32n8   17-21   Aug 1981  Coden: JSYMA9  ISSN
0022-4839  Jrnl Code: JSM
  Availability: ABI/INFORM
  Doc Type: JOURNAL PAPER
  In the future, computers in the home will provide a variety of services,
including: 1. in-home shopping and banking, 2. management of household
```

Computer Graphics Part IV

by Craig Schmidt, Product Marketing Engineer

In this, the concluding article of the four-part series on computer graphics, we will review the important ingredients which make up a graphics plotter. This will be done through the examination of various questions which should be asked when selecting a graphics plotter for your applications and budget.

When evaluating the various graphics plotters on the market, you must first ask yourself; What size plots will best meet my needs? Will eight-by-eleven-inch plots do? eleven-by-seventeen? Once this decision is made, you can begin to compare plotters, asking these questions:



- **What is the resolution of the plotter?**

  Resolution is directly related to line quality. The lower the resolution the higher the quality. For example, a plotter with 0.025mm has better line quality than a plotter with 0.127mm resolution.

- **What is the axis plotting speed?**

  Axis plotting speed is the distance the plotter can draw in one second, along the x- or y-axis. A plotting speed of 15 inches per second is better than a plotting speed of 3 inches per second. A high plotting speed will lessen the time it takes to produce a graph.

- **What type of intelligence do you want in your plotter?**

  Intelligence includes internal character sets, internal programming languages, front panel controls, internal arc generators, eavesdrop, dashed-line generators, etc. These features make the operation of the plotter not only easier but faster.

- **Does the plotter support multiple pens?**

  Multiple pens means many colors. How many pens can the plotter hold at one time, 1, 2, 4, 8? Does the plotter automatically cap the pens so they won't dry out? What type of pens are available for the plotter; fiber tip, ball points, and/or liquid ink? Are there various width pens for thin or thick lines? How many colors are available, 1, 2, 3, 4 ...?

- **What types of plotting media are available?**

  Plotting media include paper, transparencies, mylar or vellum. The more types of media that are available and supportable by the plotter, the more applications the plotter can be used for.

- **What type of media feed is supported?**

  Media feed is usually either manual, roll feed or sheet feed. Roll and sheet feed usually mean unattended operation, while manual feed, although usually less expensive, means manually changing the paper between graphs.

- **What type of service support is available?**

  If the plotter were to malfunction, where could you get it fixed and how much time would be required to fix it? Who would pay the repair and shipping costs? Are there service contracts available for the plotter? How reliable is the plotter and what is the reputation of the plotter manufacturer?

- **What interfaces are available for the plotter?**

  Does it have HP-IB/IEEE-488, the standard Hewlett-Packard interface, and/or RS-232 (serial), a common personal computer interface?

- **What is the price of the plotter?**

  This really needs no explanation. You must determine what plotter attributes you want, and then make the trade off between these attributes and price. Hewlett-Packard offers a plotter in almost every price range with many of the excellent product attributes mentioned above.

We hope this series of articles has helped you to understand the many important ingredients that make up graphics devices. It is through the understanding of these attributes, that you can best select the graphics device which is tailored to your needs.

Give your local Hewlett-Packard dealer or representative a call and see what HP has to offer. We're sure you'll be pleasantly surprised, not only on performance but on price as well.

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Hewlett-Packard Company
1000 N.E. Circle Blvd.
Corvallis, OR 97330 U.S.A.

Hewlett-Packard S.A.
7 Rue du Bois-du-Lan
P.O. Box, CH-1217 Meyrin 2
Geneva-Switzerland

Change of Address: If you change your address, please notify us and include your old label or indicate your sequence number (the first line on the label).