

# Custom Products From Hewlett-Packard

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**For research and education purposes only.**

# Executive Overview

Your competition in today's marketplace is stiff. You need help whenever you can get it. We understand that, and we're here to help you.

Our Custom Products program addresses your specific business and technical problems. Your problems are unique, and you need unique solutions. The HP-41 Advanced Calculator, HP-71 Handheld Computer, and HP-75 Portable Computer, coupled with our HP Custom Products, can provide these solutions.

Custom Products offer a personal, tailor-made approach to traditional problems. If your organization has groups of people who perform identical jobs, you may be able to save time and money, as well as improve productivity, with customized products—meeting the competition all the way.

Your applications may be in design, planning long-term, strategies, process and operation control, or sales. Whatever they may be, we can address many of your computational and information management needs with Hewlett-Packard's Custom Products program.

## The Program

Let the Custom Products program serve you by developing dedicated solutions for you. Special HP-41, HP-71, and HP-75 built-in programming features make this exceptionally easy. Keys can be completely redefined. Overlays identify your unique functions on the keyboard. Customized software modules can be plugged into special input/output ports. And a variety of peripherals can expand the capabilities of your system.

Custom software is available in Custom Modules, Custom Magnetic Cards, and Custom Bar Code. Add a Custom Keyboard Overlay or Custom Keyboard Touchpad, and the transition to a dedicated custom product is complete.

## The Mainframes

**The HP-41 Advanced Calculator** is especially well suited for stand-alone number crunching and as a controller using the HP-IL Interface.

**The HP-71 Handheld Computer** takes over where the HP-41 leaves off. An enhanced BASIC operating system provides higher calculation speeds which are further improved by FORTH and assembler capabilities. For interfacing, HP-IL provides data transfer rates up to 5,000 bytes per second.

**The HP-75 Portable Computer** has the fastest BASIC operating system of our portable line to date. The larger touch-type keyboard makes this an excellent choice when you need to type in text information and then send it to a host computer over the telephone lines. The HP-75D now has a built-in bar code wand interface, making it an excellent tool for your bar code needs.

In the following pages you'll learn about the significant role the Independent Custom Consultant (ICC) plays in the process of acquiring Custom Products. You'll learn more about the customizing features of the HP-41, HP-71, and HP-75 as well as note some details about your Custom Product alternatives. And you'll look at examples of Custom Products applications. Finally, you'll see how the whole process works so that you'll be better able to make the right decision. It's an important one, and we're ready to help.

## The Independent Custom Consultant (ICC)

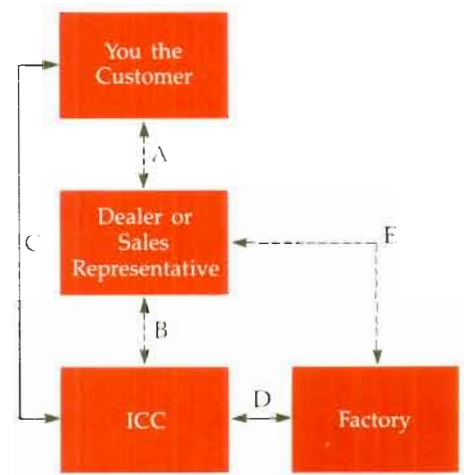
The ICC is a trained expert who can help you save time and money—and get it right the first time. The role the ICC plays in the process is described below. First, choose and contact an ICC (a list of ICC's is available from your HP Sales Representative), who can provide you with the information you need to decide if Custom Products are right for you.

The ICC can also provide you with a wide variety of services. To maximize consulting effectiveness for you, ICCs receive training that includes programming and procurement procedures on Hewlett-Packard's portable computing products. They have all the required software development tools.

Two levels of custom service are available. If you have written your own software and want it made into a Custom Product, you need only the first level. In this case, the ICC converts your software to ROM-image code using software development tools and arranges with the factory to have your product manufactured.

The second level of service is more comprehensive. In this case, the ICC can write software, provide users' manuals, field test and debug the software, consult on hardware-related questions, help you with specifications and preparation of Custom Keyboard Overlays or Custom Keyboard Touchpads (for HP-41 only), package your system into a custom case and more. Then, the ICC will arrange with the factory to have your Custom Products manufactured.

Here's how the process works.



- A. Dealer or sales representative contacted by customer.
- B. Dealer or sales representative refers customer to ICC.
- C. ICC/customer contact is made. ICC and customer establish business relationship.
- D. ICC contacts factory to order Custom Products
- E. Dealer or Sales Representative informed of ongoing activity by factory.

# HP-41 Custom Products— Who Uses Them?



Many companies have found that Custom Products provide just the solutions they need. Among them two firms, Paul-Munroe Hydraulics, Inc. and our own Hewlett-Packard Loveland Instrument Division, clearly illustrate typical success stories.

## *Custom Engineering*

Paul-Munroe Hydraulics is a California-based firm competing in the field of fluid power engineering. Paul-Munroe uses Custom Modules, Custom Keyboard Overlays, and Custom Magnetic Cards as aids in performing complex calculations in hydraulic fluid cylinder-sizing, fluid flow, and hydrostatic transmission. Because many calculations are done in the field, the convenient size and portability of the HP-41, and easy access to Custom Products, make this the ideal solution.

Hydraulic calculations that might otherwise require days to complete can be performed in a matter of hours. Programs stored in the Custom Modules not only save time, but also eliminate guesswork. Custom Overlays make relabeled keys easy to read, and allow easy operation in a single keystroke. Salespeople using custom cylinder-sizing programs find that Custom Magnetic Cards are an **inexpensive** and effective way to record and review catalog prices and inventory—whenever and wherever they're needed.

In addition, Paul-Munroe relies on the HP-41 Custom Products program as an educational tool. With Custom Products, both accuracy and ease of operation make learning in the company-sponsored hydraulics courses a comfortable and enjoyable experience.

Paul-Munroe even sells its Custom Products solution to other engineers and professionals in their field . . . in such diverse applications as hydraulic regulation of the height of a pitching mound in a baseball game, flow measurement of a Saudi Arabian oil pipeline, or cargo and ballast control of supertankers!

From attention to detail on the company's overlay logo to the "fast track" turnaround on delivery of the products themselves, Paul-Munroe has found that HP-41 Custom Products provide the competitive edge it needs in today's marketplace.

## *Custom Products for Original Equipment Manufacturers*

Hewlett-Packard Loveland Instrument Division (LID), Loveland, Colorado, acts as an original equipment manufacturer in selling instruments it builds, such as the HP 3421A Data Acquisition/Control Unit and the HP 3468A Multimeter, in combination with Custom Products. With Custom ROM Modules and Custom Keyboard Touchpads, customers have the benefit of portability, accuracy, and redefinable keyboards. These systems provide customers with the portable tools they need to implement such operations as greenhouse temperature and humidity monitoring and control, solar energy temperature and pressure level adjustment, and forest floor temperature measurement. HP-41 Custom Products offer a way for LID to provide low-cost, battery-operated computation in a data acquisition system, enhancing sales to engineers and other professionals.



# HP-71 and HP-75 Custom Products— Who Uses Them?

The HP-71 and HP-75 Custom Products program is available to meet the needs of companies seeking a BASIC language machine. The focus of the program is to provide tools useful in BASIC language applications such as information management, data collection and processing, and the transmission of data to other computers from remote sites. Choose the HP-75D when you need a larger keyboard and display and/or need to read major industrial bar codes. And pick the HP-71 when you need to combine BASIC, FORTH, or assembly language with advanced calculations.



## **HP-71 Handheld Computer—A Versatile, Low-Cost System**

The HP-71 is a powerful, relatively low-cost BASIC language computer that can be customized to meet the requirements of original equipment manufacturers and more. Its BASIC, FORTH, assembly language, and advanced calculation capabilities serve you well in such applications as inventory control, tracking work in process, label generation/verification, and lab sample tracking.

When used as a controller in the field of medicine, for example, the advantages of making tasks and services more manageable are readily seen.

A medical equipment manufacturer requires a small, low-cost controller for a patient monitoring system. This need is easily met by using an HP-71 and Custom Module to drive the medical equipment, providing information such as patient name and identification number, drug dosage calculations, and hemodynamic data entry.

The medical equipment manufacturer sells the HP-71 as an integral part of the patient monitoring system. The Custom Module changes the HP-71 from a general purpose handheld computer to a specialized equipment controller.

The availability of Custom Products enables original equipment manufacturers and their customers to take advantage of the HP-71 as the center of a low-cost, dedicated, and efficient system.

## **HP-75D Portable Computer—Boost Productivity in Inventory Control**

The HP-75 is ideal as a remote data collection and information processing tool whether operated from the keyboard or used with a bar code wand. Examples of applications for which the HP-75 is best suited include field service reporting, sales order entry, and inventory control.

For instance, a warehouse requires an efficient, cost-effective method of inventory control. And the HP-75D easily fits the bill.

Data such as inventory status from the previous day can be loaded into the HP-75 from a host mainframe such as an HP 3000, Series 80, or other personal computer. Then, inventory can be taken at a remote site via the HP-75D (with built-in bar code wand interface) either from the keyboard or by using a bar code wand. A Custom ROM Module and Custom Keyboard Overlay provide the specific custom solution that meets the needs of this warehouse.

The information then can be processed and stored at the remote site. When inventory is completed, or at any point during the process, the stored data can be transmitted to the host mainframe via the HP-IL/RS-232C Interface or modem. When using the optional HP 82718A Expansion Pod\*, a built-in modem makes this even more efficient. It is then a simple matter to create reports, charts, graphs, and more.

With the HP-75D Portable Computing System and Custom Products, companies can develop dedicated portable computer applications to improve organizational productivity.

In the HP-71 and HP-75, Hewlett-Packard provides products to meet your needs, whether they be remote data collection and information processing or monitoring and controlling instruments.

\* Available in July, 1984.

# HP-41 Custom Products

## The HP-41 Advanced Calculator

A fully configured, customized HP-41 stores over 8,000 program lines. It combines the speed, power, and accuracy of a computer with the portability, touch-key simplicity, and low cost of a handheld calculator.

There are two HP-41 models from which to choose—the HP-41CV and the HP-41CX. Both have 2,237 bytes of built-in memory or 319 registers. The HP-41CX also has 868 bytes, or 124 registers, of extended memory built-in (optional for the HP-41CV). Further expansion of the memory in either model, up to a maximum of 919 registers, is possible through the use of extended memory.

Other built-in features of the HP-41CX as compared to HP-41CV capabilities are:

HP-41CX	HP-41CV
24K-Byte Operating System	12K-Byte Operating System
124 Registers	319 Registers
868 Bytes of Extended Memory	None
58 Functions on the Keyboard	58 Functions on the Keyboard
Text-File Editor	None
Built-in Extended Functions/Memory Module	None
Built-in Time Module	None
Alphanumeric Keyboard	None
Four Plug-in Ports	None
Magnetic Card Reading Capability	None
Bar Code Reading Capability	None
RPN Logic	None

Four 1.5V size N batteries supply all the power you need. Whether you're in the field or at your desk, or reading magnetic cards or bar code, the reliability of the HP-41 is enhanced by the simplicity of the power supply.

The HP-41 uses RPN, providing you with a consistent and efficient logic system that is fast and makes error recovery easy by automatically storing your last entry. And, an important advantage is that it also lets you see intermediate results.

The HP-41 liquid-crystal display is easy to read, and it eliminates those problems generally associated with glare. The display itself acts as a ten-digit or twelve-alpha character window on a 24-character line, which may be scrolled from left to right.

Continuous Memory preserves everything from stored data to user-defined keyboard assignments, even when your calculator is turned off.

With the Hewlett-Packard Interface Loop (HP-IL), your HP-41 becomes a system that can print, plot, store, retrieve, and display information, as well as control instruments and peripherals.

Over 223 (HP-41CX) and 128 (HP-41CV) separate operations reside in the HP-41 function library and 58 of those functions are on the keyboard. Custom Keyboard Overlays can personalize the

HP-41, eliminating all irrelevant nomenclature. The Custom Keyboard Touchpad fits over the keys covering the entire keyboard. It offers dust protection, provides relabeling of the keyboard, and allows key functions to be relabeled.

Or if you prefer, get the HP-41 Opt. 001 Custom Calculator. Since it is an HP-41, its operation is unchanged. The difference is that the keys are not labeled.

Four input/output ports in the HP-41 let you add plug-in ROM modules, memory modules, and/or peripherals in combination (within accepted configurations). Custom Modules may be added, providing media for permanent and private program storage.

**\*HP-IL Interfacing**  
capability for battery-operated cassette drive, battery-operated printer, instrumentation control, video monitor, color graphics plotter, full-width printers, larger systems, acoustic coupler (modem).

**\*Magnetic Card**  
reading capability, inexpensive, convenient distribution.

**\*Bar Code**  
reading capability easily reproduced on paper.

**\*Four Plug-in Ports**  
for software modules, peripherals, interfacing, memory expansion modules, and added flexibility.

**\*12-Character LCD**  
with scrolling to 24 characters.

**Built-in Time Module**  
provides time, calendar, alarm, and stopwatch functions.

**\*Continuous Memory**

**\*Alphanumeric Keyboard**  
name and label programs, functions, and results.

**24K-Byte Operating System**  
over 200 separate operations.  
(41CV—12K-byte operating system, 128 separate operations.)

**\*RPN Logic**

**\*58 Functions**  
on the keyboard.

**Text-File Editor**  
up to 254 ASCII characters per record for storing information

**Built-in Extended Functions/Memory Module**  
adds memory, power, and flexibility in setting up and manipulating programs.

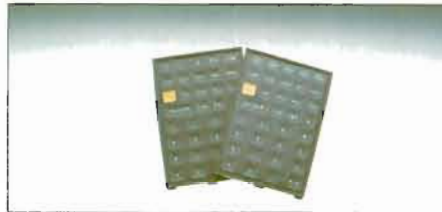
\*Applies to both HP-41CX and HP-41CV

# HP-41 Custom Products and Tools



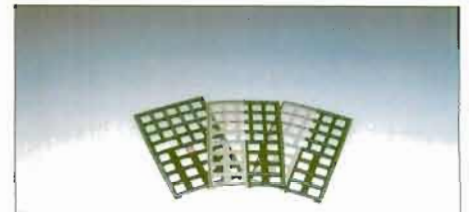
## Software Development System

- ❑ Used in developing Custom Modules on your own HP-41 Advanced Calculator
- ❑ Allows the use of a standard size keyboard for program development
- ❑ Allows the use of a large display for ease in editing
- ❑ Allows the programs you develop to be converted to ROM-image code
- ❑ Provides an emulator for use in field testing and debugging
- ❑ After programs are completed, simply copy them to a floppy disc and submit to an ICC for manufacture into Custom ROM Modules



## Custom Keyboard Touchpads

- ❑ Provide relabeling of the entire keyboard
- ❑ Allow on-key and shifted key labels to be renamed
- ❑ Fit over the keys and cover entire keyboard to protect against dust; can be easily removed
- ❑ Available in choice of touchpad background color as well as printing color
- ❑ Available with special logos, trademarks, and other symbols



## Custom Keyboard Overlays

- ❑ Provide relabeling of the shifted functions on the keyboard
- ❑ Fit between the keys on the keyboard; can be easily removed
- ❑ Available with choice of overlay background color and printing color
- ❑ Available with special logos, trademarks, and other symbols

## HP-41CV or HP-41CX Opt. 001 Custom Calculator

- ❑ Comes with owner's documentation
- ❑ Nomenclature on top of the upper four (4) rows of keys has been deleted
- ❑ The USER and PROG keys are concealed with a removable plastic cover



## Custom ROM Modules

- ❑ Provide 4K or 8K bytes of Read Only Memory (ROM) in a plug-in module
- ❑ Can provide automatic execution of programs and key reassignments
- ❑ Program is permanent; can't be erased
- ❑ Program is private; most private of any software
- ❑ Plug into any one of the four ports on the HP-41



## Custom Magnetic Cards

- ❑ Inexpensive magnetic media
- ❑ Hold nearly 200 instructions per card
- ❑ Provide the recording of special key assignments, programs, and data
- ❑ Professionally printed and labeled to your specifications
- ❑ Convenient for volume distribution
- ❑ Allow easy program and data modification for updates



## Bar Code

- ❑ Provides storage on paper that can be copied
- ❑ Extremely cost efficient, least expensive of any custom media
- ❑ Easy to use, duplicate, and distribute
- ❑ Can represent any operation that can be performed from the keyboard
- ❑ Preserves special key assignments, programs, and data
- ❑ Can be provided by a selected vendor
- ❑ Can be reproduced with HP 82184A Plotter Module

# HP-71 Custom Products



## The HP-71 Handheld Computer

The HP-71 is one of the world's most powerful handheld BASIC computers that's optimized for calculations.

It has a powerful 64K-byte operating system. You can use BASIC language, or override it with the FORTH and assembly languages.

In addition, the HP-71 has HP-IL system expansion potential, can interface via RS-232C, HP-IB, GPIO, and can be easily customized.

CALC mode, an advanced calculator operating mode, is powerful, simple to use, and easy to edit. It gives you a full scientific function set and built-in statistics functions (also available in BASIC), automatic parenthesis matching, shared variables with BASIC mode, immediate execution of expressions as they are entered, and more. And the numeric keypad is a tremendous aid to quick, accurate numeric data entry!

The enhanced BASIC language gives you more than 240 functions, statements, and operators to simplify programming. Advanced statistics functions let you perform computations on up to 15 independent variables. A complete set of trig functions lets you solve complex equations. Add new BASIC keywords by using language extension files with the FORTH/Assembler ROM—and utilize the larger keyboard and display of the HP 150, Series 80, and other personal computers in program development.

The 17.5K bytes of built-in user memory can be expanded to as much as 33.5K with up to four 4K-byte memory modules. Software programs you develop can be stored in Custom ROM Modules providing unique solutions to your problems.

Up to four Custom ROM Modules of either 16K, 32K, 48K, or 64K bytes can be inserted into the four RAM/ROM ports on your HP-71. This gives you as much

as 256K bytes of Custom ROM in addition to the 17.5K bytes of built-in RAM! Or choose any RAM/ROM combination to a maximum of four plug-ins.

Almost every key on the HP-71 keyboard can be customized to suit your requirements. And HP-71 Custom Keyboard Overlays relabel these keys with your special functions.

An optional hand pulled card reader allows inexpensive off-line storage of data and programs. HP can duplicate your Custom Magnetic Cards to store programs, text files, data files, and keyboard redefinitions.

For maximum customization potential, three volumes of internal design specifications are available from dealers and HP Sales Representatives. That means you can develop your own software, hardware, or interfaces.

All this adds up to powerful, fast, accurate custom solutions—for you.

### HP-IL Interface

option for connecting to a wide variety of battery-powered devices for mass storage, display printing, plotting, test, and measurement.

### 22-Character LCD

with scrolling to 96 characters and upper- and lowercase letters with true descenders. Create your own special characters.

### Card Reader

option to use small, inexpensive, magnetic cards.

**BASIC Language**  
powerful programming language.

**Battery Power**  
four 1.5V, AAA size batteries, or optional ac adapter.



**Continuous Memory**  
turn your HP-71 off and return later without losing calculations and programs

**Four Ports**  
accept any combination of custom or prewritten software (up to 64K bytes each) or memory modules.

**CALC Mode**  
advanced calculator operating mode.

**Five-level Command Stack**  
recall any of your last five commands for editing and re-use.

**10-digit Key Pad**  
fast, easy input of numeric data.



# HP-75 Custom Products

## The HP-75 Portable Computer

Because of its compact size, rugged design, ease of program development, and customization program, the HP-75D is ideal for remote data collection and information processing applications. Enter volumes of text data via the larger touch-type keyboard or read major industrial bar codes—with the HP-75D at the heart of your total HP solution.

A built-in bar code wand interface is the key that assures the fast, accurate entry of data. Add the 8K-byte HP 82725A Bar Code Reader Module and digital bar code wand to read 3 of 9 Code, Interleaved 2 of 5, Industrial 2 of 5, Universal Product Code (A or E), European Article Code (8 or 13), Code 11, and Codabar.

Display data on the HP-75 for verification and collect it in RAM. Later process, store, or transfer it to another computer via direct interfacing or a telephone line.

If you need to use high resolution bar code, you'll want the HP 92267A Bar Code Wand. Or choose the HP 92267B for medium resolution codes.

Add the HP 82718A Expansion Pod\* and get a 300 baud direct-connect auto-dial, auto-answer, asynchronous modem plus either 32K or 64K bytes of electronic disc memory. And you have a complete, powerful, totally portable tool.

The built-in, direct-connect modem increases the accuracy of information sent over telephone lines.

And electronic disc commands let you create, access and modify files, establish hierarchical directory structure, and copy files into and out of electronic disc. And since electronic disc memory is non-volatile, your information is saved, even when the HP-75D is turned off.

If your application demands lots of text entry, you'll find that the HP-75's staggered "touch-type" keyboard and larger keys allow fast data entry and accuracy of input. Over 190 keys/key combinations may be redefined for execution of commands, programs, or typing aids.

But best of all, an HP-75 Custom Keyboard Overlay can be made to relabel these keys for your specific applications.

Since the HP-75 is powered by rechargeable batteries, you can take it anywhere for computation and data collection.

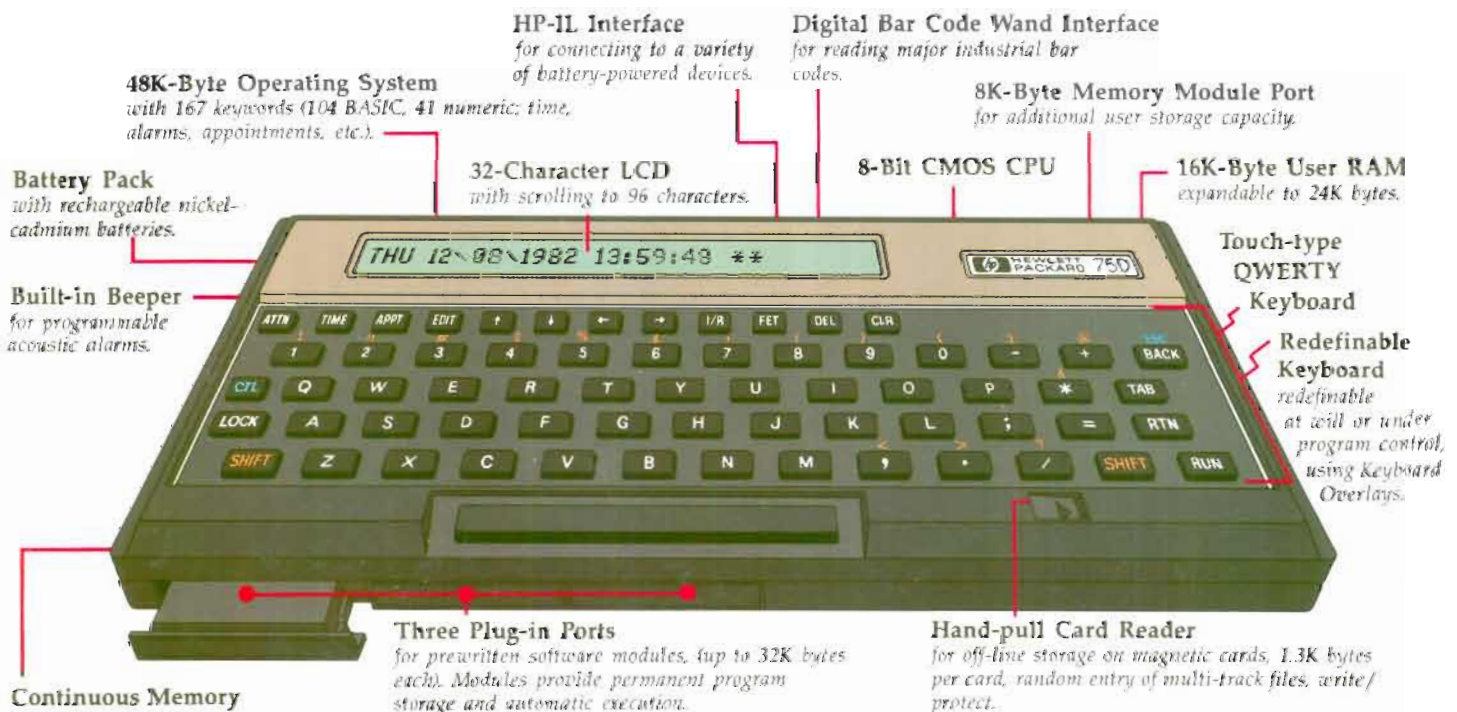
We can duplicate your Custom Magnetic Cards to store programs, text and data files, and keyboard redefinitions up to 1.3K bytes per card. Then you simply slip them through the built-in, magnetic card reader!

Software programs you develop can be stored in 8K, 16K, 24K, or 32K-byte Custom ROM Modules, providing unique solutions to your problems. The benefit is permanent storage of your programs, privacy, and consistent results.

Using the Hewlett-Packard Interface Loop (HP-IL), your HP-75 becomes a system capable of printing, plotting, storing, retrieving, and displaying information as well as controlling instruments and peripherals.

Additional powerful HP-75 features are shown below.

\* Available in July, 1984.



# HP-71 and HP-75 Custom Products and Tools



## Plug-In Module Simulator—HP-75

- Used in developing Custom Modules on your HP-75 Portable Computer
- Makes the development and field testing of software intended for ROM-based plug-in modules easy
- Write BASIC language programs with the HP-75 and load into the simulator for execution
- Provides 16K bytes of RAM that allow the temporary storage of files and programs
- Edit and update programs and data while they reside in the PMS, at your convenience
- Portable size makes it easy to use and store
- Use as many as three simulators at one time, providing up to 48K bytes of RAM
- After programs are completed, simply copy them to a cassette tape and submit to an ICC for manufacture into Custom ROM Modules

## Plug-In Module Simulation Procedure—HP-71

- Any Custom ROM Module developed for the HP-71 Handheld Computer can be simulated through one of the memory ports in the HP-71
- Use the FORTH/Assembler ROM to utilize the larger keyboard and display of the HP 150, Series 80, or other personal computers in software program development
- See the HP-71B Plug-In Module Simulation Procedure sheet (available through an HP Sales Representative or ICC) for further information



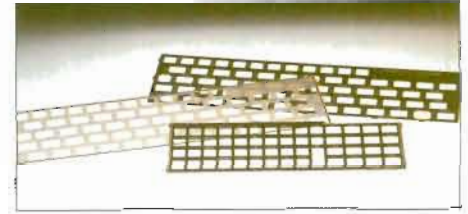
## Custom ROM Modules

- Provide 8K, 16K, 24K, or 32K (HP-75), and 16K, 32K, 48K, or 64K (HP-71) bytes of program storage in a plug-in module
- Can provide automatic execution of programs and key reassignments
- Program is permanent; can't be erased
- Program is private; most private of any software media
- Plug into any one of the three ports on the HP-75, or four ports on the HP-71
- May be used in quantities of one to three on the HP-75, and one to four on the HP-71



## Custom Magnetic Cards

- Inexpensive magnetic media
- Hold nearly 1.3K bytes instructions per card
- Allow the recording of special key assignments together with a program
- Professionally printed and labeled
- Convenient for volume distribution
- Allow easy program and data modification



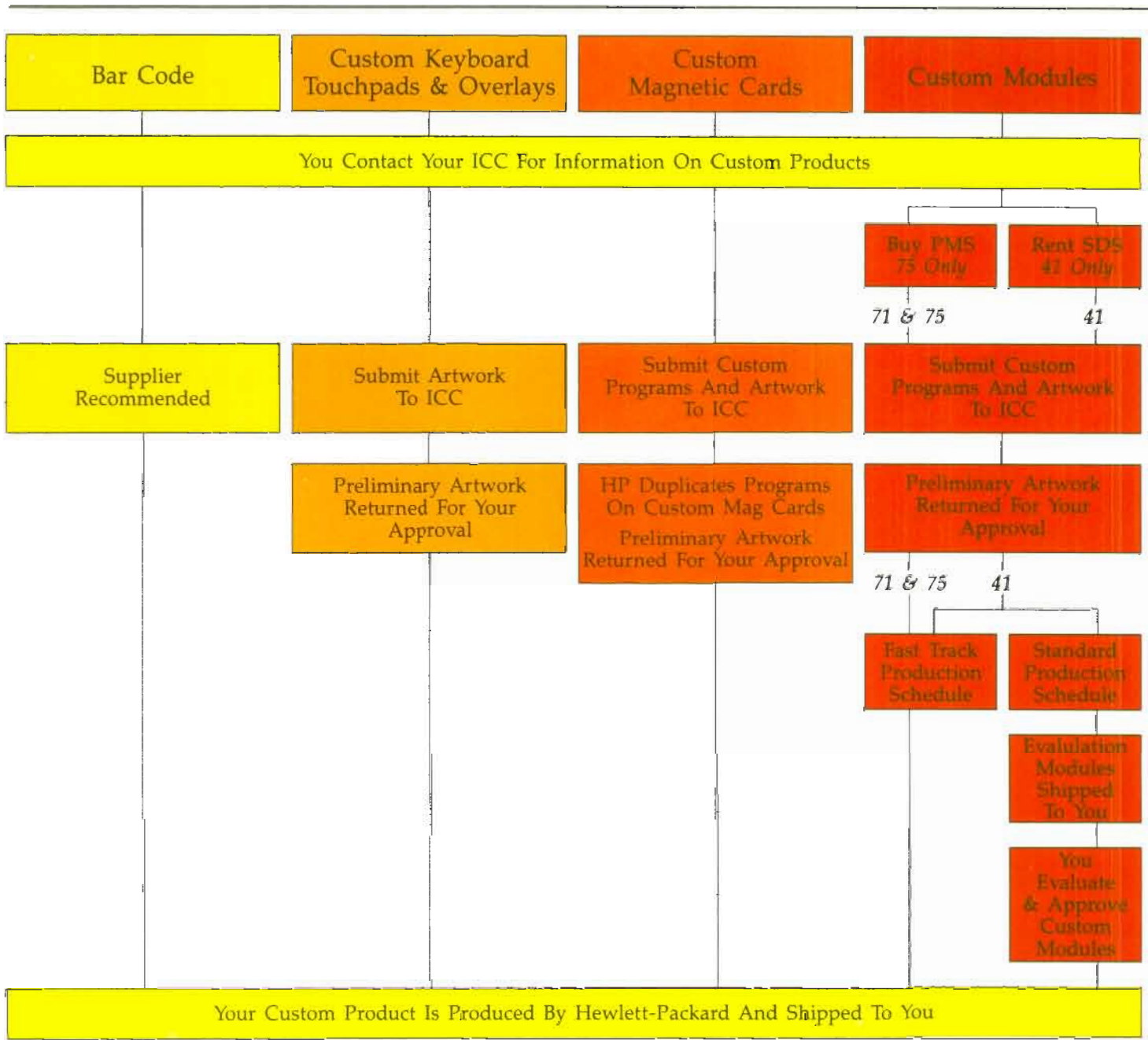
## Custom Keyboard Overlays

- Provide relabeling of any keys/key combinations on the keyboard
- Fit flat between the keys on the keyboard; can be easily removed
- Available with choice of overlay background color and printing color
- Available with special logos, trademarks, and other symbols

## HP-75D Opt. 001 Portable Computer

- Ten HP-75Ds and ten rechargers come packaged without Owner's Manuals, carrying cases, or HP-IL cables

# Custom Products— How the Process Works



# HP-41 and HP-71 Specifications

## HP-41 Advanced Calculator

<b>Dimensions</b> . . . . .	14.2 cm (5.6 in) × 7.9 cm (3.1 in) × 3.3 cm (1.3 in)
<b>Weight</b> . . . . .	205 g (7.2 oz) with batteries
<b>Power Requirements</b>	
Batteries . . . . .	four 1.5V, size N batteries (replaceable by user)
Battery current (worst case) . . . . .	20 mA (operating) 2 mA (idle) 50 µA (off)
Average alkaline battery life . . . . .	up to 6 months (battery life depends upon use, less when a peripheral device without its own power source is in use)
<b>Operating Requirements</b>	
Operating temperature . . . . .	0° to 45°C (32° to 113°F)
Storage temperature . . . . .	−20° to 65°C (−4° to 149°F)
Humidity . . . . .	40°C at 95%
<b>Display</b>	
Capacity . . . . .	10 digits; 12 alpha characters displayed (scroll to view 24); 12 annunciator words; each character position consists of 17 segments, including 3 punctuation segments.

### Character Range

A-Z, a-e, 0-9, plus 37 special characters, some of which can be obtained only by using optional plug-in peripherals.

### Number Range

$\pm 1.0000000 \times 10^{-99}$  to  $\pm 9.9999999 \times 10^{99}$ , plus zero.

Numbers are shown with a maximum of ten digits, or an 8-digit mantissa and a 2-digit exponent.

Displayed numbers are rounded to the last displayed digit; calculations are performed internally with at least ten digits.

### Memory Capacity

HP-41CX Resident Programmable: 443 storage registers (319 in RAM, 124 in extended memory), 2,237 program bytes in RAM (868 in extended memory).

Solid-state Mass Memory: 476 storage registers (3,332 program bytes).

HP-41CV Resident Programmable: 319 storage registers (2,237 program bytes).

Solid-state Mass Memory: 600 storage registers (4,200 program bytes).

Maximum overall solid-state mass memory for both models: 919 storage registers (2,237 program bytes, 4,200 mass memory bytes).

## HP-71 Handheld Computer

### Physical Specifications

<b>Dimensions</b> . . . . .	19 cm (7.5 in) × 9.7 cm (3.8 in) × 2.5 cm (1.0 in)
<b>Weight</b> . . . . .	340 g (12 oz) with batteries
<b>Power Requirements</b>	
Batteries . . . . .	four 1.5V, size AAA batteries (replaceable by user).
Battery current . . . . .	10 mA (operating) .75 mA (idle) .03 mA (off)
Average alkaline battery life . . . . .	60 operating hours (battery life depends on use)

### Operating Requirements

Operating temperature . . . . .	0° to 45°C (32° to 113°F)
Storage temperature . . . . .	−40° to 55°C (−40° to 131°F)
Humidity . . . . .	0% to 95% relative humidity

### Display

Liquid-crystal display	
Character font . . . . .	6 × 8 dot matrix
Capacity . . . . .	96 characters per line
Window size . . . . .	22 characters (scroll to 96 characters)
Character set . . . . .	256 characters

### Character Range

A-Z, a-z, 0-9, plus 65 special characters.

### Number Range

Real precision . . . . .	−9.9999999999 to −1E-499, 0, 1E-499 to 9.9999999999E499
Short precision . . . . .	−9.9999E499 to −1E-499, 0, 1E-499 to 9.9999E499
Integer precision . . . . .	−99999 to 99999
Variable types . . . . .	Numeric, String, Numeric array, String array

Numbers are shown with a maximum of 12 digits, or a 12-digit mantissa and a three-digit exponent. Calculations to 12-digit accuracy.

### Clocks and Timers

Perpetual clock calendar. Time function returns time to the nearest hundredth of a second.

Accuracy range: 15 seconds/month to 3 minutes/month

Adjustable clock speed:  $\pm 10\%$

### Beeper

The beeper is programmable with parameters for duration and tone.

The frequency range is approximately 5 to 6200 Hz.

### Redefinable Keys: 159

### Multiple File Structure

The number of files in HP-71 memory is limited only by the amount of available RAM.

The HP-71 supports the following seven file types:

BASIC	Contains BASIC programs
BIN	Assembly language programs which can be executed as programs or subprograms
LEX	Used to add new BASIC keywords
DATA	Store numeric and string data
TEXT	Used to transfer or receive files from other computers as string data
KEY	Store and retrieve redefined key assignments
SDATA	Allows data to be sent to and from the HP-41

### Language

Extended HP BASIC (240 instructions)

### ROM/RAM

Built-in operating system ROM . . . . .	64K bytes
	Four 16K, 32K, 48K, or 64K byte plug-in ROMs for an additional 256K bytes of ROM
Built-in user RAM . . . . .	17.5K bytes

### Enhancement

Memory Module (HP 82420A) . . . . .	4K bytes
Maximum system RAM (with four Memory Modules)	33.5K bytes

### Interface

Optional HP-IL (Hewlett-Packard Interface Loop)

(continued)

# HP-71 and HP-75 Specifications

## Off-Line Mass Storage

Optional Card Reader (HP 82400A)

## Continuous Memory

Retains data and programs even when the computer is turned off.

## HP-75 Portable Computer

### Physical Specifications

**Dimensions** ..... 12.7 cm (5 in) × 25.4 cm (10 in) × 3.2 cm (1.25 in)

**Weight** ..... 737.1 g (26 oz)

### Power Requirements

**Batteries** ..... NiCad Battery Pack (HP 82001B)

### Battery Current

(worst case; without bar code wand) ... 25 mA (RUN mode) providing 20 to 30 hours of RUN mode operation (approximately 2 to 3 weeks between rechargings)  
14 mA (STANDBY mode)  
20 μA (SLEEP mode)

### Operating Requirements

**Operating temperature** ..... 0° to 45°C (32° to 113°F)

**Recharging temperature** ..... 10° to 40°C (50° to 104°F)

**Storage temperature** ..... -40° to 55°C (-40° to 131°F)

**Humidity** ..... 0 to 95% relative humidity

### Display

Liquid-crystal display

**Character font** ..... 5 × 9 dot matrix

**Capacity** ..... 96 characters per line

**Window Size** ..... 32 characters (scroll to 96 characters)

**Character set** ..... 256 characters

### Character Range

A-Z, a-z, 0-9, plus 27 special characters, with or without underlining.

### Number Range

**Real precision** ..... -9.999999999999E499 to -1E-499, 0, 1E-499 to 9.999999999999E499

**Short precision** ..... -9.9999E99 to -1E-99, 0, 1E-99 to 9.9999E99

**Integer precision** ... -99999 to 99999

**Variable types** ..... Numeric, String, Numeric array

### Clocks & Timers

Perpetual clock calendar, 12-hour or 24-hour format. Time function returns time to the nearest millisecond.

**Accuracy range** ..... 15 seconds/month to 3 minutes/month

**Adjustable clock speed** ..... ±10%

### Beeper

The beeper is programmable with parameters for duration and tone.

The frequency range is approximately 1 to 1600 Hz.

**Redefinable Keys:** 194

### Multiple File Structure

The number of files in HP-75 memory is limited only by the amount of available RAM.

### Language

Extended HP BASIC (167 instructions)

### ROM/RAM

**Built-in operating system ROM** ..... 48K bytes

Three 32K byte plug-in ROMs for an additional 96K bytes ROM

**Built-in user RAM** ... 16K bytes

### Enhancement

Memory Module (HP 82700A) ..... 8K bytes

Maximum system RAM (with Memory Module) ..... 24K bytes

### Interfaces

Built-in HP-IL (Hewlett-Packard Interface Loop)

Built-in Digital Bar Code Wand Interface

### Off-Line Mass Storage

Built-in Card Reader, hand-pulled

### Continuous Memory

Retains data and programs even when the computer is turned off.

## Comparison Chart

	HP-41	HP-71	HP-75
EPRoms	Yes*	No	No
Maximum RAM (in K-bytes)	2.2	33.5	24
HP-IL peripherals	Yes	Yes	Yes
Bar Code	Yes (HP code only)	No	Yes
Expansion Pod: Modem	No	No	Direct-connect, auto-dial/auto-answer, asynchronous
Electronic Disc (in K bytes)	No	No	32 or 64
Custom Magnetic Cards	Yes	Yes	Yes
Custom Overlays	Yes	Yes	Yes
Custom Touchpads	Yes	No	No
Custom ROM Modules: Size (in K-bytes)	4, 8	BASIC: 16, 32, 48, 64 FORTH: 16, 32, 48	8, 16, 24, 32

\* Available from third party vendor

NOTE: New enhancements for products are introduced often. Check with an HP Representative for the latest update.

# Software Development System Specifications

## Software Development System

The HP 82505 Software Development System (SDS) allows you to develop plug-in ROM software on your own HP-41 Advanced Calculator.

The SDS compiles HP-41 user-language programs and/or HP-41 Microcode Library functions (contained on a floppy disc in the HP 82505AC Consumables Kit) into HP-41 ROM-image code. The ROM-image code is then transferred to the emulator for testing and debugging.

The emulator simulates the Custom ROM Module. Programs stored on the emulator are executed directly from the HP-41, leaving user memory untouched. A battery ensures that the information stored in the SDS memory is saved, even when the unit is disconnected from the calculator. Warning, error, and status information is displayed to assist the software developer in the debugging process.

Realistic performance evaluations of your custom software can be performed with the SDS system.

## Specifications

### System Requirements

#### □ Calculators:

- HP-41CV or HP-41CX Advanced Calculator
- HP-85 Personal Computer with HP 82903A 16K Memory Module (included with short-term rental of SDS).
- HP 82505AC Consumables Kit

#### □ Software Development System:

- HP 82505ST (short-term rental of SDS)
- OR

- HP 82505LT (long-term lease of SDS)

SDS consists of the following parts:

- HP 82505A Emulator
- HP 82939A Serial Interface (Opt.001)
- HP 82937A HP-IB Interface
- HP 82903A 16K Memory Module
- HP 82936A ROM Drawer
- Input/Output ROM 00085-15003
- Mass Storage ROM 00085-15001
- Port Extender 82505-60014
- Interface Cable 82505-60004

Wrist Strap 9300-0847

HP-85 Personal Computer (included only with short term rental)

#### □ Optional:

- HP 82104A Card Reader
- HP 82143A Printer/Plotter

**Dimensions** . . . . . 13.34 cm × 43.18 cm × 38.10 cm (5.25 in × 17 in × 15 in)

**Weight** . . . . . 7.14 Kg (16 lbs)

### Operating Requirements

Operating temperature . . . . . 0° to 45°C (32° to 113°F)

Storage temperature (without Battery Pack) . . . . . -40° to 75°C (-40° to 167°F)

Storage temperature (with Battery Pack) . . . . . -40° to 55°C (-40° to 131°F)

Charging temperature (Line Power on) . . . . . 15° to 40°C (59° to 104°F)

Operating Humidity . . . . . 5 to 95%

Power AC line 50-60 Hz . . . . . 115-230V ±10%

Battery . . . . . Rechargeable nickel cadmium; 5 days minimum continuous operation at 25°C; recharger time is 16 hours.

Maximum Power . . . . . 65 VA

### Microcode Listings

The consumables kit includes a floppy disc containing the Microcode Library. This library consists of 20 functions which will provide the user with added capabilities not available in the standard HP-41 system operations. Following is a list of these microcode functions:

- ALENG—Returns number of characters in ALPHA register to X-register.
- ANUM—Recalls a number from the ALPHA register to X-register.

AROT—Depending on whether the value in the X-register is positive or negative, rotates ALPHA register to the left or to the right the number of positions equal to the number of characters in the X-register.

ATOX—Shifts the leftmost character out of the ALPHA register and places its character code in the X-register.

AUTOST—Executes a specified program in the Custom ROM when the HP-41 is turned on.

CLKEYS—Clears all USER mode key assignments.

GETKEY—Places the keycode of the next key pressed in the X-register.

KEYASN—Automatically assigns the table of the keys in the Custom ROM to the HP-41.

PASN—Assigns the function in the ALPHA register to the keycode in the X-register.

PCLPS—Replaces programs in main memory with the one named in the ALPHA register.

POSA—Looks in the ALPHA register for the character or string specified in the X-register and places its position in the X-register.

PRIVACY—Protects a Custom ROM from being examined while in program mode.

PSIZE—Allocates the number of data registers specified in the X-register.

RCLFLG—Recalls flags 00 through 43 to the X-register as ALPHA data.

REGMOVE—Copies a block of registers to a specific place in main memory.

REGSWAP—Exchanges two blocks of registers.

SIZE?—The number of allocated data registers is returned in the X-register.

STOFLG—Restores HP-41 flags 00 through 43.

XTOA—Appends the character code in the X-register to the right-hand end of the string in the ALPHA register.

X<>F—Sets flags 0 through 7 based on the value in the X-register and recalls the previous status of those flags to the X-register.

# Plug-in Module Simulator Specifications

## Plug-in Module Simulator

The HP 82713A Plug-in Module Simulator (PMS) provides ROM simulation capability for your HP-75 Portable Computer. The simulator and accompanying software provide a convenient method for field-testing and debugging ROM programs.

The simulator has two banks of 8K-byte CMOS memory and an integral lithium battery that retains the contents of the memory, even when it is not connected to the HP-75. Programs can be developed in each 8K-byte bank of memory. Four banks of PMS memory are required to develop a 32K-byte Custom ROM Module.

The simulator plugs directly into any of the front ports on the HP-75, and up to three can be used at one time.

Circuitry built into the unit simulates a plug-in ROM module. Programs stored on the simulator can be executed directly from the HP-75, leaving user memory untouched. Files can be stored on the simulator on a temporary or permanent basis, so it can also be a useful, cost-effective storage medium for programs or files that need periodic updating.

Realistic performance evaluations of your software can be performed with the PMS. Comparisons can be made between the performance of programs run on the HP-75 and those run in the PMS. In addition, field-testing is made easier because of the compact size and portability of the PMS. If you are developing software for the manufacture of a Custom ROM Module, completed programs are copied from the PMS to a cassette tape and sent to HP.

## Specifications

### System Requirements

- Computer: HP-75  
No additional devices or software are required.

### HP Part Number

- HP 82713A

**Description** . . . . . Plug-in Module Simulator for the HP-75 Portable Computer

**Dimensions** . . . . . Case: 2.8 cm × 11.9 cm × 16 cm (1.1 in × 4.7 in × 6.3 in)  
Plug: (max. dim.) 2 cm × 4.3 cm × 9.4 cm (.8 in × 1.7 in × 3.7 in)  
Cable: 45.7 cm long (18 in)

**Weight** . . . . . 368.6 g (13 oz)

### Operating Requirements

**Operating temperature** . . . . . -20° to 55°C (-4° to 131°F)

**Storage temperature** . . . . . -40° to 75°C (-40° to 167°F)

### Operational Limitations

The following operations should not be used on files on either plug-in ROM modules or when the PMS is used as a plug-in module. These limitations represent the built-in security and privacy features of ROM-based software media.

ASSIGN #  
EDIT  
LIST  
PLIST  
PRINT  
PURGE  
READ #  
RENAME  
Single Step  
TRANSFORM

The following commands cannot be used without risking loss of files or unpredictable results.

MARGIN  
VER\$

### Statements And Functions

**BUILD**—Initializes the designated bank of memory.

**CAT**—Lists files contained in a bank of memory.

**CHECKSUM**—Computes a value to ensure the integrity of the contents of a bank of memory.

**COPY**—Transfers files from the HP-75 to PMS memory or vice versa.

**PRIVATE**—Used to secure a file by designating it as "private."

**PURGE**—Deletes a file from memory.

**ROMAVATL**—Computes amount of unused memory, in bytes, in a PMS memory bank.

**ROMID**—Assigns the ROM-ID number on a PMS memory bank.

**ROMSIZE**—Computes the amount of memory (in bytes) required to store an HP-75 file in a PMS memory bank.

# HP-IL Peripherals



## HP 2225B ThinkJet Printer

- Disposable ink-jet printhead cartridge (prints about 500 pages per cartridge)
- Quiet operation
- Bidirectional printing at 80 or 142 characters/line; 150 characters/second (266 characters/second compressed)
- Dot-mode graphics
- Permanent copy
- Briefcase portable
- HP-IL battery powered (prints about 200 pages between recharges)



## HP 82162A Printer/Plotter

- 24-character line
- Automatic centering and left/right justification
- Parse mode (automatically breaks lines at spaces)
- Briefcase portable
- Battery-powered



## HP 82725A Bar Code Reader Module

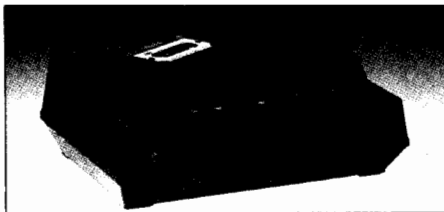
- Supports major industrial bar codes
- Reads labels containing up to 42 characters
- Check digit verification option
- Bidirectional scanning

## HP 92267A/B Digital Bar Code Wands

- Push-to-read switch
- Replaceable, sealed sapphire tip
- 45° scan angle

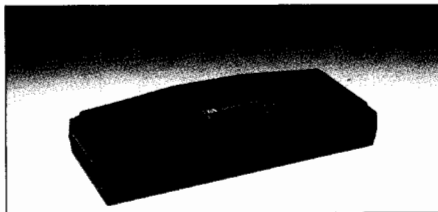
## HP 82718A Expansion Pod\*\*

- Direct-connect 300 baud, auto-dial/auto-answer, asynchronous modem
- 32K- or 64K-bytes CMOS Electronic Disc RAM



## HP 82161A Digital Cassette Drive

- 128K user bytes
- File-by-name data structure
- Digitally-certified media
- Battery-powered



## HP 82168A HP-IL Acoustic Coupler (Modem)

- Bell 113 compatibility
- Battery-powered
- Acoustic coupling
- Sends/receives at 300 baud

## HP 82938A HP-IL/Series 80 Interface

- Compatibility with Series 80 personal computers
- Enables a Series 80 personal computer to be either a system controller or a device when on the HP-IL loop

## HP 82169A HP-IL/HP-IB Interface

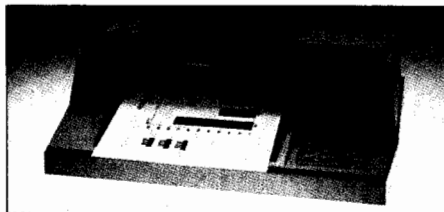
- Translates HP-IL data to HP-IB data or vice versa
- HP-IL can control HP-IB
- HP-IB can control HP-IL
- Power supply (AC Adapter) included

## HP 82165A HP-IL/GPIO Interface

- Communicates with any 8- or 16-bit parallel bus structure
- Comes with power supply

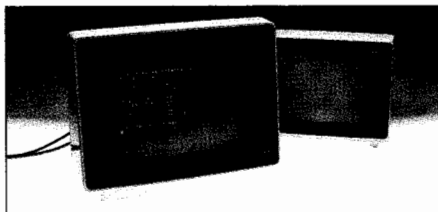
## HP 82164A HP-IL/RS-232C Interface

- Translates asynchronous RS-232C communication to HP-IL and vice versa
- Full or half duplex capability
- Automatically handles XON/XOFF or ENQ/ACK software
- Selectable baud rates, parity options, stop bits and word lengths



## HP 7470A Graphics Plotter

- Opt. 003
- High-quality, hard copy graphics
- Uses plain paper or overhead transparencies
- English and special characters
- Text written in any direction, with or without slant, and in many sizes
- Two-pen capacity



## HP 82912A 9" Video Monitor

## HP 82913A 12" Video Monitor

- Expand display capability

## HP 92198A Mountain Computer Video Interface\*

- 24 rows by 80 columns or 20 rows by 40 columns
- Compatible with television sets or video monitors
- Inverse video

\* Available from Mountain Computer  
 \*\* Available in July, 1984



Technical information covered in this brochure is subject to change without notice.

For additional information or a demonstration of Hewlett-Packard professional calculators and handheld computers, visit your nearest HP dealer. For the location and number of the dealer nearest you, call toll-free 1-800-FOR-HPCC (1-800-367-4772).

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