

# Heathkit®

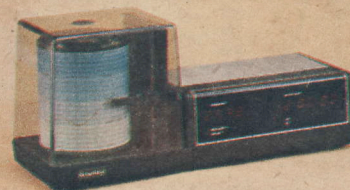
FALL • 1981



**NEW** Satellite Earth Station with Receiver Kit, Antenna and Space Command Remote Control opens a new world of TV viewing



**NEW** Memory Keyer adds fun to Ham Radio



**NEW** Digital Barograph charts weather patterns

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**RETAIL CATALOG  
NUMBER 854R**

## Pick a strong partner — make Heath your computer partner

**More than a slogan:** It's Heath's total commitment to give you extra value for your computer dollar. Now with more software, more peripherals, more accessories — Heath offers one of the most complete and innovative computer lines anywhere. You get more versatility and flexibility — at affordable prices.

**On selecting a computer:** Do you want built-in peripherals for convenience, or the flexibility to design your own system? Can you expand memory power as your skills grow? How good is the software? Is it compatible with existing software? Will the manufacturer stand behind the computer? You can be sure of the answers when you select Heath.

### Choose from three very different computers for different people:

**For convenience — the All-In-One H-89.** If you're more interested in running software than in hardware and software development, the H-89 gives you a complete, balanced computer system in one package. It's powerful and very cost-competitive, with a personality that a first-time computer user will find comfortable. 100K of floppy disk capability is built-in. And you can expand to 64K RAM and over 2.8 megabytes of on-line storage. Two optional anti-glare CRTs are now available for the All-In-One. More on page 70.

**For flexibility — the H-8.** If you're interested in developing hardware or writing physical I/O routines in Assembly language, the H-8 is for you. Its versatile bus-oriented architecture, 64K RAM capacity, expandability and hardware front panel position it as the right choice. And an optional Z-80 CPU Board is now available. See page 72 for the full story.

**For DEC compatibility — the 16-bit H-11A.** If you need a computer for scientific uses, real-time systems or similar applications, and DEC PDP-11V03 hardware/software capability is significant, the H-11A is your choice. See p. 77.

### The full line of Heath software meets your growing needs:

**Operating systems let you fully utilize Heath's capabilities.** Take advantage of all the programs written for the industry standard CP/M Operating System. Much of the 500-program HUG (Heath Users' Group) software library is based on HDOS (Heath Disk Operating System). The P-System with UCSD Pascal features clear readability, fast adaptability. See page 83 for complete information on these operating systems.

**Programming languages are available to fit most any application.** Assembly is the language best understood by your computer. BASIC is an easy-to-learn programming language. FORTRAN is perfect for complicated math and science programs. COBOL lends itself to business and accounting applications. All are compatible with thousands of existing programs. See pgs. 84-85.

**Utility and applications programs include new WordStar Word Processing Software and other new Micropro utilities.** Zenith Electronic Typing Word Processing Software (now on both 5.25" and 8" disks), office aids and other programs are also available. Turn to pages 86-87. And Heath's SOFTSTUFF line offers software tools at affordable prices. See page 89.

**HUG (Heath Users' Group) shares an extensive program library** and informs you of the latest Heath computer developments. See page 81 for details.

**Expand to over 2.5 megabytes of on-line storage** with the H-47 8-Inch Floppy Disk System. See page 75.

**Heath Accessories** — including memory, interfacing, wire wrapping products and others — make your computer more useful. See pages 71, 76, 77 and 82.

**Commercial computer products** — including the assembled Z-89 Computer, Z-19 Video Terminal, Z-47 and Z-87 Floppy Disk Systems, dot matrix and letter-quality printers — are available. See pgs. 78-79.

**You get complete, accurate documentation.** Assembly, operating and instruction manuals are fully detailed.

**You get the convenience of one-stop shopping.** Our complete computer line is available here in the Heathkit Catalog.

**And we won't leave you out in the cold.** Expert technical advice is always available by phone, letter or in person. And our service specialists help keep your Heath Computer System working right.

**5% Discount on complete Heath Computer Systems:** Buy any Heath Computer, one major peripheral and any amount of accessories on the same order form. Then, deduct 5% from the total price (excluding shipping and handling; one discount per customer; not combinable with other discounts).



# **1 All-In-One Computer: extra convenience in a compact unit — 64K RAM capacity, built-in video terminal, floppy disk drive, expanding software selection — all at an affordable price**

Only  
**\$1695<sup>00</sup>**  
 for H-89 with  
 standard CRT

- 16K RAM standard, expandable to 64K
- Two Z-80 microprocessors for high-speed operation
- Built-in disk storage

- Professional-style keyboard, 12-key numeric keypad
- Easy-to-read, 12-inch CRT displays up to 2000 characters
- Runs all Heath H-8 disk software

Are you looking for all the computer power and built-in peripherals you need — but your budget doesn't allow for extravagance? The Heathkit All-In-One Computer has the power, peripherals and convenience you need, for little more than "bare-bones" models.

This easy-to-operate 8-bit computer features separate Z-80 microprocessors for the computer and video terminal. Computer never has to share processing power with terminal, so the All-In-One can perform a variety of high-speed tasks.

**Includes professional video terminal:** Now with a choice of standard or non-glare CRTs, the All-In-One has all display functions of our H-19 (p. 74). CRT displays twenty-five 80-character lines.

**The typewriter-format professional keyboard** controls all terminal functions. The keyboard prints the entire ASCII set, upper and lower cases — along with 33 graphics symbols for extra flexibility.

**Direct cursor addressing** lets you insert or delete characters anywhere on the screen. Control all 32 terminal functions from keyboard or computer. Reverse video lets you emphasize any portion of the screen by reversing white on black.

**Designed in calculator format,** the 12-key numeric keypad makes entering arithmetic programs faster and easier than before. Shifted functions give you control to make insertions or deletions.

**You get more memory power.** 16K bytes of random access memory (RAM) is supplied. Built-in diagnostics make memory checks faster and easier.

**You can expand memory capacity,** first up to 32K or 48K bytes of RAM (using one or two H-88-2 16K Chip Sets, p. 71) — and then up to 64K bytes of RAM (under CP/M — 56K using HDOS) with the WH-88-16 64K RAM Expansion Set on p. 71, to meet your advanced computing needs.

**The All-In-One's built-in 5.25" floppy disk drive** gives you up to 100K bytes of on-line data storage capacity. You get fast, accurate access to data.

**If you need more storage,** buy the H-77 5.25" Floppy Disk System and get up to 300K bytes.

**For maximum data storage** — over 2.5 megabytes on-line — select the H-47 8" Floppy Disk System. (Requires WH-88-47 Interface on page 75, H-88-7 ROM Kit on page 71, HDOS 2.0 or CP/M 2.2 on page 83.)

**You get H-8 compatibility.** All H-8 disk software runs on All-In-Ones with floppy disk storage.

**Choose from our expanding software selection.** New WordStar Word Processing Software — new Micro-Pro utilities — HDOS 2.0, CP/M 2.2, UCSD P-System with Pascal — SOFTSTUFF tools — other utility and applications programs — and the Heath Users' Group's over 500 programs (pgs. 81-89).

**Enjoy more flexibility.** A 3-Port RS-232C Serial Interface (HA-88-3, p. 71) lets you use many peripherals (with appropriate software). Cassette interfacing is standard with kit versions.

Requires 32K bytes of RAM and HDOS, CP/M or similar operating software for normal operation.

**HKS-89 All-In-One Computer Kits.** H-88A with 5.25" floppy disk drive (100 KB on-line storage).

**Kit HKS-89-1,** Computer with non-glare white CRT, Shpg. wt. 81 lbs. .... **1725.00**

**Kit HKS-89-2,** Computer with non-glare green CRT, Shpg. wt. 81 lbs. .... **1725.00**

**Kit HKS-89-3,** Computer with standard white CRT, Shpg. wt. 81 lbs. .... **1695.00**

**An assembled commercial product of this type is available. See the Z-89 on page 78.**

**H-88A All-In-One Computer Kits, w/o disk drive.**

**Kit HS-88-1,** non-glare white CRT, 58 lbs. . . **1325.00**

**Kit HS-88-2,** non-glare green CRT, 58 lbs. . . **1325.00**

**Kit HS-88-3,** std. white CRT, 58 lbs. .... **1295.00**

**H-88-A SPECIFICATIONS:** Clock: 2.048 MHz. Video Terminal: High-resolution CRT with P4 phosphor. Keyboard: 80 keys. Cursor: Blinking, non-destructive underline or block. Cursor Controls: Up, down, left, right, home, CR, LF, back space and tab. Cursor Addressing: Relative and direct. Tab: Standard eight-column tab. Refresh Rate: Same as AC line frequency. Edit Functions: Insert and delete character or line. Erase Functions: Erase from beginning of line, erase to end of line, erase from beginning of page, erase to end of page, erase line, erase page. Power Requirement: 120/240 VAC, 50/60 Hz. Overall Dimensions: 13" H x 17" W x 20" D.



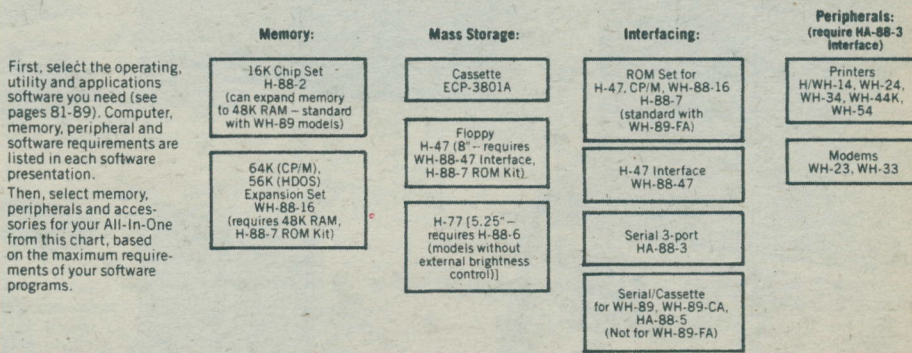
## **The H-89 All-In-One — more computer than the competition**

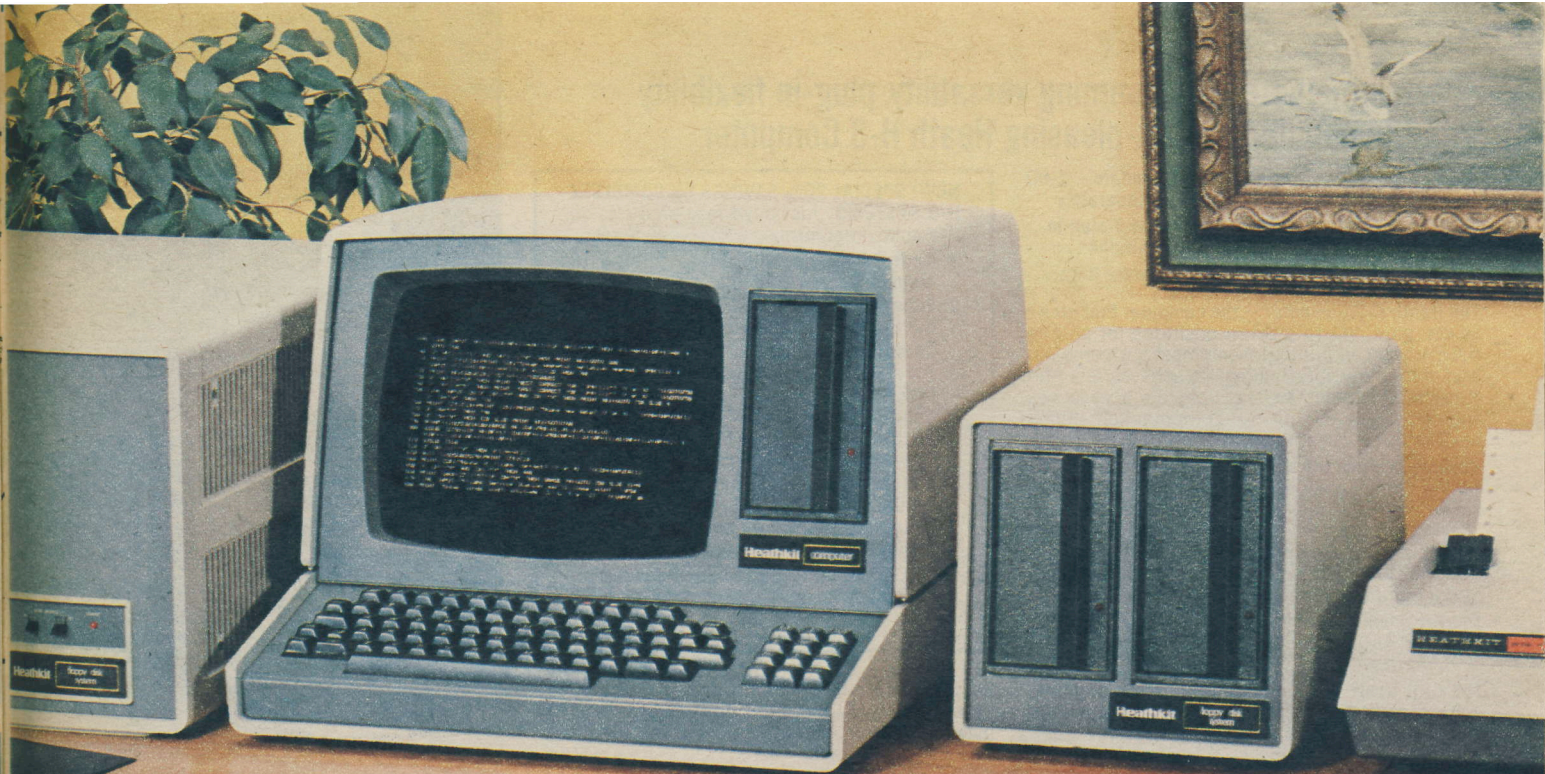
BRAND	TWO MICRO-PROCESSORS?	PROFESSIONAL SCREEN SIZE?	COMPLETE KEYBOARD?	BUILT-IN VIDEO DISPLAY?	ALL-IN-ONE CONSTRUCTION?	BASIC OTHER LANGUAGES?	BUILT-IN FLOPPY?	STANDARD CP/M AVAILABLE?	64K MEMORY CAPACITY?	PRICE*
Heath H-89	YES (Two Z-80s)	YES (25 lines x 80 char.)	YES (80 keys, upper and lower cases; includes 12-key numeric pad)	YES (High-resolution CRT)	YES	YES (6)	YES (100KB capacity)	YES	YES (16K standard)	\$1923 (Kit, with standard CRT)
Apple II	NO (Single 6502)	NO (24 lines x 40 char.)	NO (48 keys, N-key rollover)	NO (External monitor)	NO (3 pieces)	YES (5)	NO (Extra)	NO	YES (with \$500 language card)	\$2200
Apple III	NO (Single 6502A)	YES (24 lines x 80 char.)	YES (74 keys, upper and lower cases; includes 13-key numeric pad)	NO (External monitor)	NO (2 pieces)	YES (3)	YES (140KB capacity)	NO	YES (128K)	\$4190
TRS-80 Model III	NO (Single Z-80)	NO (16 lines x 64 char.)	NO (65 keys, upper and lower cases; includes 12-key numeric pad; no control key)	YES (Medium-resolution CRT)	YES	YES (6)	YES (178KB capacity)	NO	NO (48K)	\$3034

\*For systems with 8" video display, one 5.25" floppy disk drive, 48K RAM (except 96K in Apple III), standard DOS, BASIC — as of 3-20-81.

\*\*Apple III system (A3P0001) includes 96K RAM and \$250 Visicalc software in minimum configuration.

## **Design an All-In-One Computer System for your needs**





① H-89 All-In-One Computer

② H-77 Floppy Disk System

## ② The H-77 adds even more versatility to your All-In-One

**\$625<sup>00</sup>** Kit  
with one drive

- Additional data storage, easier copying of programs
- Each drive installs vertically to take up less space
- Build in 2 evenings

Designed especially for the All-In-One Computer, the H-77 Floppy Disk System gives you all the storage and programming capacity you need for most applications. When you use the H-77 with your All-In-One, you have room for up to three disk drives. You can mount operating system and program disks at the same time, for rapid access to programs and data. And because the H-77 Floppy Disk System is designed to work with the Heath All-In-One Computer, you'll have a harmonious computer system.

The storage media for the H-77 is the standard, hard-sectored 40-track diskette. Measuring just 5.25 inches in diameter, each floppy disk offers access to 100K bytes of program and data storage.

Disk drives install vertically, so the H-77 takes up less space. And each drive is factory assembled and tested, for easier kitbuilding.

You get the flexibility to add as much data storage capability as you need. You can add the H-77 to your H/Z-89, or to your H-88 (with the optional H-88-4 Disk Drive) for two-drive capability and 200K bytes of on-line data storage. The H-77 comes with a diskette storage box which fits into the second drive housing, so your system looks neat and efficient.

Or, for 3-drive capability and 300K bytes of on-line storage, add the H-17-1 Second Drive to your H-77. (Three-drive systems require HDOS, Ver. 1.6, HDOS, Ver. 2.0 (HOS-817-1) or CP/M (HOS-817-2) Operating Systems - see page 83.)

For maximum data storage capacity - over 2.8 megabytes on-line - use the H/Z-89 and H-77 with the H/Z-47 8" Floppy Disk System (p. 75).

Expand the capabilities of your All-In-One Computer today. 120/240 VAC, 50/60 Hz. 8.63" H x 8.88" W x 15" D (21.92 x 22.56 x 38.10 cm).

No modifications are required to connect the H-77 to All-In-One Computers with external brightness control. H-88-6 Modification Kit (below) is required for All-In-One Computers without an external brightness control.

Kit H-77, with one drive, 25 lbs. .... 625.00

Kit H-87, with two drives, 30 lbs. .... 895.00

An assembled commercial product of this type is also available. Look for the Z-87 on page 78.

Backplate Modification Kit. Required to use H/Z-47, H-77, Z-87 Floppy Disk Systems with All-In-Ones which do not have an external brightness control.

H-88-6, Shpg. wt. 2 lbs. .... 50.00

**H-77/Z-87 SPECIFICATIONS:** Diskette Size: 5.25 inches. Diskette Type: Single-sided, single-density. Number of Tracks per Diskette: 40. Number of Sectors per Track: 10. Formatted Bytes per Sector: 256. (Diskettes not included.) Spindle Motor Speed: 300 revolutions per minute (rpm), +1 percent. Data Transfer Rate: 128 kilohertz. Motor Start Time: 1 second. Operating Temperature Range: 32 to 104 degrees F (0 to 40 degrees C). Power Requirement: 120/240 VAC, 50/60 Hz. Overall Dimensions: 8.625" H x 8.875" W x 15" D (21.9 x 22.5 x 38.1 cm). Net Weight: 22.5 lbs. (10.2 kilograms).

## All-In-One Accessories

**SAVE 35% on 16K RAM Expansion Set.** Expand your H-88 or H-89 to as much as 48K RAM with one or two of these memory expansion sets.

H-88-2, Shpg. wt. 1 lb. Was \$60.00, NOW \$39.00

**64K Wired Memory Expansion Kit** expands RAM capacity of the All-In-One to 64K. Requires 48K of memory, H-88-7 ROM Kit (sold below).

WH-88-16, Shpg. wt. 1 lb. .... 150.00

**Replacement ROM Kit** to use All-In-One Computer with H/Z-47, CP/M and WH-88-16 Memory Expansion. Facilitates ORG-0 operation.

H-88-7, Shpg. wt. 1 lb. .... 55.00

**Three-Port EIA RS-232S Serial Interface** lets All-In-One communicate with printers, time-share systems and other peripherals.

HA-88-3, Shpg. wt. 2 lbs. .... 120.00

**Floppy Disk Drive and Controller for H-88.**

H-88-4, Shpg. wt. 17 lbs. .... 490.00

**Cassette Interface for WH-89-CA Computer.**

H-88-5, Shpg. wt. 2 lbs. .... 100.00

**Wire Wrapping Board** with bus connectors. Design custom circuits. Accepts forty-eight 16-pin sockets (also 54 14-pin, other combinations). Uses HCA-6, HCA-7 (p. 76).

H-88-10, Shpg. wt. 1 lb. .... 30.00

**Second Drive for the H-77/Z-87.**

H-17-1, Shpg. wt. 5 lbs. .... 345.00

**Plastic Anti-Glare Filter, Clear.**

HCA-3, Shpg. wt. 1 lb. .... 12.95

**Fabric Anti-Glare CRT Filter, Black.**

HCA-4, Shpg. wt. 1 lb. .... 19.95

**Dust Cover for All-In-One Computer and H/Z-19.**

HCA-5-89, Shpg. wt. 1 lb. .... 14.00

**Dust Cover for the H-77/Z-87.**

HCA-5-77, Shpg. wt. 1 lb. .... 14.00



FREE delivery, within 50 miles of store, for phone charge orders that ship UPS.

# 1 Get immediate programming versatility, plug-in flexibility with the popular, budget-pleasing Heath H-8 Computer

ONLY  
\$350<sup>00</sup>

- 8080A CPU standard — Z-80 CPU available separately
- Buffered bus has 7 plug-in memory, I/O positions
- Expanding software library

The Heath H-8 Computer — the computer that grows as you grow. With its seven positions for plug-in boards, you can put together almost any combination of memory, interfacing and accessories. And our expanding selection of peripherals, accessories and software gives your H-8 Computer unmatched flexibility and versatility.

Novices can use the H-8 as a computer trainer. The 16-key front panel keyboard provides octal data entry, direct access to registers and memory, one-button program load and dump, and input/output keys to communicate directly with any port. And you can directly monitor program activity with the 8-digit front panel octal readout.

The H-8's features add extra value. Random Access Memory (RAM) capacity — including interfacing — is 64K bytes.

The CPU board, including the 8080A chip, clock, systems controller and ROM monitor, is fully assembled, wired and tested for easier kit assembly and faster system setup.

An exclusive Heath 50-pin fully-buffered bus gives you ample room for memory and interfacing. The built-in speaker gives you audible feedback and special effects. Front panel lights keep you up to date on status. With all these features and more, the H-8 is an excellent choice to be the heart of your computer system.

Now you can equip your Heath H-8 Computer with the powerful Z-80 microprocessor — the same CPU used in the popular Heath H-89 All-In-One Computer! Learn more about the Heath HA-8-6 Z-80 CPU Board at right.

Heath floppy disk systems, sold separately, provide greater flexibility. The H-17, 5.25-Inch Floppy Disk System (sold on page 73) provides 100K bytes of on-line data storage. Add a second drive to expand data storage capacity to 200K bytes. And with the H-17-3 Modification Kit, you can expand the on-line and program data storage capacity of the H-17 to 300K bytes.

Expand to over 2.5 megabytes on-line! The H-47 Floppy Disk System, our 8-inch, dual-sided, double-density system, provides maximum data storage capacity for the H-8 Computer. See page 75 for more information on the H-47.

Design an H-8 system that meets your specific needs — and save a big 20%! Choose from an expanding selection of peripherals and accessories — including additional memory and data storage, a video terminal, color graphics, printers, a music synthesizer system and two modems.

Choose from an expanding software library. We support the H-8 with the Heath Disk Operating System (HDOS), CP/M and the UCSD P-System with Pascal. Languages include a BASIC Interpreter, BASIC Compiler, FORTRAN and COBOL. See pages 83-85 for more information.

Many new applications programs are being introduced — including problem-solvers for home, hobby and business. And the Heath Users' Group maintains over 500 programs — from business accounting and personal budgeting to computer-aided instruction, exciting games — even weather forecasting! Turn to pages 81-89 for the full story. 72/COMPUTERS

NEW! SPECIAL 20% SAVINGS ON COMPLETE H-8 SYSTEMS! Just buy these products on the same order form:

1. An H-8 Computer with at least 2 WH-8-16 Memory Boards (32K RAM);
2. Either the H-8-4 RS-232C Serial Interface, the H-8-2 Parallel Interface or the H-8-5 Serial/Cassette Interface
3. For mass storage, either the H-17 Floppy Disk System or the H-8-5 Interface;
4. Your choice of the H-19 Video Terminal, WH-34 DECwriter IV Teleprinter or the WH-44K/Diablo 1640 Printer/Terminal;
5. And any one of these operating systems: (HDOS, CP/M, UCSD P-System with Pascal or Cassette — see p. 83 and check memory requirements).

Then, deduct 20% — up to \$500 savings on a \$2,500 order (excluding shipping/handling charges; one discount per customer; not combinable with other discounts).

Get added flexibility — at a budget-pleasing price. The Heath H-8 Computer requires at least 16K bytes of Random Access Memory (RAM — see page 76) and operating software (HDOS, Heath Standard CP/M, UCSD P-System with Pascal, H-8-18 Cassette Software or similar operating system — see p. 83 and check minimum memory requirements of each system) for normal operation.

Kit H-8, Shpg. wt. 30 lbs. .... 350.00

PAMGO ROM. Boot up with 1 or 3 keystrokes — not 11. Not for use with HA-8-8 or HA-8-6.

H-8-9, Shpg. wt. 1 lb. .... 20.00

NEW! Z-80 CPU Card for H-8. Includes a powerful Z-80 CPU, plus all features of HA-8-8 Extended Configuration Option below (at no extra cost). Available in mid August.

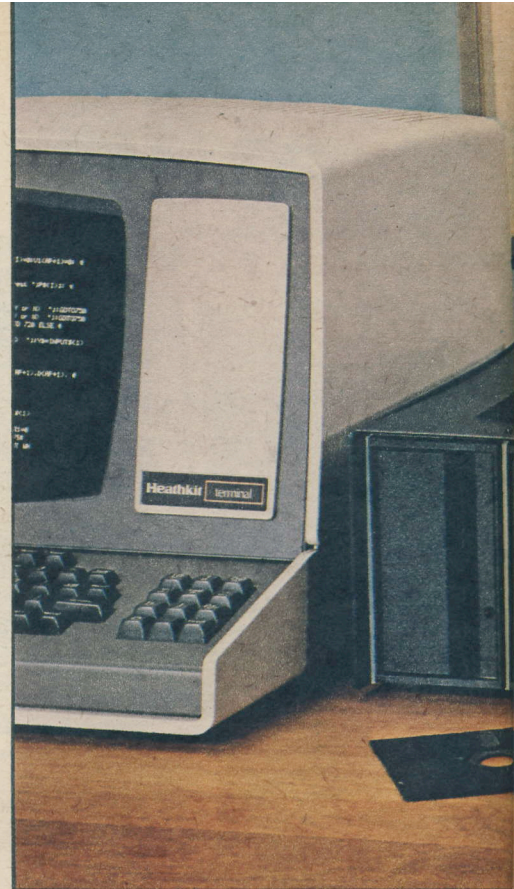
HA-8-6, Assembled, Shpg. wt. 5 lbs. .... 199.00

Extended Configuration Option. Required to run H-47 or CP/M in H-8s without HA-8-6 Z-80 CPU Card above. Includes new front panel ROM with single-button boot-up.

HA-8-8, Shpg. wt. 1 lb. .... 65.00

Dust Cover for H-8. HCA-5-8, 1 lb. .... 14.00

Look at the Manuals — with no risk. Manuals for H-8 Computer, H-8-4 Four-Port Serial Interface, H-14 Dot Matrix Line Printer, WH-8-16 Wired 16K RAM Memory Board and H-19 Professional Video Terminal. When you order the H-8 Computer, deduct



\$30.00 from the purchase price (excluding shipping and handling charges).

HM-800, Shpg. wt. 11 lbs. .... 30.00

NOTE: Product manual included with each kit.

**H-8 SPECIFICATIONS:** Microprocessor: 8080A. Monitor: In on-board 1K x 8 ROM. Octal addresses, data input and display from the front panel. **Monitor Functions:** Memory display and alter, register display and alter, memory load and dump, single instruction execution, program execution, port input and output. **Clock:** 2.048 MHz. **Interrupts:** Seven, priority vectored. **Power Supplies:** +8 VDC at 10 amperes maximum, regulated to +5 VDC on each circuit board; +18 VDC at 500 milliamps, regulated to +12 VDC and -5 VDC on the CPU circuit board. **Chassis Capacity:** Seven locations on the mother circuit board for memory or interfacing cards. Four memory cards maximum. One bus expansion maximum. **Operating Temperature Range:** 32 to 104 degrees F (0 to 40 degrees C). **Power Requirement:** 120/240 VAC, 50/60 Hz, 150 Watts. **Dimensions:** 6.50" H x 16.25" W x 17" D (16.51 x 41.28 x 43.18 cm). **Net Weight:** 21 lbs. (9.5 kg).

## How to configure a Heath H-8 Computer System

With 7 plug-in positions for memory and I/O, your H-8 Computer System can grow as your needs grow. You can expand to 64K of memory, and up to over 2 megabytes of on-line data storage. You'll find that the tremendous benefits provided by these H-8 accessories is well worth your hard-earned computer dollar.

Memory:  
(Up to 4 cards,  
64K RAM)

Data Storage:

Interfacing:

Peripherals:

Wired 16K  
WH-8-16

Cassette  
ECP-3801A  
(requires H-8-5  
Interface)

Floppy Disk  
H-17 (5.25" — requires  
minor modifications. HA-8-8  
Ext. Configuration to run CP/M)  
H-47 (8" — requires  
HA-8-8, WH-8-47)

Wired  
H-47 Interface with  
2 Serial Ports  
WH-8-47

Serial/  
Cassette  
1-port  
H-8-5

Serial  
4-port  
H-8-4

Parallel  
3-port  
H-8-2

Terminal  
H-19  
(requires Serial I/O  
H-8-4, H-8-5 or WH-8-47)

Color Display  
GDZ-1320  
(requires HA-8-3  
Color Board)

Printers  
H-14, WH-24-1,  
WH-55K, WH-54  
(requires H-8-4 or WH-8-47)

Modems  
WH-23, WH-33  
(requires Serial I/O  
H-8-4, H-8-5 or WH-8-47)



Now use your Visa or MasterCard credit cards or Heathkit Revolving Charge to purchase your kit!

2 H-17 Floppy Disk System (shown with three-drive modification and 2 additional drives installed)

1 H-8 Computer

H-47 Floppy Disk System (p. 75)

## 2 Instant access and increased capacity — yours with the H-17 Floppy Disk System

**\$625<sup>00</sup>**  
Kit

- Up to 300K bytes of on-line data storage (using accessories)
- Build in just 2 evenings

**Make your H-8 Computer System** a total versatility system — with the H-17 Floppy Disk System. With the H-17, you get the data storage capacity you need to load programs quickly. Store dozens of programs on a single disk and have rapid access to any one of them, anytime you need it.

**The H-17 provides** up to 100K bytes of on-line data storage (up to 300K bytes with additional drives — order at right). Data is stored on standard, hard-sectored 40-track diskettes — just 5.25 inches in diameter. Disks are easier to handle — and load — than paper tape or cassettes.

**The H-17 includes** a single disk drive, a disk interface/controller circuit board which plugs directly into the H-8's mainframe, and a built-in power supply. Because the H-17 Floppy Disk System is especially designed for the H-8 Computer, you get a harmonious computer system that interfaces properly and runs smoothly.

See the expanding line of systems and applications software for the Heath H-8 Computer — including the complete line of **SOFTSTUFF™** software tools, utility programs and the Heath Users' Group software library, with more than 500 useful programs. Turn to pages 81-89 for complete details on software.

- Take advantage of the hundreds of disk-based H-8 software programs
- Assembled and tested drive system

**The H-17 uses** the famous Siemens 82 single-drive system, a performance-proven 5.25-inch floppy disk drive which provides accurate high-speed access to data. The assembled Siemens drive performs better than most equivalent systems.

**For more data storage area,** add the optional H-17-1 Second Drive and make your H-17 a more versatile dual-drive floppy disk system. With two drives, you'll have up to 200K bytes of program and data storage area. You'll be able to run operating system and program disks at the same time.

**If you need even more on-line data storage capacity,** buy the new H-17-3 Three-Drive Modification Kit and another H-17-1 Drive. Add this kit to your H-17 to get up to 300K bytes of on-line storage — 50% more than on previous versions. With the H-17-3, your H-17 can provide even more versatility.

**To use the H-17 Floppy Disk System effectively,** you need an H-8 Computer with at least 32K of Random Access Memory (RAM), as well as a Heath disk-based operating system (sold on page 83).

**Your choice of operating systems includes** the Heath Disk Operating System, which many of the 500 utility and applications programs in the Heath Users' Group software library (p. 81) are based on; Heath CP/M, with hundreds of existing programs available; and the UCSD P-System with Pascal, a modular system with a large library of utility and applications programs.

**Kit includes** one blank 5.25-inch floppy diskette.

**Kit H-17,** with one drive, 28 lbs. .... **625.00**

**Factory Assembled and Tested H-17 Floppy Disk System.** Comes with the same extra-value features found on the kit version above. With one drive.

**WH-17,** Shpg. wt. 28 lbs. .... **695.00**

**Three-Drive Modification Kit for H-17 Floppy Disk.** Increases capacity of the H-17 to three 5.25-inch floppy disk drives, instead of two. Enjoy even more programming flexibility and versatility. Includes new sheet metal, fan and power supply components, 3-drive cable. Easy kit assembly — takes as little as one evening. Requires H-17 or WH-17. Drive not included; order H-17-1 Drive separately (below) to take advantage of additional data storage capability.

**Kit H-17-3,** Shpg. wt. 8 lbs. .... **85.00**

**Optional Second or Third Drive** adds versatility to your H-17. Run operating system and program disks simultaneously. 100K on-line bytes per drive.

**H-17-1,** Assembled, Shpg. wt. 5 lbs. .... **345.00**

**Dust Cover for H-17 Floppy Disk System.**

**HCA-5-17,** 1 lb. .... **14.00**

**H-17/WH-17 SPECIFICATIONS:** Storage Media: 5.25-inch, hard-sectored diskette. Number of Tracks per Diskette: 40. Number of Sectors per Track: 10. Formatted Bytes per Sector: 256. Drive Type: Siemens Model 82. Track Seek Time: 30 milliseconds. Random Sector Access Time: Less than 250 milliseconds. Operating Temperature Range: 32-104°F (0-40°C). Power Requirement: 120/240 VAC, 50/60 Hz, 75 watts. Dimensions: 6.25"H x 13.5"W x 13.5"D (15.89 x 34.29 x 34.29 cm).



FREE delivery, within 50 miles of store, for phone charge orders that ship UPS.

# The Heath H-19A Professional Video Terminal features two new optional anti-glare CRTs

- Z-80 microprocessor-based for fast, efficient data handling
- Heavy-duty typewriter-format keyboard with separate 12-key numeric keypad
- Eight user-definable function keys
- DEC VT-52 software-compatible
- Expandable to an All-In-One Computer

As low as  
**\$695<sup>00</sup>**  
Kit  
with standard  
white CRT

**CHOOSE FROM  
ANTI-GLARE WHITE,  
ANTI-GLARE GREEN  
OR STANDARD  
WHITE CRTS**

The Heath H-19A Professional Video Terminal features exceptional capabilities in its price range. It's designed for the H-8 or H-11A Computers – or with any device using an RS-232C Serial Interface.

The H-19A's professional keyboard, laid out in typewriter format, lets you begin entering data right away. The terminal's 32 functions can be controlled from the keyboard, or a computer. A separate 12-key numeric keypad, in calculator format, makes the entry of mathematical programs faster and easier.

Baud rates ranging from 110 to 9600 are keyboard-selectable for easier changes. Eight separate user-function keys give extra flexibility.

The H-19A displays the entire ASCII character set, including upper and lower case letters. The terminal can also display thirty-three graphics characters, which can be arranged for a variety of graphic displays and effects.

The video display screen can show up to twenty-four 80-character lines (with a software-controlled 25th line). Using the H-19A's direct or relative cursor addressing capabilities, you can make corrections or edit text – anywhere on the video display screen.

The 12" (30.48 cm) diagonal cathode-ray tube (CRT) features an extremely wide bandwidth for outstanding resolution and bright, clear, easy-to-read video displays. A reverse video capability allows you to emphasize any portion of the video screen by reversing white on black.

Now you have a choice of two anti-glare screens (green or white) to make the H-19A easier on your eyes – as well as the standard white CRT.

You'll be able to change your H-19A into an H-88A All-In-One Computer, with the H-19-3 Conversion Kit (available 4th quarter 1981). And the H-19's ROM listing is available (also below) to help you understand how this powerful, versatile video terminal operates – or to allow you to alter its personality and cursor control protocols to match those of other terminals. For 120/240 VAC, 50/60 Hz power. Draws just 45 Watts. Overall Dimensions of the H-19 Video Terminal are 13" H x 17" W x 20" D (33.02 x 43.18 x 50.80 cm).

**H-19A Professional Video Terminal Kit with Anti-Glare White CRT.**  
Kit HS-19-1, Shpg. wt. 52 lbs. .... 725.00

**H-19A Professional Video Terminal Kit with Anti-Glare Green CRT.**  
Kit HS-19-2, Shpg. wt. 52 lbs. .... 725.00

**H-19A Professional Video Terminal Kit with Standard White CRT.**  
Kit HS-19-3, Shpg. wt. 52 lbs. .... 695.00

An assembled commercial product of this type is also available. Please see the Z-19 Professional Video Terminal on page 78.

**H-19-1, Source Listings for ROM of H-19 Video Terminal, 1 lb. .... 25.00**

**Black Fabric Anti-Glare CRT Filter for the H-19 or H-19A Video Terminals.** Sun-Flex nylon cover makes video displays stand out, cuts eye strain.  
HCA-4, Shpg. wt. 1 lb. .... 19.95

**Clear Plastic Anti-Glare CRT Filter for the H-19 or H-19A Video Terminals.** Pannelgraphix cover makes video displays easier to see.  
HCA-3, Shpg. wt. 1 lb. .... 12.95



**Dust Cover for the Heath H-19 or H-19A Professional Video Terminals.**

HCA-5-89, Shpg. wt. 1 lb. .... 14.00

**Convert the Heath H-19 Professional Video Terminal (not H-19A) into an H-88 All-In-One Computer!** Featuring easy kit assembly, this conversion kit includes a detailed, step-by-step assembly manual and all necessary parts. When finished, you'll have an H-88 All-In-One Computer with 16K bytes of Random Access Memory (RAM) – without giving up any of the features of your powerful video terminal. Add an H-88-4 5.25" Floppy Disk Drive with Controller (sold on page 71), and you can expand to a full-fledged H-89! Not for H-19A Video Terminal; a version of this kit, designed for use with the H-19A, will be available in the fourth quarter of 1981.

**Kit H-19-2, Shpg. wt. 19 lbs. .... 695.00**

**H-19A SPECIFICATIONS:** CRT: 12" (30.48 cm) diagonal. **Display Format:** 25 lines x 80 characters (25th line software-controlled). **Display Size:** 6.5" H x 8.5" W (16.51 x 21.59 cm). **Character Size:** Approximately 0.2" H x 0.1" W (0.508 x 0.254 cm). **Character Set:** 128 (95 ASCII, 33 graphic). **Character Type:** 5 x 7 dot matrix (upper and lower case) and 5 x 9 dot matrix (lower case with descenders). **Keyboard:** 84 keys (60 alphanumeric, 12 function), 12-key numeric pad. **Cursor:** Blinking nondestructive underline or block. **Cursor Controls:** Up, down, left, right, home, CR, LF, back space and tab. **Cursor Addressing:** Relative and direct. **Tab:** Standard 8-column tab. **Refresh Rate:** 60 Hz at 60 Hz line frequency and 50 Hz at 50 Hz line frequency. **Edit Functions:** Insert and delete character or line. **Erase:** Erase page, erase to end of line, erase to end of page, erase to beginning of line, erase to beginning of page and erase line. **Scroll:** Automatic scrolling, line/page freeze. **Bell:** On receipt of control G. **Video:** Normal and reverse (using escape sequence), by character. **Communications:** **Interfacing:** Standard EIA RS-232 Serial Interfacing. **Baud Rates:** 110 to 9600. **Mode:** Full or half-duplex. **Parity:** Even, odd, stick and none. **Handshaking:** Software, control S – control Q; all RS-232 Serial lines tied high internally. Buffered terminal is capable of keeping up with most operations and normal scrolling text output, at 9600 baud or less. **Operating Temperature Range:** 32-104 degrees F (0-40 degrees C). **Power Requirement:** 120/240 VAC, 50/60 Hz, 45 Watts. **Overall Dimensions:** 13" H x 17" W x 20" D (33.02 x 43.18 x 50.80 cm). **Net Weight:** 45 lbs. (20.4 kg).



# Add over 2 megabytes of on-line storage capacity with the H-47 Dual-Drive 8" Floppy Disk System

**\$2595<sup>00</sup>**  
Kit

- Supplied with two disk drives for over 2 million bytes of on-line data and program storage area
- Stores over 1.26 million bytes on each 8-inch disk — more than 12 times the capacity of a 5.25" disk
- Fully compatible with Heath and Zenith 5.25" disk systems
- Runs HDOS and GPM/Operating Systems

With the Heath H-47 Dual-Drive 8-Inch Floppy Disk System, you can add over 2 megabytes of on-line data and program storage to Heath H-8 Computer Systems — as well as Heath H-89 and Zenith Z-89 All-In-One Computer Systems.

The digital information is stored on 8-inch, soft-sectored floppy diskettes using the standard IBM 3740 format with FM or MFM encoding. Each diskette has 77 tracks per side — which permits a maximum storage capacity of 1.261 megabytes (depending upon format) per double-sided, double-density diskette. Because the Heath H-47 Floppy Disk System is supplied with two pre-assembled 8-inch floppy disk drives, this means you can have 2,522,000 bytes of data on-line at any one time (based on twenty-six 256-byte sectors per track) — more than 12 times the capacity of a 5.25-inch dual-drive system. This amount of on-line storage capacity was available only to mini and larger computer systems a short time ago!

With this additional on-line data storage capacity, even extended accounting, inventory and mathematical applications software programs are now within range of your H-8, H-89 or Z-89 Computer.

The 8-inch floppy diskettes load quickly and easily through the vertical drive doors in the H-47's front panel. An activity light on each drive shows when that drive is in use. A door lock solenoid prevents inadvertent damage to the diskettes, by not allowing the door to be opened during activity.

Compatible with Heath 5.25" floppy disk systems, you can use up to three 5.25-inch floppy disk drives with the two 8-inch floppy disk drives in the H-47, for maximum data and program storage capacity — over 2.8 million on-line bytes! And you can transfer data between 8" and 5.25" disks at any time.

Enjoy maximum software capabilities: With the H-47, you can run both HDOS and Heath Standard CP/M Operating Systems. Hundreds of useful languages, utility and applications software programs are available.

Less than half the access time: The H-47 accesses data in a fast 191 milliseconds — compared to the 490 millisecond time of currently available 5.25-inch floppy disk systems for the H-8, H-89 and Z-89 Computers.

Extremely accurate access to data: Designed to extremely close tolerances, the band actuator head stepping mechanism of the H-47 is engineered to deliver extremely accurate data access. The H-47 meets a  $1 \times 10^9$  bits soft error rate, and a  $1 \times 10^{12}$  hard error rate.

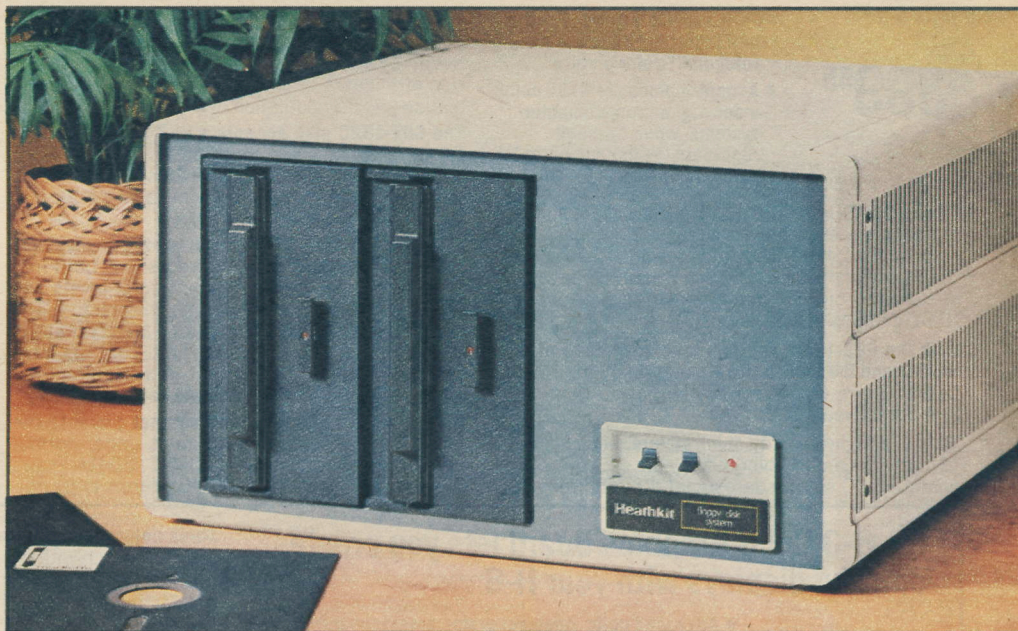
Special read/write protection: Each recording head in the disk drives of the H-47 Floppy Disk System is a read/write gap-type head. A photosensor in the drive unit detects the presence or absence of a notch in the diskette to insure write protection. If the write-protect notch is not detached, a signal is transmitted to the controller to indicate that both read and write operations are allowed. If the write-protect notch is detected, the signal indicates that only read operations are permitted.

In addition, front panel switches allow you to write-protect each drive.

Designed of steel and rugged structural foam for superior strength and durability, the H-47's case is attractively styled for desktop use. The H-47 can also be optionally rack-mounted.

The Heath H-47 Floppy Disk System includes a 40-conductor flat cable, which connects it to the Heath H-8, Heath H-89 or Zenith Z-89 Computers. The H-47 is self-contained and requires no power from the host system.

To run with the H-47, H-8 Computer Systems require the WH-8-47 H-8 to H-47 Interface with two RS-232C Serial Ports, and the HA-8-8 Extended Configuration Option. Heath H-89, WH-89 and WH-89-CA Computers — as well as Zenith Z-89 Computers — require the WH-88-47 All-In-One to H-47 Interface and the



H-88-7 Replacement ROM Set. WH-89-FA and Z-89-FA Computers require the WH-88-47 Interface. H-89 and Z-89 Computers without an external brightness control also require the H-88-6 Backplate Modification Kit (not required for current models). For 120/240 VAC, 50/60 Hz. Draws 204 watts of power. Dimensions, 10.2" H x 18.9" W x 18" D (25.91 x 48.00 x 45.72 cm).

**Heath H-47 8-Inch Dual-Drive Floppy Disk System.** Includes two drives.

**Kit H-47,** Shpg. wt. 87 lbs., Motor Freight ..... **2595.00**

An assembled commercial product of this type is also available. See the Zenith Z-47-8A Floppy Disk System on page 78.

**Wired H-8 to H-47 Interface, with two RS-232C Serial Ports.** Has the features of the WH-88-47 below — and an EIA Standard RS-232C Serial Interface.

**WH-8-47,** Assembled and tested, Shpg. wt. 2 lbs. .... **235.00**

**Extended Configuration Option for H-8 Computers.**

**HA-8-8,** Assembled and tested, Shpg. wt. 1 lb. .... **65.00**

**Wired All-In-One to H-47 Interface.** Connects the H-89, WH-89 and Z-89 Computers to the H-47. The controller circuit board selects the correct drive for a write or read operation, properly handling the flow of data to or from the drives. The controller board includes Read-Only Memory (ROM) that operates the system and Random Access Memory (RAM) that serves as a buffer memory.

All data and address exchanges between the WH-88-47 All-In-One to H-47 Interface's circuit board and the All-In-One Computer's bus are buffered.

**WH-88-47,** Assembled and tested, Shpg. wt. 2 lbs. .... **195.00**

**Replacement ROM for All-In-One Computers.** Required to use H-47 or CP/M Operating System in all H-88 and H-89 Computer Kits — and in WH-89s and Z-89s without external brightness controls.

**H-88-7,** Shpg. wt. 1 lb. .... **55.00**

**Backplate Modification Kit.** Required to use H-47 with H-88, H-89, WH-89 and Z-89 All-In-One Computers which do not have an external brightness control.

**H-88-6,** Shpg. wt. 2 lbs. .... **50.00**

**H-47 SPECIFICATIONS:** Disk Type: 8-inch floppy, dual-density/dual-sided or single-density/single-sided diskette (in standard IBM 3740 format). Disk Capacity: Dual-density/dual-sided diskette, up to 1,261,568 bytes per disk (depending upon format used); Single-density/single-sided diskette, up to 256,000 bytes per diskette (depending upon format used). Number of Surfaces per Diskette: 1 or 2 (depending upon diskette used). Number of Tracks Per Surface: 77 on each side. Recording Density: Outer Track, 1836 BPI (single-density), 3672 BPI (dual-density); Inner Track, 6536 BPI. Track Density: 48 tracks per inch. Sectors Per Track: 8 to 26 (26 standard). Data Transfer Rate: Rotational Speed (Spindle Motor Speed): 360 rpm,  $\pm 2.5\%$ . Average Rotational Latency (Average Latency Time): 83.3 mS. Average Seek Time: 78 mS. Head Settle Time: 15 mS. Average Access Time: 191 mS, including settle. Track-to-Track Move Time: 3 mS. Head Load Time: 35 mS. Operating Temperature Range: 40 to 90 degrees F (5 to 32 degrees C). Power Requirement: 120/240 VAC, 50/60 Hz, 204 Watts. Overall Dimensions: 10.2" H x 18.9" W x 18" D (25.91 x 48.00 x 45.72 cm). Net Weight: 65.8 lbs. (29.9 kg).



FREE delivery, within 50 miles of store, for phone charge orders that ship UPS.

## The GDZ-1320 Color Video Display complements your computer, VCR or color camera

**\$399<sup>95</sup>**

- Fully assembled and tested unit features 13-inch (diagonal) color picture
- Accepts composite NTSC color video signal from computer systems, video cassette recorders (VCRs) and color TV cameras

The Heath/Zenith GDZ-1320 Color Video Display represents outstanding value in its field. Team this colorful peripheral with the Heath HA-8-3 Color Graphics Board below. Or use it with computers, VCRs and color TV cameras which produce an NTSC composite video signal.

With the GDZ-1320, you can take advantage of the HA-8-3 and the color software offered by the Heath Users' Group (HUG) for the H-8 and All-In-One Computer Systems.

You get a higher-quality color picture, because this 13-inch (diagonal) color display accepts the composite NTSC color video signal directly from the

HA-8-3 Color Graphics Board — as well as other devices. You get a better picture than that produced by an RF modulator, because direct reception eliminates interference caused during modulation and demodulation of the signal.

The GDZ-1320 also accepts a Hi-Z audio input. An RCA-type phono jack, with an impedance of 75 ohms, is provided to accept NTSC composite video input — while a miniature phone jack is built into the unit for audio input.

**Fast warm-up capability lets you use the Display right away.** Fully automatic color processing, built into the Display, assures consistent color levels and vivid hues, for a better all-around color picture. The GDZ-1320's picture stays so rock-steady that the vertical hold and horizontal hold controls have been eliminated. And a built-in audio amplifier and speaker faithfully reproduce each sound.

**A high-impact black styrene cabinet** protects the Color Video Display's electronics under normal operating conditions. For 120 VAC, 60 Hz. Draws 82 Watts. UL and CSA listed. Conforms to techni-



cal requirements of 21 CFR, Subchapter J, for X-radiation. Dimensions of the GDZ-1320 Color Video Display are 14" H x 20.25" W x 14.75" D (35.56 x 51.44 x 37.47 cm).

**GDZ-1320, Assembled, Shpg. wt. 44 lbs. . . 399.95**

## HA-8-3 Color Graphics Board lets you create colorful displays with your H-8

**\$495<sup>00</sup>**

- Advanced color video generator, programmable sound generator for maximum enjoyment
- Board is capable of accepting up to four X-Y joystick consoles and the AMD-9511 Arithmetic Processing Chip (both optional)
- Board is fully assembled and tested, for fast and easy installation in your H-8 Computer

When you add the HA-8-3 Color Graphics Board to your H-8, you'll enter a new, colorful world of programming. This board connects to the GDZ-1320 above (preferred), or to other devices which accept NTSC composite video.

The advanced TI-9918 Color Video Display Generator produces vivid pictures for color and black-and-white video displays. Maximum resolution of this Color Video Display Generator is 256 x 192 pixels. The video display screen consists of 35 display planes.

**Three color display modes:** Pattern Mode, which produces 32 x 24 pattern positions, each with two unique colors; Text Mode, which produces 40 x 24 text positions on the screen (two colors are defined for the entire screen); and Multicolor Mode, which produces a grid of 64 x 48 positions. One color is allowed for each of the 3072 screen positions.

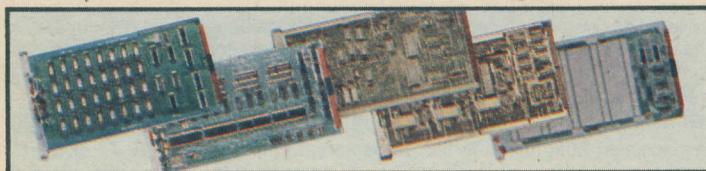
**The AY-3-8910 Programmable Sound Generator** can make nearly any sound desired for your game or other application — under software control.

**Eight channels of A/D conversion are provided,** for up to four X-Y joystick consoles (not included). Each channel has 4 bits of parallel I/O for switches and LEDs. A built-in socket accommodates the AMD-9511 Arithmetic Processor Chip (not supplied), which permits extremely rapid floating point, trigonometric and transcendental computations — as well as hardware multiplication/division of integer and floating point numbers.

**Demonstration software is supplied on a 5.25-inch disk.** Additional software will be developed and offered by the Heath Users' Group (HUG). Due to the use of wait states and an 18VDC power requirement, proper operation of the board is guaranteed only when used with Heath memory boards — or with other memory boards which use fully static single-supply RAMs.

**HA-8-3, Assembled and tested, Shpg. wt. 3 lbs. . . . . 495.00**

## Memory, interfacing, accessories for H-8 Computer



16K RAM Wired Memory Board.  
WH-8-16, Assembled, 2 lbs. . . . . 299.00

4-Port RS-232C Serial Interface.  
Modern controls, WH-8-41 Cable.  
Kit H-8-4, Shpg. wt. 2 lbs. . . . . 195.00

WH-8-4, Assembled, 3 lbs. . . . . 250.00

WH-8-41, Adapter Cable, 1 lb. . . . . 15.00

1-Port, 1200 Baud Serial/Cassette Interface. Not to connect H-8 to H-14.  
Kit H-8-5, 3 lbs. . . . . 125.00

WH-8-5, Assembled, 2 lbs. . . . . 145.00

WH-8-51, Adapter Cable, 1 lb. . . . . 15.00

3-Port, 8-Bit Parallel Interface.  
Kit H-8-2, Shpg. wt. 3 lbs. . . . . 150.00

Save \$26 on Reusable Circuit Design Breadboard Card. Kit H-8-7, 2 lbs. . . . . Was \$105, NOW 79.00

## Design and build custom circuits for your H-8

**Wire Wrapping Board** accepts 80 16-pin sockets, 3 50-pin flat cable connectors. Includes bus connectors, heat sink, 5V regulator, miscellaneous hardware.  
Kit H-8-10, 1 lb. . . . . 29.95

**Wire Wrapping Kit** — tool, 50' wire, 200 pre-cut, pre-stripped 1"-4" wires. Kit HCA-6, 1 lb. . . . . 13.95

**Wire Wrapping Socket Kit.** 36 3-level W/W sockets (14 to 40-pin). Kit HCA-7, 1 lb. . . . . 29.95

## These accessories add versatility to your H-8

**Boot up faster with PAMGO ROM.** Use just 1 keystroke on power-up, 3 on reboot — instead of 11. 2708-compatible masked, programmed ROM is exactly like H-8's front panel ROM — except power-up or reset, program counter is set to 030 000 split octal default address. Not for H-8s with HA-8-8 Extended Configuration Option, which already have 1-button boot ROM. H-8-9, Shpg. wt. 1 lb. . . . . 20.00

**Extender Board** lets you operate your H-8 Computer with accessory boards outside the card case. This board allows easier access to components for servicing, prototyping or debugging purposes.

**HA-8-1, Shpg. wt. 1 lb. . . . . 40.00**

**Music Synthesizer System.** Board connects to stereo system with two shielded cables (included). True D/A converter provides excellent 27.5-3,300 Hz frequency response, up to 9 harmonics. Four-part harmony (voices) in stereo. Enter any song right from conventional sheet music — even if you've never read music before. Documentation shows how to get maximum enjoyment. Software on 5.25" disk. Requires 24K RAM, H-17 and terminal. HA-8-2, Assembled, 3 lbs. . . . . 159.00

**Wired H-47 Disk Interface** with two RS-232C Serial Ports interfaces H-8 with H-47, line printers, video terminals and other serial devices.

**WH-8-47, Assembled, Shpg. wt. 2 lbs. . . . . 235.00**

**Extended Configuration Option.** Required to run H-8 with H-47 and/or CP/M. Has PAMGO-type 1-button boot. Features included with HA-8-6 Z-80 CPU Card. HA-8-8, Shpg. wt. 1 lb. . . . . 65.00



# Save a big \$1,335 — and get a complete, DEC-compatible educational/science computer system

Only  
**\$3995<sup>00</sup>**

- System features full compatibility with DEC PDP-11/03 — at a very substantial savings!
- Includes 56K bytes of memory and 500K bytes of on-line data storage (in IBM 3740 format)
- Powerful 16-bit computer system features a half-size KD-11HA (DEC LSI-11/2) microprocessor

Now you can save over \$1,300 — and get DEC-compatible 16-bit power, with flexibility you need to run DEC programs and real-time laboratory applications. It uses the same microprocessor, memory, interfacing and operating system as the DEC LSI-11, and runs all DEC PDP-11/03 software.

**1 H-11A Computer has 16-bit power:** Your choice of a 16-bit or 8-bit computer depends upon your needs. If you're a professional who needs full DEC compatibility, the 16-bit H-11A is your choice. It has adequate computing power, even for the more complex jobs that you will tackle later.

Smaller, yet powerful microprocessor: A KD11-HA (half-size LSI-11/2) microprocessor — makes the H-11A identical to the DEC PDP-11/03, at a fraction of the cost. The KD11-HA features PDP-11/34 instruction set, 380 ns microcycle time, resident firmware debugging (ODT), ASCII console routines, single and double operand instructions. With no on-board memory, you get more flexibility to match ROM, RAM and interfacing to your particular needs.

Seven plug-in slots: handle up to 56K bytes of memory and interfacing. You can even combine LSI-11 and LSI-11/2 components.

The easy-to-build Heath H-11A Computer includes cabinet, heavy-duty power supply, backplane with bus and assembled CPU board.

In this special system configuration, the H-11A also comes with two WHA-11-16 32K Byte Memory Expansion Modules to provide the computer with its maximum memory capacity — and H-11-5 Serial Interface Kit to communicate with peripherals via either RS-232C Serial Interfacing or a 20 mA current loop — and a WH-11-51 Adapter Cable for the Serial Interface.

**2 The H-27 Dual-Drive Floppy Disk System,** included in the HKS-11 system, provides up to 500K bytes of on-line data storage — enough for most of your needs. It stores data on 8-inch disks, compatible with the IBM 3740 format.

You get fast access to data — The H-27's Z-80 microprocessor-based disk controller provides an average data access time of 250 milliseconds.

Full compatibility: The H-27 is compatible with DEC RX01 (PDP-11/03) and RXV11 (PDP-11V03) hardware and software — so you can use the hundreds of applications programs written for the DEC PDP-11 microcomputer.

Extra-value features: Single-board bootstrap/interface circuit takes just one



H-11A backplane slot. Built-in diagnostics, mechanical interlock and write-protect function guard important programs.

Start programming right away — because this system includes both the HT-11 Disk Operating System and HT-11-1 FORTRAN (below).

**Complete H-11A 16-Bit Microcomputer System.** Includes H-11A Computer, two WHA-11-16 Memory Expansion Modules, H-11-5 Serial Interface, WH-11-51 Adapter Cable, H-27 Dual-Drive 8" Floppy Disk System, HT-11 Disk Operating System and HT-11-1 FORTRAN Language. \$5330.00 if purchased separately.

**Kit HKS-11,** Shpg. wt. 176 lbs., Motor Freight ..... **NOW ONLY 3995.00**

**Kit H-11A,** DEC-compatible 16-Bit Computer, Shpg. wt. 43 lbs. .... **1395.00**

**WH-11-UL,** Assembled/UL-approved Computer, 37 lbs. .... **2100.00**

**Kit H-27,** 8" Disk System Kit with 2 drives, 93 lbs., Mtr. Frt. .... **2195.00**

**WH-27,** Assembled H-27 with 2 drives, 69 lbs., Mtr. Frt. .... **2595.00**

**Line Time Clock Switch Modification Kit** (shown above right) places the LTC switch on the front panel for easier access. Includes new front panel.

**Kit 830-35,** Postpaid ..... **53.50**

**Look at the Manuals before you buy.** Manuals for H-11A Computer, H-11-5 Serial Interface, H-11-2 Parallel Interface and H-19 Video Terminal. Purchase price refunded when you buy an H-11A Computer. **HM-1100,** 12 lbs. .... **30.00**

**H-11A/WH-11-UL SPECIFICATIONS:** Memory: 64K bytes total. RAM/ROM Addressed-0 to 56K; I/O Addressed-56 to 64K. Backplane: Eight 2-wide module slots. Power Requirement: 120/240 VAC, 50/60 Hz, 200 Watts. Dimensions: 6.5" H x 19" W x 17" D.

**H/WH-27 SPECIFICATIONS:** Data Transfer Rate: Average Access Time: 250 ms. Power Requirement: 120/240 VAC, 50/60 Hz. Dimensions: 7.75" H x 18" W x 20" D.

## Add flexibility to your H-11A with these accessories and interfaces

**32K Byte (16K Word) Memory Expansion Module** provides additional RAM. On-board refresh, 570 nS cycle time, 250 nS access time. Maximum H-11A memory capacity, 56K bytes (28K words).

**WHA-11-16,** Assembled and tested, 2 lbs. ... **495.00**

**Extended Arithmetic Chip** saves memory space, adds fixed point multiplication, division and extended shifts. Full floating point functions.

**H-11-6,** Shpg. wt. 1 lb. .... **190.00**

**Serial Interface** provides RS-232C or 20 mA loop interfaces. 50-9600 baud rates. Compatible with PDP-11V03, other LSI-11 computers. Plugs directly into the LSI-11 backplane. Includes mating connectors. To interface printers to H-11A, order WHA-11-5 (right).

**Kit H-11-5,** Shpg. wt. 2 lbs. .... **135.00**

**WH-11-5,** Assembled and tested, 1 lb. .... **160.00**

**Adapter Cable for H-11-5 Serial Interface.**

**WH-11-51,** Assembled and tested, 1 lb. .... **15.00**

**Printer-to-H-11A Serial Interface Board.**

**WHA-11-5,** Shpg. wt. 1 lb. .... **150.00**

**Parallel Interface.** 32 latched I/O lines, 16-bit word transfers and LSI-11 interface — as well as control logic for interrupt processing and vectored addressing. Drives cable up to 25' long. Compatible with TTL, DTL devices.

**Kit H-11-2,** Shpg. wt. 2 lbs. .... **130.00**

**WH-11-2** Assembled and Tested, 1 lb. .... **160.00**

**Wire Wrapping Board** for designing custom circuits is punched, etched to accept 32 16-pin IC sockets (38 14-pin, other combinations). With card extractor, hardware. Uses HCA-6, HCA-7 (p. 76).

**H-11-10,** Shpg. wt. 1 lb. .... **35.00**

## Program your H-11A more efficiently with Operating Software and FORTRAN

**EXPAND** applies user's or library's definition whenever source program references macro. **ASEMBL** Assembly Language outputs single relocatable binary object file, can also produce assembly listing with symbol table. **CREF** Cross-Reference appends index of symbol usage to assembly listing when specified as part of assembly output. All 3 programs support PDP-11 instruction set.

**EDIT** text editor creates, modifies ASCII source files

for input to other system programs. **LINKER** converts assembler or FORTRAN object modules into run-time format for loading, execution. Relocates code, links global references, creates runnable program file for system. **LIBRARIAN** creates, maintains subroutine libraries for linker.

**PIP** transfers, merges, moves, copies, renames and deletes files; lists, zeros and compresses device directories. **ODT** (On-line Debugging Technique) provides commands to display, alter the state of a running program.

**BASIC INTERPRETER** offers access to HT-11's I/O system and file structure through BASIC. Variable-

length strings, sequential files, virtual memory arrays, chaining, overlays. Calculator mode performs calculations, aids in debugging.

Requires H-11A/H-27 system with 32K bytes (16K words) RAM, H-19 (p. 74) and H-11-5 (above).

**HT-11 (Requires Sublicense Grant on page 88),** Shpg. wt. 12 lbs. .... **350.00**

**FORTRAN Language for H-11A.** Binary software features complete ANSI Standard 1966 FORTRAN IV with extensions for increased speed. Requires H-11A/H-27 system with HT-11 O/S above.

**HT-11-1 (Requires Sublicense Grant on page 88),** Shpg. wt. 9 lbs. .... **250.00**



FREE delivery, within 50 miles of store, for phone charge orders that ship UPS.

COMPUTERS/77

# Assembled commercial computer products from Zenith Data Systems

## Z-89 Computer with free \$150 operating system!

**\$2895<sup>00</sup>**

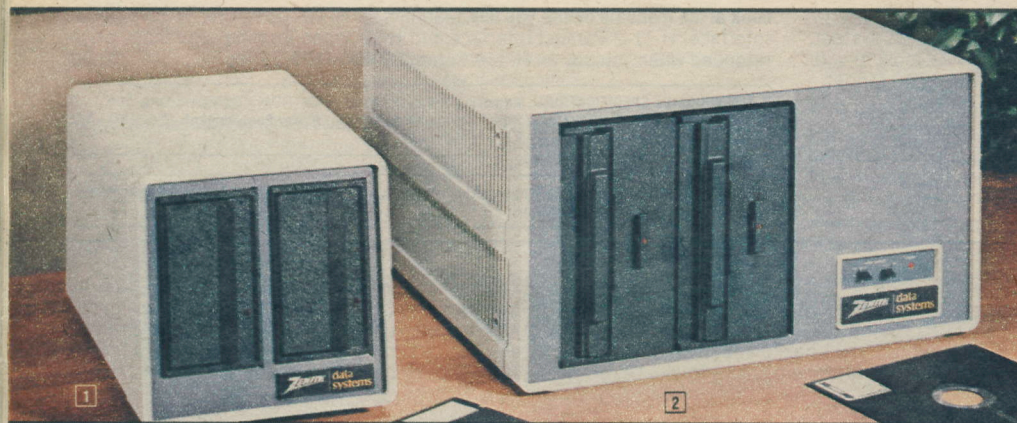
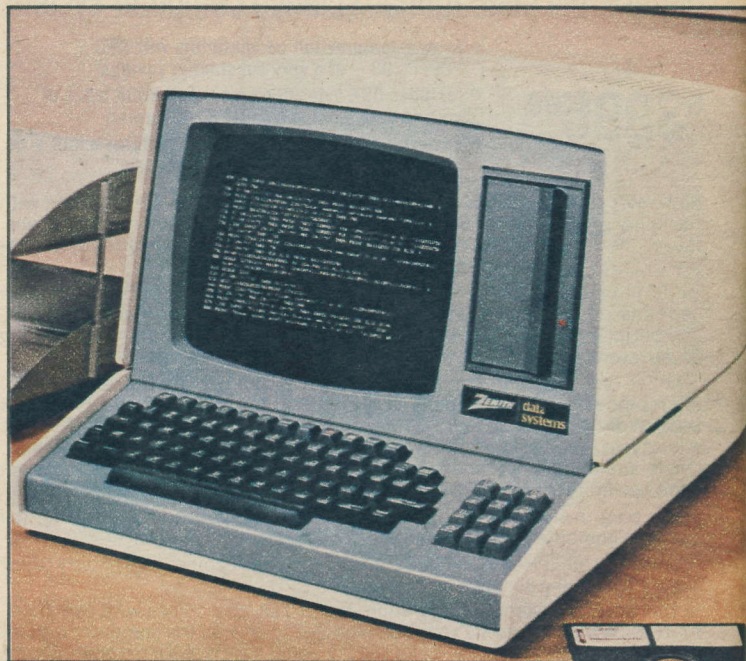
- Includes your choice of HDOS or CP/M Operating Systems, \$150 values, at no extra cost! Indicate model number of the HDOS or CP/M System you want to your salesperson (see p. 83)

Two Zilog Z-80 microprocessors – today's standard of the microcomputing industry – control computing and terminal functions, with a memory capacity of up to 64K bytes of RAM (48K bytes of RAM are standard). Built-in 5.25" floppy disk drive stores up to 100K. Optional external storage, using either 5.25" (Z-87) or 8" (Z-47) drives, can increase capacity to over 2.8 megabytes. Super-clear, large-capacity video display shows twenty-five 80-character lines (2,000 characters) at any one time. Typewriter-style keyboard with 33 special graphics characters. Three RS-232 Serial I/O Ports for printer and telecommunications expandability. Uses same memory and accessories as H-89 – see pgs. 70-71. For 120/240 VAC. Overall Dimensions, 13" H x 17" W x 20" D.

**Z-89-FA, Assembled, 55 lbs. . . . . \$3045.00 Value, NOW ONLY 2895.00**

Zenith Data Systems Computers, which are factory assembled and tested, are designed for commercial use. Operation of these models in residential areas may cause unacceptable interference to radio and TV reception – requiring the operator, pursuant to FCC regulations, to take whatever steps are necessary to correct the interference.

The Zenith line of commercial computer products includes the Z-89 All-In-One Computer, the Z-19 Professional Video Terminal, 5.25" and 8" floppy disk systems – as well as letter-quality and matrix printers.



### 1 Add 200K of on-line storage with Z-87 5.25" Disk System

**\$1195<sup>00</sup>**

- Features dual drives, easy plug-in adaptability to Z-89, read/write protection

Add 200K bytes of on-line data storage to your Z-89 with the Z-87. Two vertical disk drives take up less space. They accept single-density, single-sided, hard-sectored, 40-track 5.25" floppy diskettes. Extremely accurate – meets 1 x 10(9) bit soft error rate and 1 x 10(12) hard error rate. Single read/write gap-type recording head. Photosensor in each drive detects presence or absence of notch in diskette, assuring proper read/write protection. For 120/240 VAC, 50/60 Hz. Draws 75 Watts of power. Overall Dimensions 8.625" H x 8.875" W x 15" D (21.9 x 22.5 x 38.1 cm).

**Z-87, Assembled with 2 drives, 28 lbs. . . 1195.00**

### 2 Move up to over 2.5 megabytes on-line with Z-47

**\$3500<sup>00</sup>**

- Compatible with Z-89; adds over 2.5 megabytes of on-line data and program storage

The dual-drive Z-47 provides enough on-line data storage for extended accounting, inventory and mathematical functions – up to 2.5 megabytes. It accepts 8" floppy diskettes in IBM 3740 format. Door lock solenoids prevent inadvertent damage to diskettes by locking drive doors closed during activity. Photosensor read/write protection. Fast 191 mS average data access time. 120/240 VAC. 10.20" H x 18.90" W x 18" D. Compatible with current Z-89, but requires H-88-6 Mod. Kit and H-88-7 ROM (p. 71) to run on Z-89s with no external brightness control. Assembled.

**Z-47-BA, 66 lbs., Motor Freight . . . . . 3500.00**



### Z-19 Video Terminal features fast, efficient operation

**\$995<sup>00</sup>**

- Terminal interfaces with most standard systems; ANSI and DEC VT-52 compatible

The Z-19 features a Zilog Z-80 microprocessor to allow complete screen control for easier data entry. A super-sharp, high-resolution video display shows twenty-five 80-character lines (2,000 characters). High-performance typewriter-style keyboard has 72 keys, 12 special user-function keys (8 of which are user-programmable), and a separate 12-key numeric pad. 33 special graphics characters. Edit by character or line. RS-232C Serial Interfacing runs at 110-9600 baud. All features controllable from keyboard, computer or interior switches. 120/240 VAC. 13" H x 17" W x 20" D.

**Z-19, Assembled, Shpg. wt. 43 lbs. . . . . 995.00**



## Rugged dot matrix and letter-quality commercial printers fill every need

You'll find a commercial printer for your particular need in our factory assembled and tested line. Choose from two letter-quality daisy wheel printers: the WH-44/Diablo 1640 KSR Printer/Terminal, with a full ASCII keyboard; and the WH-54/Diablo 630 R0 Printer, which uses both metal and plastic daisy wheels.

There are also two dot matrix printers: The WH-24-1/TI-810 Printer, the fastest dot matrix printer we offer; and the WH-34/LA-34 DECwriter IV Printer/Terminal, which includes keyboard. And the HCA-2 Floor Stand fits all printers shown on this page.



### Letter-quality printer/terminal for word processing

**\$2995<sup>00</sup>**

- 45 cps bi-directional, letter-quality printing
- With full ASCII keyboard — upper, lower case
- Has RS-232C Interface, 256-byte print buffer

Forward/reverse paper motion, ETX/ACK protocol, host program control, self-testing capabilities. Has 2-color/graphics capabilities with 1/20" horizontal, 1/48" vertical motion. Accepts data at 110-1200 baud; compatible with Bell 102, 113, 212, equivalent modems. With friction platen, power supply, operator control panel, HCS-22 Print Wheel (Elite 12 w/unslashed zero), HCS-51 Film Ribbon. 120/240 VAC, 9.25" H x 23.50" W x 15.75" D.

**WH-44K**, Assembled, Shpg. wt. 72 lbs., Motor Freight ..... **2995.00**

**Bi-Directional Tractor Feed for WH-44K, WH-54** allows moving paper backward through printer for graphics, improved registration. **HCA-1**, 9 lbs. .... **259.00**

### Save \$100 on this versatile DECwriter Teleprinter

NOW ONLY

**\$1095<sup>00</sup>**

**SAVE \$100!**



- Assembled unit prints at true 30 cps speed
- Reproduces full 128-character ASCII set

WH-34/LA-34 DECwriter IV has typewriter-style keyboard. Burst speeds to 45 cps. RS-232C Interface. 120 VAC. 7" H x 22" W x 15.5" D.

**WH-34**, Assembled, 47 lbs. .... **Was \$1195.00, NOW ONLY 1095.00**

**WHA-34-2**, Tractor Feed, Shpg. wt. 3 lbs. .... **179.00**



### Floor Stand for commercial printers

Fits all printers on this page. Raises printer to desk level for easier operation. With paper rack.

**HCA-2**, Shpg. wt. 28 lbs. .... **99.00**



**SAVE \$200!**

### The lowest price we've offered on Diablo quality!

NOW ONLY

**\$2295<sup>00</sup>**

- Diablo 630 R0 is factory assembled and tested
- Uses high-quality metal, plastic daisy wheels
- Fewer parts, adjustments for reliable operation

Now you can save \$200 on this value-priced breakthrough! The WH-54 is ideal for word processing systems and other applications which require letter-quality printing. Fewer moving parts and field adjustments. Uses both metal and plastic print wheels. Prints full 96-character ASCII set, upper and lower case, at up to 35-40 cps. RS-232C Interface and 256-byte print buffer run at 110-1200 baud. Includes friction platen, power supply, operator control panel, HCS-22 Print Wheel (Elite 12 with unslashed zero) and HCS-51 Film Ribbon. 120/240 VAC. 9.25" H x 23.5" W x 15.75" D.

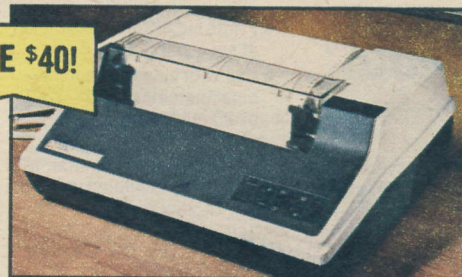
**WH-54**, Assembled, 65 lbs., Mtr. Frt. .... **Was \$2495.00, NOW ONLY 2295.00**

### Save on WH-24-1/TI-810 — our fastest printer!

NOW ONLY

**\$1695<sup>00</sup>**

**SAVE \$40!**



- Features optimized 150 cps bi-directional dot matrix printing
- Prints upper, lower case characters
- Handles forms up to 15" wide

Reproduces full 96-character ASCII set, upper and lower case. Built-in RS-232C Serial Interface, 256-byte FIFO buffer accept data from 110-9600 baud. Adjust line width to 132 characters, vertical spacing to 6 or 8 lines per inch. Prints up to 5 copies of an original. 120/240 VAC, 50/60 Hz. 8" H x 25.75" W x 20" D. Requires WHA-11-5 Serial I/O Card (p. 77) for use with H-11A; not required for other Heath computers.

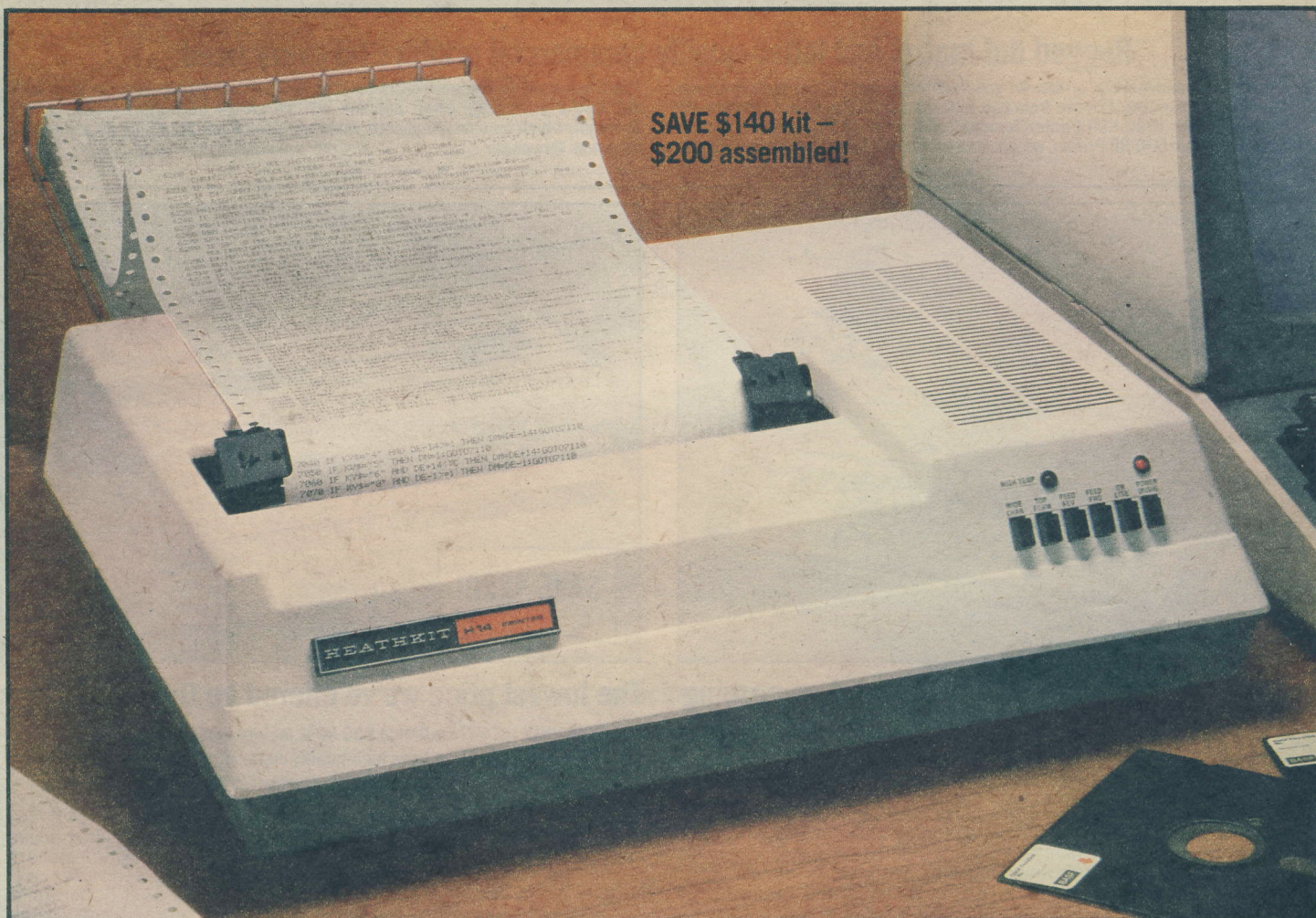
**WH-24-1**, Assembled, 66 lbs., Mtr. Frt. .... **Was \$1735.00, NOW ONLY 1695.00**

See our full line of quality print wheels, ribbons and paper for these commercial printers on page 82.



FREE delivery, within 50 miles of store, for phone charge orders that ship UPS.

**SAVE \$140 kit —  
\$200 assembled!**



## Lowest price ever on kit and assembled versions of popular H-14 Line Printer!

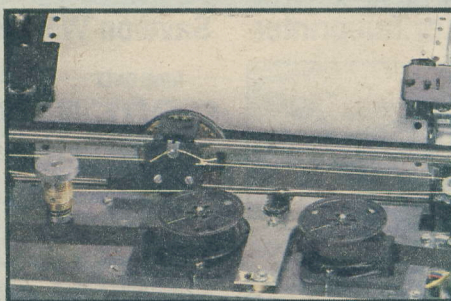
**NOW ONLY  
\$495<sup>00</sup>  
Kit**

- Has extra features you won't find on comparably priced dot matrix line printers
- Prints std. 96-char. ASCII set at speeds of up to 75 cps
- Use with most computers — communicates via RS-232C or 20 mA loop interfacing

Now save even more on the Heath H-14 Printer, with new, lower prices on both kit and assembled versions! With the H-14, you get hard copy for added convenience in reading, editing, debugging and modifying your computer programs. The H-14 can also provide handy printed copies of address lists or other data you need for any of your personal or business applications.

The versatile, microprocessor-based H-14 prints the standard 96-character ASCII set (upper and lower case) on a 5 x 7 dot matrix print head. Uses readily available 0.5-inch nylon inked ribbon on 2-inch spools. Maximum throughput rate is 75 characters per second, with selectable 80, 96 or 132 character line length. Standard vertical spacing is 6 lines per inch; 8 lines per inch spacing is a software selectable option.

80/COMPUTERS



**Sharp printout, low payout: The Heath H-14 is one of the lowest-cost microprocessor-based line printers available today.**

Baud rates are user-selectable, from 110 to 4800. Adjustable width sprocket feed handles edge-punched fan-fold paper from 2.5 inches to 9.5 inches wide, with a maximum form thickness of 0.006 inch.

The H-14 connects to most computers with an RS-232C Serial Interface or 20 mA current loop. Handshaking provided by busy control signal.

Standard equipment for the H-14 includes a 25-pin male EIA connector for fast, convenient hookup — and a matching paper catch which keeps the output of the printer handy and organized.

The H-14 is designed to give years of reliable, trouble-free service — at substantial savings, both in kit and assembled form. 120/240 VAC. 4.80" H x 18.33" W x 14.33" D. Requires HDOS or CP/M for H/Z-89; H-88-18 for H-88; any Heath-offered operating system for H-8.

**SAVE \$140 on easy-to-build H-14 Printer.**  
Kit H-14, 30 lbs. . . Was \$635.00, **NOW ONLY 495.00**  
**SAVE on factory assembled WH-14 Printer.**  
WH-14, 27 lbs. . . . \$795 in Cat. 852, **NOW 595.00**  
**HCA-5-14, Dust Cover for H/WH-14, 1 lb. . . 14.00**

**H-14/WH-14 SPECIFICATIONS:** **Printing Speed:** Initial time per full line is approximately 1.75 seconds on 60 Hz power line, 2.1 seconds on 50 Hz power line. Avg. throughput approx. 40 cps with 96 char. line. Print head temp. controlled by varying print speed. **Characters:** Impact prints 0.11" high characters. **Format:** 80, 96 or 132 cpi (96 cpi software selectable only). **Forms Handling:** Sprocket feed with adj. widths, 2.5"/sec slewing rate. Form depth selectable from 0.0210" to 0.1365". **Ribbon System:** Standard typewriter ribbon with automatic reversing mechanism. **Panel LED Indicators:** Power on/off, print head temp. **Operator Controls:** Power on/off, on/off line, fwd/reverse feed, top of form, wide characters.



Now use your Visa or MasterCard credit cards or Heathkit Revolving Charge to purchase your kit!

# HUG makes your Heath computer even more powerful with its 500-program software library



Membership in the Heath Users' Group (HUG) keeps you up to date on the latest Heath computer developments — while you expand your utility and applications software capabilities!

## Here's what a membership in HUG gives you:

**1. Special access to the HUG Software Library** — a constantly updated and expanded library which now has more than 500 low-cost, user-submitted utility and applications programs for your H-8, H-88 or H-89/Z-89 All-In-One Computer. The library includes a diversified collection of programs, sub-routines and procedures written by members of HUG. The programs are stored on cassettes and disks (see partial list below);

**2. The HUG Software Library Catalog**, which describes the contents of the HUG Software Library — including utility and applications programs in computer-aided instruction, business applications, personal finance, amateur radio programs and more. The catalog lists each program in the library by program name, program description, program language, version, equipment required to run the program and HUG author;

**3. A one-year subscription to REMark Magazine (10 issues)** — an exclusive periodical for HUG members. REMark provides these important services: It contains sneak previews of upcoming Heath computer products — and the magazine also serves as an open forum, where members of HUG can share new hardware modifications, software enhancements, applications programs and other ideas about their computers;

**4. A vinyl-covered, three-ring binder** — with an inside pocket containing the HUG Handbook. It explains the Heath Users' Group in more detail: why it was started, how members participate (some HUG members have even formed local users' groups to increase the benefits of belonging to HUG), plus hints on making the most of your membership. Use this binder to store HUG membership information, software documentation, back issues of REMark and other materials you will receive as a HUG member;

**5. A chance to win valuable prizes by competing in HUG Software Contests** — a great way to further your program-writing expertise and have fun at the same time. Besides receiving valuable gifts, the winners of these software contests have their names printed in REMark Magazine;

**6. The official HUG Identification Card**, which entitles you to all of the special benefits which are available only to HUG members.

## Here's a quick peek at some of the different programs available from the HUG Software Library to its members:

- Memory Test Programs
- HUG Editor
- Page Editor
- Time for HDOS
- File Cruncher
- File Maintenance
- Create-a-Program
- Suppressing Command Completion
- String Sort
- Floating Point Package
- Fixed Point Package
- Cross-Reference Utility
- Disk Dump Utility
- Loan Amortization
- Cash Flow
- Real Estate Programs
- Stock Programs
- Tax Programs
- Time Management
- Home Budget Maintenance
- Checkbook Programs
- Disk DUP Utility
- Disk Relabeler
- Credit Card Management
- Investments
- Annuities

## Exciting H-8 Computer Games

In 1200 baud cassette form, requires H-8 Computer and H-8-5 Interface to load. Not for H/Z-89 Computer or H-8-4 Interface.

**Biorhythm** tells you when to face the world, when to stay in bed. Requires Extended BASIC, 16K RAM. PA-82, Shpg. wt. 1 lb. .... 10.00

**Space War** lets you command the starship Enterprise on a galactic journey, fighting Klingons and solving problems. Requires 24K RAM. PA-83, Shpg. wt. 1 lb. .... 10.00

**Game Set #1.** Includes Craps, Orbit, Tic-Tac-Toe, Nim, Hexapawn, Hangman, Hamrabi and Derby. Requires 8K RAM. PA-84, Shpg. wt. 1 lb. .... 10.00



- Mailing List
- Basic Letters
- Spelling Words
- Vocabulary Practice
- Antonyms
- Arithmetic Practice
- Calculator
- Metric Conversion
- Simultaneous Equations
- Graphs
- Programs for Printers
- HDOS Device Drivers
- Renumbering Programs
- Modern Packages
- Text Processors
- Sort Utilities
- Disk Recovery Utilities
- Assembly Language Routines
- Disassemblers
- Map of BASIC Symbols
- Pilot Language
- Small Business Packages
- Business Analysis
- Accounts Receivable
- Accounts Payable
- Payroll
- Inventory Package
- Expense Report
- Finance
- Plotting
- Chemistry Symbol Quiz
- Education Game
- Electronic Formulas
- Solar Domes
- Music
- Morse Code
- Antenna Design Programs
- Amateur Radio Log Book
- QSL Files
- OSCAR Locator
- Baudot Driver
- Teletype Driver
- AC Circuits
- Resonant Frequency Calculator
- Op-Amp Programs
- Power Supply Design
- Weather Forecasting
- Games and Graphic Games
- HDOS2CP/M Utility
- 11 Disks of CP/M Programs

When you purchase a Heath computer, you'll find a HUG membership application enclosed. But if you don't own a Heath computer — or don't have an application form — you can still join HUG. Just fill out the Heath Users' Group application form below and mail to HUG Membership, Hilltop Road, St. Joseph, MI 49085.

	HUG Membership Rates (per year, U.S. Funds)		
	U.S.	Canada & Mexico	International
New Members:	\$18	\$20	\$28
Renewal	\$15	\$17	\$22

Send to: HUG Membership, Hilltop Road, St. Joseph, MI 49085.

Yes, I want to become a member of HUG and take advantage of keeping up to date on the latest Heath computer developments, while I increase my utility and applications software library.

I've enclosed \$ \_\_\_\_\_ (U.S. Funds only) to cover my membership. NOTE: No charge orders or billings are accepted.

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Country: \_\_\_\_\_

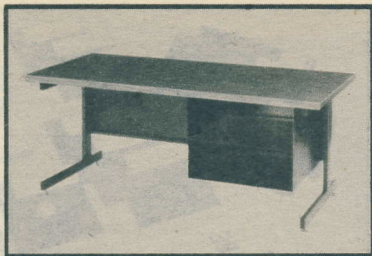
Signature: \_\_\_\_\_



FREE delivery, within 50 miles of store, for phone charge orders that ship UPS.

## Space-saving Computer Work Station organizes your computer system

- Gain attractive, rugged operating efficiency. The PD-11 Computer Work Station organizes your computer components in less space



**\$295<sup>00</sup>**

Organizes your system in less space – yet all components are easily accessible. Designed to Heath specifications, the 60" x 30" easy-to-clean Formica desk top places terminals at a comfortable height for seated operators. Lower shelves

hold the computer and disk systems (except H-47, H-77). Upper shelf measures 8.5" H x 20" W x 19.75" D (21.59 x 50.80 x 50.17 cm), while the lower shelf measures 7" H x 20" W x 19.75" D (17.18 x 50.80 x 50.17 cm).

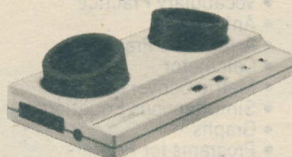
Rugged steel legs and sheet metal shelving last under constant use. Locking casters make it easy to roll the work station from place to place – and to keep your computer system components securely in place. Partially assembled.

PD-11, Shpg. wt. 95 lbs., Mtr. Frt., FOB El Segundo, CA ..... **295.00**

## Versatile Acoustic Modem is ideal for any phone

**\$159<sup>00</sup>**

- Assembled modem allows your computer to communicate with other computers



The Lexicon Lex-11 Modem lets your computer talk to other computers over standard telephone lines. Also communicates with any Bell 103 compatible modem. Selectable answer/originate modes. Many practical and useful applications. RS-232 interfacing. For 120 VAC.

WH-23, Assembled and tested, Shpg. wt. 3 lbs. .... **159.00**

## Direct-Connect Modem offers improved quality

**\$195<sup>00</sup>**

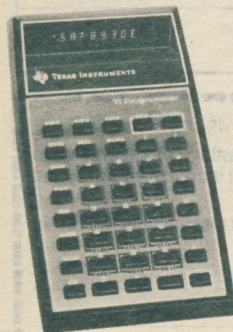
- UDS Direct-Connect Modem offers better quality than acoustic modems



RS-232C interface. Two modular phone jacks. Connects to standard phone line. Full duplex communication, originate/answer modes. FCC Certified. Powered by phone line. Requires std. single-line phone with modular connectors. Phone-modem cable included.

WH-33, Assembled and tested, Shpg. wt. 2 lbs. .... **195.00**

## Multi-Function TI Calculator for computer hobbyists



**\$59<sup>95</sup>**

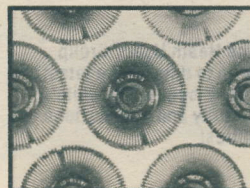
- Compact, goes anywhere
- Special memory, logic operations for complicated calculations and computer-related applications
- Factory assembled and tested

Designed especially for the computer hobbyist, this fully assembled Texas Instruments® Pocket Programmer/Calculator features fast conversions between octal, decimal and hexadecimal number systems; special logic operations for computer applications; three-key independent memory and fifteen levels of parentheses to handle complicated calculations; constant mode to simplify repetitive calculations; and an easy-to-read 8-digit LED display. Lightweight and compact enough to fit in

your shirt pocket, this Texas Instruments product is ideal for any computer-related application. A rechargeable battery and a 120 VAC, 60 Hz adapter/charger are standard features on this fully assembled and tested multi-function calculator. Overall Dimensions of the Texas Instruments PC-11 Calculator are 5.5" H x 3" W x 1.25" D (13.97 x 7.62 x 3.18 cm).

PC-11, Assembled and tested, Shpg. wt. 2 lbs. .... **59.95**

## Choose from a full line of computer system supplies for highest-quality system performance



### Letter-quality Diablo printwheels

Courier 10 (Diablo 38100), Pica w/slashed zero. HCS-20, Shpg. wt. 1 lb. .... **8.00**  
 Courier 72 (D. 38107), Pica w/unslashed zero. HCS-21, Shpg. wt. 1 lb. .... **8.00**  
 Elite 12 (D. 38102), Elite w/unslashed zero. HCS-22, Shpg. wt. 1 lb. .... **8.00**

General Scientific (Diablo 38141). Greek letters, superscripts, math symbols. HCS-23, Shpg. wt. 1 lb. .... **8.00**

APL-10 (Diablo 38150). Special set for APL language. HCS-24, 1 lb. .... **8.00**

OCR-A (Diablo 38144). ANSI Std. OCR Type A font. HCS-25, 1 lb. .... **8.00**

Prestige Elite Legal 12A (Diablo 38105). Elite w/legal symbols, incl. ¢, ® and ™. HCS-26, Shpg. wt. 1 lb. .... **8.00**

Courier Legal 10 (D. 38104) Pica w/legal symbols. HCS-27, 1 lb. .... **8.00**



### Ribbons for dark, clear printouts

Ribbon for H-14 Line Printer. Also fits ASR-33 printers. HCS-52, 1 lb. .... **Pkg. of 3, 8.00**

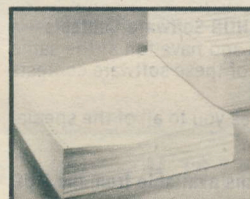
Cloth Ribbons for the WH-44 Diablo Printer. HCS-50, Shpg. wt. 1 lb. .... **Pkg. of 3, 18.00**

Film Ribbons for the WH-44 Diablo Printer. HCS-51, Shpg. wt. 1 lb. .... **Pkg. of 3, 18.00**

Ribbon for the WH-24/TI-810 Bi-Directional Line Printer and the H-36/LA-36 DECwriter II. Long-lasting, top-quality ribbon. HCS-53, Shpg. wt. 1 lb. .... **Pkg. of 3, 18.00**

Ribbon Cartridges for the WH-34 DECwriter IV Computer Teleprinter. Eliminates messy ribbon changes. When old ribbon wears out, simply remove old cartridge and insert new ribbon cartridge.

HCS-54, Shpg. wt. 1 lb. .... **Pkg. of 3, 29.00**



### Top-quality paper for printers

Premium 8.5" x 11" Printer Paper. For all printers sold by Heath. 2800 sheets of premium, one-part fan-fold paper, approximately 20 lb. high-quality white bond. In box.

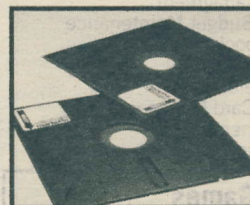
HCS-1, Shpg. wt. 28 lbs. .... **32.00**

Standard 8.5" x 11" Paper. Package contains 3200 sheets of standard, one-part, fan-fold 8.5" x 11" (21.59 x 27.94 cm) white paper.

Approximately 15 lb. bond strength. HCS-2, 31 lbs. .... **32.00**

14.875" x 11" Paper for WH-24, WH-34, H-36 and WH-44 Printers. Box contains 3200 fan-fold sheets of white/green lined paper.

HCS-3, Shpg. wt. 47 lbs. .... **42.00**



### Floppy disks for mass storage

5.25-Inch Single-Density, Single-Sided Floppy Diskettes. For use with all Heath 5.25-inch floppy disk systems – as well as North Star and some other personal computer systems. Formattable with either 40 or 35 tracks per diskette. Hard-sectored, with 10 sectors per track. Maximum data storage capacity of each diskette, 100K bytes.

HCS-61, Pkg. of 5, 1 lb. .... **20.00**

8-Inch Single-Density, Single-Sided Diskettes. For the H-27 and H-47, virtually all other systems which use 8" soft sectored floppy disks. Std. CP/M media. 77 tracks. 250K byte capacity. Supplied in std. IBM 3740 format.

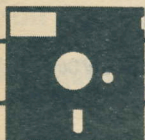
HCS-62, Package of 5, Shpg. wt. 2 lbs. .... **25.00**

8-Inch Double-Density, Single-Sided Floppy Diskettes. For use with the Heath H-47 Floppy Disk System. 77 tracks. 500K byte capacity per diskette.

HCS-64, Pkg. of 10, Shpg. wt. 2 lbs. .... **60.00**

8-Inch Double-Density, Double-Sided Floppy Diskettes. For use with the Heath H-47 Floppy Disk System. 77 tracks. 1 megabyte capacity per diskette.

HCS-65, Pkg. of 10, Shpg. wt. 2 lbs. .... **70.00**



## OPERATING SYSTEMS

### Heath Disk Operating System (HDOS 2.0) for all H-8, H/Z-89 All-In-One Computer Systems

- Versions available for both 5.25" and 8" floppy disk systems
- Updates supplied free of charge for one year after purchase

The Heath Disk Operating System. (HDOS), Version 2.0, includes:

**Extended Benton Harbor BASIC, Version 6.0** — an easy-to-use, enhanced version of Dartmouth BASIC which includes strings and files. It provides fast operation and includes character strings, convenience commands, numeric data with over six digits of accuracy, math functions, Boolean values which permit logical operations, free format programs and conditional statements;

**ASM Assembly Language**, a 2-pass absolute 8080 assembler with cross-reference feature which assembles source program into listing and object program in executable binary format;

**EDIT Text Editor** converts your computer and terminal into a powerful typewriter for generating and editing text. It prepares source code for Assembly Language and can help prepare reports, write letters and edit manuscripts;

**DEBUG Console Debugger** for entry and debugging of machine language programs via an external terminal. Features single/multiple stepping through programs, breakpointing, load/dump from tape storage (user program required);

**PIP** to copy, concatenate or transfer files between devices; **INITIALIZATION** to format new or magnetically damaged diskettes; **SYSTEM GENERATION** to write HDOS onto a newly formatted diskette; and **TEST**, a diagnostic utility program which assists in checking out and maintaining your floppy disk system.

**HDOS is designed for efficient use of memory and disk space.** 32K RAM and 1 disk drive are required, although 48K RAM and 2 drives are highly recommended — and may be required to use some other software products with HDOS.

Includes 713-page manual, diskette. 5.25", 8" versions identical (including code), except for media. Supports H-8, H/Z-89; H-17, H/Z-47 and H-77/Z-87 Floppy Disk Systems; many other software products.

**HOS-817-1**, on 5.25" diskette, Shpg. wt. 5 lbs. .... 150.00

**HOS-847-1**, on 8" diskette, Shpg. wt. 5 lbs. .... 150.00

### Take advantage of the powerful, easy-to-use UCSD P-System with Pascal Language

- Rapidly growing in popularity, system can run on many computers
- Modular design of this operating system makes programming easier

**Take advantage of the easy and fun-to-use Pascal Language.** Its clear readability, with powerful structure and data types, has meant increasing popularity and rapid software development. Modular design makes each Pascal program more accommodating to changing needs, and more reliable when run.

**UCSD Pascal is more versatile.** Programs written for one computer can run on another, often without recompilation. And UCSD Pascal can be used on many systems, not just one. Its programs are compiled into universal P-code, which can be run on any microcomputer with a resident interpreter.

Heath's P-System with UCSD Pascal Language includes these modules:

**OPERATING SYSTEM**, an interactive system with disk file handling capabilities, run-time support routines and block I/O service routines; a fast one-pass **PASCAL COMPILER** which produces universal P-code, runnable on most microcomputers; an efficient and compact **INTERPRETER** which runs universal P-code; **TWO EDITORS**, a powerful screen-oriented editor that runs in both programming and text editing modes, and a character-oriented editor with a wide variety of commands for context editing with hard-copy terminals;

**FILER**, to manipulate and keep track of disk files; **CONDITIONAL MACRO-ASSEMBLER**, which produces code that can be linked with your Pascal program; **LINKER**, a utility for link-editing Pascal object code and assembly code modules; and **SYSTEM LIBRARY**, with frequently used utilities.

Requires 48K RAM, 2 drives. Includes manual, diskettes. For Heath computers only. Supported by Softech Microsystems; updates will be supplied for a nominal charge.

**HOS-817-3**, on 5.25" disks for H-8 and H/Z-89 Computers, 8 lbs. .... 295.00

**HOS-1127-3**, on 8" IBM disks for H-11A/H-27 systems, 8 lbs. .... 295.00



FREE delivery, within 50 miles of store, for phone charge orders that ship UPS.

### Program with industry standard CP/M — configured for H-8 and H/Z-89 Computers

- Hundreds of CP/M applications software programs are now available
- Especially engineered and configured for Heath computer systems

Digital Research's CP/M opens the door to more languages, utilities and applications software than any other microcomputer disk operating system. That's because CP/M is used by over 200 hardware manufacturers, OEMs and distributors — over 100,000 computer users — and many software vendors.

**Standard (ORG-0) CP/M (Ver. 2.202) supports the H-8 and H/Z-89 Computers** and their mass storage peripherals (allowing concurrent operation and automatic density selection) — as well as all Heath printers and hard copy terminals.

**You get full source code** for hardware drivers, including disk drivers, so you can customize the system to fit your special requirements. The IOBYTE allows device assignment, permits switching between hard copy and CRT terminals — or between several printers — without rebooting. A configuration utility permits changes to ease operation, such as setting disk step rate or selecting echo/cursor backup operation without reassembling.

**Additional features**, such as the implementation of BIOS as a disk-resident relocatable file, make this one of the best available implementations of CP/M.

**CP/M includes three modules, plus utilities and an operating manual with almost 300 pages of detailed information.** BIOS, supplied in source code and object code, contains all hardware-level I/O code, and is unique to Heath. BDOS is the resident nucleus, with all file level and logical I/O code. Its physical I/O is performed via calls to the BIOS. BDOS features fully dynamic allocation and de-allocation of physically non-contiguous files. CCP is the transient monitor, facilitating command-level communications between the operator and CP/M. Space used by CCP is available to user programs during normal operation.

**Utilities include** a 2-pass absolute 8080 assembler, a text editor, an 8080 debugger with traced execution and disassembly, file dump, system generation/relocation and file size/disk usage displays. You can also set file attribution (read only and/or system), assign physical/logical devices, display system parameters, copy files and convert Intel HEX files into memory images.

Requires 32K RAM, 1 disk drive (2 drives recommended). H-8 systems require HA-8-8 Ext. Configuration; H/Z-89 systems (except WH/Z-89-FA) require H-88-7 ROM Kit. Includes support and updates for one year. For Heath computers only.

**HOS-817-2 (Requires Sublicense Grant, p. 88)**, on 5.25" diskette, 5 lbs. .... 150.00

**HOS-847-2 (Requires Sublicense Grant, p. 88)**, on 8" diskette, 5 lbs. .... 150.00

### Useful H-8/H-88 Cassette Operating Software

- Helps form a solid base for future computer programming
- Supplied on audio cassettes, in convenient 1200 baud form

**The Heath Cassette Operating system helps you program your H-8 or H-88 Computer quickly and easily.** Convenience features (automatic command completion to simplify typing, dynamic syntax checking to alert you to errors and a special user configuration feature which lets you personalize the system) make it easier to use and more practical than similar systems. The system includes:

**Extended Benton Harbor BASIC (Version 6.0)**, an enhanced Dartmouth BASIC which includes strings and files. You get faster operation, convenience commands, math functions, dynamic storage allocation, expanded error messages and recovery ability. Also has numeric data with over 6 digits of accuracy, Boolean values for logical operations, free format programs, math functions, enhanced expression and conditional statement facilities;

**HASL-8 Assembly Language**, a two-pass absolute assembler that lets you create source programs using letters, numbers and symbols to generate efficient machine language code;

**TED-8 Text Editor** for generating and editing text. It prepares the source code for HASL-8 Assembly Language — and can also be used to prepare reports, write letters and edit manuscripts;

**BUG-8 Console Debugger** for entry/debugging of user machine language programs via external terminal. Features single/multiple stepping, insertion of breakpoints, loading/dumping of user programs to/from tape storage and display/alteration of contents of a memory location or any 8080 register.

Requires 16K RAM. H-8 systems also require H-8-5 Interface (p. 78). Cassette interfacing is standard with the H-88 and H-89 All-In-One Computers; H-88-5 Interface (p. 71) required for HS-89, WH-89 and Z-89 Computers.

**H-8-18**, for H-8 Computer, Shpg. wt. 11 lbs. .... 30.00

**H-88-18**, for H-88 Computer, Shpg. wt. 5 lbs. .... 30.00

## PROGRAMMING LANGUAGES

Write your own computer programs with surprising ease. And execute programs just as easily. Each language functions best in its own unique programming environments. We'll even keep your language current by supplying updates free of charge for one full year — when you sign and return the registration card enclosed with each software package.

### Microsoft BASIC Language for general use

As low as  
**\$150<sup>00</sup>**

- Extra-value features make programming easier
- Has many math, algebraic and trigonometric functions
- Available for both HDOS and CP/M Operating Systems

Heath computer owners can use and enjoy Microsoft BASIC — one of the most versatile general-purpose programming languages available for microcomputer systems. Scores of practical utility and applications programs are written in this BASIC. This version of MBASIC is written especially for the H-8 Computer and the H/Z-89 All-In-One Computer.

**Capabilities include** direct access to CPU ports and memory locations; an IF-THEN-ELSE control structure which allows more highly-structured programming (including editing during programming and random or sequential filing capabilities); mathematical and logical operators; and a DEF statement, which allows user-defined functions which are not listed as intrinsic functions.

**You also get many extended features:** Program edit facilities, including insertion, deletion, character change and search capabilities; file management facilities which include random files, sequential files and file manipulation.

**Powerful string processing functions are provided,** including LEFT, RIGHT, MID, ASC, CHR and concatenation; extended statements, operators, functions and commands which are not available in most other BASICs (ERASE to eliminate arrays from a program, LINE INPUT to add lines to string variables without delimiters, SWAP to exchange the values of two variables, the TRON and TROFF debugging aids to help trace the execution of program instructions, and WIDTH to set the width of the terminal printing line).

**Microsoft BASIC also includes** automatic line numbering and renumbering features; branching, loops and subroutines; and more aids.

**Math functions include** algebraic and trigonometric capabilities, as well as double precision floating point number and double precision mathematics.

This software package requires an H-8 (page 72), H-89 (page 70) or Z-89 (page 78) Computer with 40K RAM and HDOS or CP/M (page 83).

**Microsoft BASIC Language Interpreter, Version 4.82.** Includes manual and 5.25" diskette. Requires the Heath Disk Operating System (HDOS — page 83).

**H-8-21 (Requires Sublicense Grant, p. 88),** Shpg. wt. 3 lbs. .... **150.00**

**Microsoft BASIC Language Interpreter, Version 5.21.** Includes manual and 5.25" diskette. Requires the Heath Standard CP/M Operating System (page 83).

**HMS-817-1 (Requires Sublicense Grant, p. 88),** Shpg. wt. 5 lbs. .... **175.00**

**Microsoft BASIC Language Interpreter, Version 5.21.** Includes manual and 8" diskette. Requires the Heath Standard CP/M Operating System (page 83).

**HMS-847-1 (Requires Sublicense Grant, p. 88),** Shpg. wt. 5 lbs. .... **175.00**

### BASIC Compiler speeds general programming

**\$250<sup>00</sup>**

- Compiled computer programs run much faster
- Includes these useful utility programs — MACRO-80 Assembler, LINK-80 Editor and LIB-80 Library Manager

**Eliminate time-consuming interpretation** when you run a computer program, by using Microsoft's BASIC Compiler, Ver. 5.23. First, compile your program with this compiler. It converts each line of the program into machine code — the language your computer understands best. You'll find that a pre-compiled program runs much faster than a similar program run through an interpreter.

**Many utility programs are included to make compiling easier:** The MACRO-80 Relocating Assembler converts Assembly Language programs into source code for the LINK-80 Editor. The LINK-80 Linkage Editor converts relocatable libraries and modules into runnable load modules. The useful LIB-80 Library Manager allows you to build your own library of relocatable modules.

The Microsoft BASIC Compiler System requires an H-8 (p. 72), H-89 (p. 70) or Z-89 (p. 78) Computer with 40K or more bytes of RAM, two floppy disk drives and the Heath Standard CP/M Operating System (see page 83).

**HMS-817-4 (Requires Sublicense Grant, p. 88),** on 5.25" disk, 5 lbs. .... **250.00**

**HMS-847-4 (Requires Sublicense Grant, p. 88),** on 8" disk, 5 lbs. .... **250.00**

## Science, math-oriented Microsoft FORTRAN

As low as  
**\$175<sup>00</sup>**

- Includes powerful Microsoft ANSI-66 FORTRAN IV Compiler
- Also features Macro-Assembler, Linkage Editor and Cross-Reference Generator
- Linkable library of mathematical, I/O and utility routines

With more power to help you perform mathematical and scientific programs on your Heath computer, the Microsoft FORTRAN Programming System features:

1. **The unique Microsoft FORTRAN-80 Compiler,** which uses the powerful ANSI-66 FORTRAN IV Computer Language — so you can draw from a large base of utility and applications programs;
2. **The MACRO-80 Relocating Assembler,** for use with 8080 and Z-80 CPUs;
3. **The CREF Cross-Reference Generator,** for sorted cross-reference listings;
4. **The LINK-80 Linkage Editor,** which generates runnable load modules;
5. **The Microsoft FORTRAN Library,** filled with floating point mathematical routines — plus all FORTRAN I/O and utility routines;
6. **Sample FORTRAN-80 and MACRO-80 Assembler source programs.**

**The Microsoft FORTRAN-80 Compiler is a true native-code compiler** which supports the full ANSI-66 FORTRAN IV Language, except for complex numbers. This allows you to take advantage of the large base of utility and applications programs already written in the FORTRAN Language.

A microprocessor-based FORTRAN development package, which generates relocatable object modules, is included with the compiler. You can link these modules, using the loader in the LINK-80 Linkage Editor, and generate an absolute file.

This compiler also includes many extensions to increase system utility and efficiency — and it performs some object code optimization. An option to list generated object code in 8080 Assembly Language is available.

**The Microsoft MACRO-80 Relocating Assembler** is an assembler designed for use with both the 8080 and Z-80 microprocessors. It has complete facilities for macro development. The MACRO-80 Assembler generates relocatable object modules for use with the Microsoft LINK-80 Linkage Editor. It accepts Intel 8080 and Zilog Z-80 mnemonics, features macros and conditional assembly, and will generate a sorted cross-reference listing (when used with the CREF Cross-Reference Generator, included with this software package).

**The LINK-80 Linkage Editor,** included with this programming system, converts relocatable libraries or modules (such as those produced by Microsoft FORTRAN, BASIC, COBOL and Pascal language — as well as by the Microsoft MACRO-80 Relocating Assembler and Digital Research's PL/1 Compiler) into runnable load modules for direct execution or disk storage.

Capabilities of the Microsoft LINK-80 Linkage Editor include options to specify prommable code, and the ability to separately specify origin addresses for code and data segments. An absolute symbol table listing of the generated load module may be obtained.

**Microsoft's FORTRAN Library includes** all FORTRAN mathematical, I/O and utility functions. Using the FORTRAN Library, you can perform a multitude of functions — absolute values, truncation, remainders, maximum values, conversion, transfer of signs, positive differences, exponentials, logarithms, sines, cosines, hyperbolic tangents, arctangents and square roots.

The library contains arithmetic routines, conversion subroutines and subprogram linkages. Special functions (INP, CALL OUT, PEEK, CALL POKE and other subprogram linkages) allow sophisticated programming.

**The versatile Microsoft LIB-80 Library Manager,** included with CP/M versions of the Microsoft FORTRAN Programming System, allows the building of your own libraries of relocatable modules.

This programming system requires an H-8 (page 72), H-89 (page 70) or Z-89 (page 78) Computer with 40K or more bytes of Random Access Memory (RAM). Microsoft FORTRAN also requires two or more floppy disk drives (for the H-8 Computer, use the H-17 on page 73 or the H-47 on page 75; for the H-89 All-In-One Computer, use the H-77 on page 71 or the H-47 on page 75), and the Heath Disk Operating System (HDOS — see page 83) or the Heath Standard CP/M Operating System (see page 83), as indicated below.

**Microsoft FORTRAN Programming System, Ver. 3.35, supplied on 5.25-inch disk.** Requires the Heath Disk Operating System (HDOS — see page 83).

**H-8-20 (Requires Sublicense Grant on page 88),** Shpg. wt. 4 lbs. .... **175.00**

**Microsoft FORTRAN Programming System, Ver. 3.40, supplied on 5.25-inch disk.** Requires the Heath Standard CP/M Operating System (see page 83).

**HMS-817-2 (Requires Sublicense Grant on page 88),** Shpg. wt. 5 lbs. ... **195.00**

**Microsoft FORTRAN Programming System, Ver. 3.40, supplied on 8-inch disk.** Requires the Heath Standard CP/M Operating System (see page 83).

**HMS-847-2 (Requires Sublicense Grant on page 88),** Shpg. wt. 5 lbs. ... **195.00**



## Run powerful, business-oriented COBOL

**\$395<sup>00</sup>**

- The business world's most popular computer language
- Includes most Level-I features and many Level-II extras
- Available in 5.25" and 8" versions, for H-8 or H/Z-89

You can run COBOL — the ideal programming language for business data processing — on your H-8 or H/Z-89 computer system. Microsoft's COBOL-80 Programming System, Version 4.01, is ideally suited for business data processing tasks — which include processing disk files and data bases.

Microsoft COBOL-80 far exceeds the minimum specifications of ANSI-74 COBOL, and has so many Level-II features and optional modules that you can easily use most COBOL programs written for large computer systems (Minimum required by ANSI Standard for COBOL Language is Nucleus, Table Handling and Sequential I/O modules only, at Level-I implementation):

MODULE	MCOBOL 4.01 IMPLEMENTATION LEVEL
Nucleus	Level-I plus these Level-II features:
CONDITIONS — Level 88 conditions with value series or range; use of logical AND/OR/NOT in conditional use of algebraic relational symbols (>, =); implied subject, or both subject and relation, in relational conditions; sign test; nested IF statements; parentheses in conditions.	
VERBS — Extensions to ACCEPT and DISPLAY for formatted screen handling; ACCEPTance of data from DATE/DAY/TIME; STRING and UNSTRING statements; COMPUTE with multiple receiving fields; PERFORM VARYING.	
IDENTIFIERS — Mnemonic names for ACCEPT or DISPLAY devices; procedure names consisting of digits only; qualification of names (in procedure division statements only).	
Table Handling	Level-I, some Level-II features
Sequential I/O	Level-I, most Level-II features
Relative I/O	Level-I, some Level-II features
Interprogram Communication	Level-I
Library	Level-I
Communication	None
Debugging	Special extensions to ANSI-74 Standard providing convenient trace-style debugging
Report Writer	None
Segmentation	Level-I
Sort/Merge	None now; full Level-II implementation will be available in late 1981, as an extra-cost option.

The Microsoft COBOL Programming System includes the **MACRO-80 Assembler** — an 8080/Z-80 assembler which incorporates almost all "big computer" assembler features — without sacrificing speed or memory space. Featuring complete facilities for macro development, it generates relocatable object modules for use with the Microsoft LINK-80 Linkage Editor. MACRO-80 accepts Intel 8080 and Zilog Z-80 mnemonics, features macros and conditional assembly; the **LINK-80 Linkage Editor**, which converts relocatable libraries or modules into runnable load modules for direct execution or disk storage; the **LIB-80 Library Manager**, which allows you to build your own libraries of relocatable modules; the **special Microsoft COBOL Library**; and **run-time software** designed to make this system even more versatile.

This programming package also has important extensions which make the COBOL Language easier to use in a microcomputer environment — such as extended debugging facilities which feature special extensions to the ANSI-74 Standard for more convenient debugging, and advanced screen handling facilities which permit easy forms handling on CRT terminals with cursor control (like the Heath H-19A Professional Video Terminal, sold on page 74).

Microsoft COBOL can typically handle a 600-1,000 line program, in a H-8, H-89 or Z-89 Computer with 48K bytes of Random Access Memory (RAM).

Requires an H-8 (page 72), H-89 (page 70) or Z-89 (page 78) with at least 48K bytes of Random Access Memory (RAM), two floppy disk drives (the Heath H-47 Floppy Disk System, shown on page 75, is recommended for applications involving large disk files) and the Heath CP/M Operating System (sold on page 83). All versions of Microsoft COBOL are identical, except for media. Available in 5.25" or 8" versions (see below). For Heath computers only.

Microsoft COBOL Programming System, supplied on 5.25-inch floppy diskette. HMS-817-3 (Requires Sublicense Grant, p. 88), Shpg. wt. 5 lbs. .... 395.00

Microsoft COBOL Programming System, supplied on 8-inch floppy diskette. HMS-847-3 (Requires Sublicense Grant, p. 88), Shpg. wt. 5 lbs. .... 395.00

## Write programs faster with Microsoft MACRO-80

**\$69<sup>95</sup>**

- For sophisticated Assembly Language programmers
- Includes many extra-value features previously found only on large computer mainframes

Here's a complete Assembly Language programming package — including the MACRO-80 Assembler, LINK-80 Linkage Editor and CREF Cross-Reference Generator. CP/M versions also include the LIB-80 Library Manager.

Microsoft's **MACRO-80 Relocating Macro-Assembler** is designed for 8080 and Z-80 microcomputer systems — including the H-8 and H/Z-89. It assembles code, generating relocatable object modules for the LINK-80 Editor.

You get almost all "big computer" assembler features without sacrificing speed or memory space. Accepting both Intel 8080 and Zilog Z-80 mnemonics, MACRO-80 supports a complete, Intel-standard macro facility — including IRP, IRPC, REPEAT, local variables and EXITM. Nesting of macros is limited only by memory. Code is assembled in relocatable modules that are manipulated with the flexible LINK-80 Editor. Conditional assembly is enhanced by pseudo-operators which include testing of assembly pass, symbol definition and parameters to macros. Nest conditionals up to 255 levels.

MACRO-80 can generate a sorted cross-reference listing when used with CREF.

**LINK-80** converts relocatable libraries or modules — produced by MACRO-80 or other languages and compilers — into runnable load modules for direct execution or disk storage. Versatile loader capabilities are executed by easy command lines and switches. Programs load with one command, modules load in user-specified locations, and external references between modules are resolved automatically. LINK-80 also performs library searches for system subroutines and generates a memory load map, showing main program and subroutine locations.

**CREF** supplies a convenient alphabetic list of all program variable names, along with the line numbers where they are referenced and defined.

**LIB-80 (in CP/M versions)** lets you build libraries of relocatable modules.

Supplied on 5.25-inch floppy disk, the Microsoft MACRO-80 Package takes up approximately 14K RAM. It has an assembly rate of over 1000 lines per minute.

HMS-817-51, for HDOS systems, Shpg. wt. 2 lbs. .... 69.95

HMS-817-52, for CP/M systems, Shpg. wt. 2 lbs. .... 69.95

## Gain more programming flexibility with C BASIC

**\$115<sup>00</sup>**

- Widely used in CP/M applications systems
- Includes pseudo-code compiler, run-time interpreter
- Available in 5.25" or 8" floppy disk formats

**C BASIC** is widely used by many software houses and distributors of CP/M software as their language of choice. This non-interactive BASIC includes a pseudo-code compiler and run-time interpreter.

**C BASIC** has a variety of extended features, including the IF... THEN... ELSE and WHILE constructs and access to disk files. C BASIC also allows the use of 31-character variable names, and the free use of comments, spaces and tabs. These aid in creating programs that are self-documenting and maintainable.

This version of **C BASIC** also has integer variables, multiple line functions, chaining with common variables, additional pre-defined functions and more. A cross-reference lister is also provided with Version 2.0 of C BASIC.

The **C BASIC** system consists of three programs. The first program converts the user's source language program into a series of coded operations that are placed on the intermediate disk file. The second program, the run-time monitor, directly executes the operations included in the intermediate file. The third and final program, XREF.COM, will produce a cross-reference listing of all variables used in a C BASIC source program.

**Expressions available** include string constants, integers and real numbers, identifiers, variables and assignment statements. Machine language linkage statements and functions — include PEEK, POKE, CALL and SAVEMEM — increase C BASIC's versatility. Several control and I/O statements allow for more sophisticated programming. Output can be directed to disk or printer.

The facilities available to the user of the **C BASIC** language for accessing disk files are **extremely versatile** — providing for many different file organizations and accessing methods.

Requires an H-8 (p. 72), H-89 (p. 70) or Z-89 (p. 78) with 24K RAM (48K RAM recommended), one disk drive and Heath CP/M (p. 83).

**C BASIC Programming Language, supplied on 5.25-inch floppy disk.**

HCM-817-1, Shpg. wt. 1 lb. .... 115.00

**C BASIC Programming Language, supplied on 8-inch floppy disk.**

HCM-847-1, Shpg. wt. 1 lb. .... 115.00



FREE delivery, within 50 miles of store, for phone charge orders that ship UPS.

## UTILITY PROGRAMS



### Powerful program development capabilities are yours with WordMaster

**WordMaster Video Text Editor, Ver. 1.07, provides everything needed for program development — and more.** It's only 20% as large as WordStar and is much faster — without printer interface or formatting functions. Which means that you can enhance your file management capabilities at a lower price.

**You get** a video edit mode, automatic floppy disk I/O (forward and backward, for files too large to edit in RAM, a scratchpad memory for moving text and storing command strings, the ability to write/read text to/from files other than the file being edited — facilitating use of source libraries (as well as splitting/merging files), nestable loops in command string, pattern matching abilities, macro facilities (loops, execute scratchpad, branch out of loop on search failure), and extremely fast response to most commands.

**At any given moment, WordMaster can operate in one of three modes:**

**In Video Mode,** you can see the text as you make alterations — with the actual

cursor position shown on the screen. You can move the cursor in all four directions, page through text forward and backward, insert and delete lines or part of lines, and input or delete characters and words.

**Video mode** speeds editing and reduces mistakes when using a CRT terminal (like the H-19 on page 74 — or the H/Z-89's built-in terminal) or video display. You can move to any point in the file without leaving Video Mode. The cursor can be positioned by line, word and character.

**Command Mode** permits search, global replacements, text moves and other functions — as well as making available most of the familiar command and editing functions of CP/M's Text Editor.

You can do everything in Command Mode that you can in Video Mode, but any changes in the text are only displayed at your command. In addition, other facilities are available — including searching, substituting, looping, matching and moving around blocks of text. You can also combine and/or separate text from/to different files on your diskettes.

**The Insert Mode** is used to enter all original text, and for large insertions of text into a WordMaster file. In this mode, a backspace also erases the last character typed. Video Mode is usually preferable for this purpose; Insert Mode is provided for use with hard copy terminals, and for compatibility with CP/M's ED Text Editor.

**Includes manual, diskette.** Requires a H-8/H-19 or H/Z-89 system with 32K RAM, one floppy disk drive and the Heath Standard CP/M (sold on page 83).

**HMP-817-5,** on 5.25" diskette, Shpg. wt. 4 lbs. .... **99.00**

**HMP-847-5,** on 8" diskette, Shpg. wt. 4 lbs. .... **99.00**



### Make large sorting tasks faster, easier with the SuperSort Utility

**SuperSort (Version 1.5) makes sorting so simple, it's simply in a class by itself.** It offers superior sorting, merging and selecting power with unmatched speed and convenience. It can sort and merge up to thirty-two input files into a single file, at the rate of 560 records per minute. And new records can be integrated into a master file in one simple and efficient operation!

**This utility** can sort, merge and select records from data files compatible with BASIC, Assembly, FORTRAN and COBOL applications programs — and with text editors — on H-8 and H/Z-89 Computers using Heath CP/M.

**SuperSort accepts just about any kind of record you can imagine.** The data can be justified, or include floating decimals, exponential notation, or upper and lower case letters; it can even be in several standard formats (binary, EBCDIC, BCD, ASCII or others). You won't waste time and money translating records for the computer. And you can have fixed or variable length records and fields. In fact, you can have a different number of fields in each record.

**When you ask SuperSort to select or exclude records** you can give it as many selection criteria as you like, such as between, not between, equal to, less than or greater than, and others. For example — if your file contains names, addresses, sex, annual earnings, age group, marital status and Zip Code you could select all records for single females over 35, earning between \$25,000 and \$35,000, and living in the western U.S. In the same single pass, the records could be sorted alphabetically within each Zip Code! In one simple operation, you can apply up to 32 sorting keys.

**Several optional outputs are available from SuperSort:** With the Keys-Only

**Output Option,** the output file receives the specified keys as extracted from the input records — rather than the sorted input records. This permits building an index to a file, extracting fields in order to print a summary, or selecting and rearranging (positional) fields to form a new data base.

**When you use the Record Number Output Option of SuperSort,** the output file receives the record numbers of the input records, in either ASCII or binary format. The extracted keys may accompany the record numbers, or not. This permits building multiple indices into a file, ordered on various keys, without duplicating the data, so that another program may retrieve the records by key value or in key order.

**When using the Pointer Output Option,** the output file receives the sector number and byte offset at which each record begins — with or without the keys. This provides another method of building indices, whereby another program may retrieve the records from the original file.

**Compatible with BASIC,** SuperSort can handle delimited records of varying lengths, comma-delimited fields (with/without spaces surrounding data — quotes can be used to imbed commas or leading/trailing blanks). Free format numbers can be used as keys or in record selection tests. SuperSort can be called as a subroutine from a **Microsoft FORTRAN** program — handling formatted files and data in A, D, E, F, G, I and L formats. And it can also be called as a subroutine from a **Microsoft COBOL** program.

**SuperSort is delivered to you — ready to run.** Sort and merge instructions are easy to enter. Errors are a snap to correct.

**Includes binder, diskette.** Requires H-8 or H/Z-89 with 48K RAM, one floppy disk drive and Heath Standard CP/M (sold on page 83).

**HMP-817-1,** on 5.25" diskette, Shpg. wt. 4 lbs. .... **195.00**

**HMP-847-1,** on 8" diskette, Shpg. wt. 4 lbs. .... **195.00**

### Source listings for selected Heath products give better understanding of operation

**NEW! Complete Listing for Heath H-8-18 and H-88-18 Cassette Operating Software.** Includes the following source listings: H-8-52 Debugger, H-8-53 Editor, H-8-54 Assembly Language and H-8-60 Extended Benton Harbor BASIC Language below. These listings would cost \$100.00 if purchased separately.

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**Source Listing for Heath Disk Operating System (HDOS), Version 1.6.** Includes H-8-51 (Source Listing for ROM of H-17 Floppy Disk System) below, as well as all other utilities and device drivers. Purchasers of this source listing are eligible to receive updates as new releases become available (at a cost of \$50.00 per update).

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**Source Listing for the Read-Only Memory (ROM) of the Heath H-17 5.25-Inch Floppy Disk System.**

**H-8-51,** Shpg. wt. 1 lb. .... **25.00**

**Source Listing for the ROM of the H-19 Video Terminal.**

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**NOTE:** All of these hardware and software source listings are copyrighted. Reproduction of these source listings is expressly prohibited. Updates of source listings for the Heath Disk Operating System (HDOS) are available for a nominal charge, as described above.





## WordStar Word Processing Software is powerful, CP/M-compatible

**WordStar is a CP/M-compatible, screen-oriented word processor with integrated printing capabilities.** The entry, alteration and formatting of text are performed directly on your video screen, resulting in the display of a true print image; additional enhancements are performed during printout.

**WordStar's edit function** includes on-screen text formatting (with automatic margination, justification, and centering on command), powerful editing commands and flexible find/replace commands.

**The unique "Help" System** can be displayed during editing. User-selectable comprehensive prompting, at 4 levels, eliminates the need to refer to a manual.

**Helpful hyphenation facilities speed editing.** WordStar's Hyphen-Help feature stops when a hyphen is necessary, and lets you choose the hyphenation point – or decide not to hyphenate. Hyphens entered with this feature are "soft" – if not needed in later editing, "soft" hyphens will be automatically deleted.

**Find and Replace is another WordStar feature you're sure to use.** WordStar searches for specified character strings – replacing them with updated information quickly and automatically, throughout the document.

**WordStar supports** automatic page numbering, print enhancements (underlining, double striking, boldfacing, strikeouts, subscripts and superscripts) and several other operator options, on printers with appropriate capabilities.

With the decimal tab feature of WordStar, columns of numerical data can be typed as easily as operating an adding machine. This feature automatically lines up the numbers.

**Use WordStar as a CP/M text editor:** Edit program source files, input files for other text formatters, enter data and accomplish other tasks – because the disk document files are standard CP/M text files, with minor additions. Other programs can even be executed during use – with automatic return to WordStar.

**WordStar also features print spooling.** For greater efficiency, one disk file can be printed – while you work on a second file (requires 64K RAM).

**WordStar includes both** a "plain vanilla" version for customer installation with any computer and printer – as well as a pre-installed version for immediate, hassle-free use on the Heath H-8, Heath H-89 or Zenith Z-89 Computers – and all Heath printers. For daisy wheel and other incremental printers, variable spacing (down to 1/48" line spacing and 1/120" character pitch) is supported by WordStar.

**The WordStar Word Processing System includes** a detailed set-up and operating manual, along with a master diskette. It requires an H-8/H-19 (see page 72), H-89 (see page 70) or Z-89 (see page 78) Computer System with 48K bytes of RAM, two or more floppy disk drives, Heath CP/M (see page 83) and a printer. Any Heath-offered printer works with the WordStar system; we recommend the WH-44K (Diablo 1640 KSR) or WH-54 (Diablo 630 RO) Letter-Quality Printers (see page 79). Mfr.'s suggested list price, \$495.00.

**HMP-817-2**, on 5.25" disk, Shpg. wt. 2 lbs. .... **395.00**  
**HMP-847-2**, on 8" disk, Shpg. wt. 2 lbs. .... **395.00**



## Mail/Merge Mailing List Software adds new capabilities to WordStar

**When you choose MailMerge, you add powerful file merging capabilities to WordStar.** It can combine a names/addresses file with a letter text file, inserting data where variables are specified – even in mid-paragraph. Personalized form letters can be created with a specified salutation and/or closing. The same data file can be used for both form letters and mailing labels.

**Features include** merging of data from one file into another file (inserting data

into text at user-designated places), multiple printing of the same file, automatic chained printing of several files on a common disk, printing of a file "nesting" in another file (8 levels of nesting can be accommodated), and the ability to print raw data in an easy-to-read form.

**As data is merged with text**, paragraphs are reformed – for form letters that look as though each received special attention.

**Requires** H-8/H-19, H-89 or Z-89 with 48K RAM, 2 disk drives, CP/M (p. 83), WordStar (above) and a printer. Any Heath-offered printer will work; we recommend the WH-44K or WH-54 (p. 79).

**HMP-817-3**, on 5.25" disk, Shpg. wt. 4 lbs. .... **135.00**  
**HMP-847-3**, on 8" disk, Shpg. wt. 4 lbs. .... **135.00**

## Save over 50% on Zenith Electronic Typing – our easy-to-learn word processing system

**Now priced at a big \$200 savings**, Zenith Electronic Typing makes word processing practical for both single-secretary offices and departmentalized secretarial staffs. Anyone who can turn on a TV and type can increase their output by up to 50 percent, usually even on the first day. All you need are standard secretarial skills. A special self-instruction course shows you how – in as little as two hours.

**Using Zenith Electronic Typing** – which supports up to three 5.25" or 8" floppy disk drives – near-perfect documents can be produced in a fraction of the time required by conventional typing – with no white-outs, strike-overs or erasures.

**Features include** Upper/Lower Case Video Display; Creation, Addition or Revision on up to three 5.25" or 8" disk drives; Scrolling (moving through a document) and two Search Modes to quickly find area which need editing; Append Mode to create a new document by joining separate paragraphs; Automatic Replacement of any word, name or phrase throughout a document to speed production of customized form letters; Automatic Realignment to save hours of retyping; Automatic Centering and Justification – on command – to eliminate counting or guessing; and Block Move of words, sentences or paragraphs within a document.

**Once the document is letter-perfect**, the touch of another key automatically prints a clean copy of the document – on a separate printer (not included) – at an error-free rate of up to 450 words per minute.

**Control the cost of paperwork, by using Zenith Electronic Typing.** This complete word processing software system includes a detailed set-up and operating manual, easy-to-use training disk and master disk.

**Zenith Electronic Typing requires** an H-8/H-19, H-89 or Z-89 with 48K RAM – one floppy disk drives – and a printer. Any Heath-offered printer will work with this system; we recommend the WH-54 (Diablo 630 RO), or WH-44K (Diablo 1640 KSR), Letter-Quality Daisy Wheel Printers (see page 79).

**H-8-40**, on 5.25" disk, Shpg. wt. 6 lbs. .... **Was \$395.00, NOW ONLY 195.00**  
**H-8-47-1**, on 8" disk, Shpg. wt. 4 lbs. .... **195.00**



## Magic Wand for Heath CP/M combines ease of use, versatility and power

**Magic Wand Word Processing Software** puts excellent versatility, ease of use, power and CP/M compatibility at your fingertips. More powerful than Zenith Electronic Typing (but not as powerful as WordStar), users will find Magic Wand easier to learn and use with its special set-up and operating manual.

**Magic Wand consists of two modes: EDIT and PRINT.**

**EDIT features** forward and backward scrolling, insertion by character (for editing) or full insertion (for creating files), deletion of characters/lines/blocks of copy, search/repeat search/search and replace/multiple search and replace commands, the ability to move blocks of copy from one spot to another within the same file (leaving or deleting the block in its original location), the ability to examine the disk directory without leaving EDIT, and the ability to display or include all or part of any pure ASCII file on disk into the text you are editing (without exiting EDIT or affecting any of the text).

**You can even print one file while editing another** – with Magic Wand's printing in background (print spooling) feature.

**Features found in Magic Wand's PRINT mode include** the ability to enter commands directly from the keyboard – or to imbed commands in a text file, regular or paragraph indentation, justification and centering (on command), underscoring, kerning/strikeover, boldfacing, superscripting and subscripting (to make writing math, scientific and other papers with superscripts or subscripts easier), ghost hyphenation (which enables Magic Wand to automatically hyphenate words at the ends of lines – when necessary – in the right places) and the ability to print multiple copies of a single file.

**Magic Wand also supports** proportional printing, horizontal spacing down to 1/120 inch and vertical spacing to 1/48 inch (on capable printers).

**Includes** an extensive user's manual with set-up and operating instructions as well as a master disk. It requires an H-8/H-19 or H/Z-89 computer system with 48K RAM, Heath CP/M and a printer. Any Heath-offered printer will work; we recommend the WH-54 or WH-44K Letter-Quality Printers (see page 79).

**HRS-817-9**, on 5.25" disk, Shpg. wt. 6 lbs. .... **295.00**



**FREE delivery, within 50 miles of store, for phone charge orders that ship UPS.**



## UTILITY PROGRAMS

These programs — the MAC Macro Assembler, DESPOOL Spooler and SID/ZSID Debugging Utility — add new capabilities to the Heath CP/M Operating System (page 83).

Each program includes full documentation and free updates for one year, when the registration card enclosed with each software package is signed and returned.

### Advanced, easy-to-use MAC Macro-Assembler

**\$85<sup>00</sup>**

- Uses full Intel-compatible macro definitions
- Full documentation, diskette with macro libraries
- Fully compatible with CP/M's ASM Assembly Language

Digital Research's Macro-Assembler makes writing Assembly programs easier — and can generate a SID-compatible symbol table file for debugging use. The 168-page manual is practically a macro-assembler textbook, while the diskette has macro libraries for performing many useful tasks. Requires H-8 (p. 72), H-89 (p. 70) or Z-89 (p. 78) with 1 disk drive and CP/M (p. 83).

**HDR-817-1 (Requires Sublicense Grant below), on 5.25" disk, 2 lbs. .... 85.00**

**HDR-847-1 (Requires Sublicense Grant below), on 8" disk, 2 lbs. .... 85.00**

### DESPPOOL for multi-tasking printer operation

**\$50<sup>00</sup>**

- Perform two tasks at the same time on your computer
- Print one file while working on another file
- Quick set-up, easy to use on H-8, H-89, Z-89

DESPPOOL gives your system maximum efficiency by allowing it to print one file through your printer — while you continue to use the assembler, editor, BASIC or an applications program. This spooler requires an H-8 (p. 72), H-89 (p. 70) or Z-89 (p. 78) Computer with 1 disk drive and Heath CP/M (p. 83).

**HDR-817-3 (Requires Sublicense Grant below), on 5.25" disk, 2 lbs. .... 50.00**

**HDR-847-3 (Requires Sublicense Grant below), on 8" disk, 2 lbs. .... 50.00**

## SID/ZSID upgrades the CP/M DDT Debugger

**\$125<sup>00</sup>**

- Get both 8080-compatible SID and Z-80-compatible ZSID — save substantially over separate prices
- Advanced version of CP/M's DDT Debugging Utility

Allows use of names used at the source level, instead of addresses, for greater versatility and ease in program modification. Can also draw histograms of programs and subroutines. Fully functional in DDT-type mode without symbol file. Requires H-8 (p. 72), H-89 (p. 70) or Z-89 (p. 78) with 1 disk drive, Heath CP/M (p. 83), MAC (above) and LINK-80 Linkage Editor or Digital Research's Linkage Editor (to create table file used for symbolic references).

**HDR-817-2 (Requires Sublicense Grant below), on 5.25" disk, 2 lbs. .... 125.00**

**HDR-847-2 (Requires Sublicense Grant below), on 8" disk, 2 lbs. .... 125.00**

### Books to help you get more from your computer

**Introduction to Microprocessors, Volume 1.** This book introduces you to basic principles of microprocessors.

**EDP-224 ..... 12.95**

**Getting Acquainted With Microcomputers.** 228-page guide explains what microprocessors can do.

**EDP-275 ..... 8.95**

**8080 Machine Language Programming for Beginners.** EDP-272 ..... 7.95

**PDP-11 Programming Fundamentals.** Program a PDP-11 computer in Assembly Language and get the most out of it. EDP-239 ..... 10.00

**101 Basic Computer Games.** 250-page book describes family-oriented games. Contains listing, sample run, description of each game.

**EDP-237 ..... 7.50**

**The Software Gourmet Guide and Cookbook.** 218-page publication for 8080A computers with general-purpose routines, time delays, random number generators, 6 appendices. EDP-228 ..... 12.95

**Basic Software Library, Volume II.** Basic computer programs in the fields of engineering and statistics.

**EDP-241 ..... 24.95**

**Basic Software Library, Volume III.** Advanced business programs in this volume of the Basic Software Library help cut clerical costs.

**EDP-242 ..... 39.95**

**Basic Software Library, Volume IV.** This volume contains general-purpose programs for many applications.

**EDP-243 ..... 9.95**

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☐ Digital Research SID/ZSID ☐ MicroPro WordStar ☐ MicroPro MailMerge  
☐ MicroPro SuperSort ☐ Microsoft BASIC Compiler ☐ Microsoft BASIC Interpreter  
☐ Microsoft COBOL ☐ Microsoft FORTRAN

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SOFTSTUFF offers a full line of quality software tools, priced to fit your budget. All SOFTSTUFF programs have been tested on the Heath and Zenith hardware indicated. Documentation for each SOFTSTUFF product has also been improved. SOFTSTUFF products are supplied to you on 5.25-inch floppy diskettes (unless otherwise indicated), and are shipped to you postpaid. Specify your operating system (HDOS or Heath CP/M) when ordering.

**NEW**

### New SOFTSTUFF products add versatility and fun to H-8 and H/Z-89 Computers

**Mailpro 127.1 Mailing List Package.** Random access files, user-selected fields, sorting and retrieval on any field (such as name or Zip Code), user-specified printing formats, selective printing (print all names and addresses or only selected ones), form letters and special error trapping routines. Requires H-8 or H-89 with 48K RAM, one disk drive and HDOS.

**SF-9009**, for HDOS systems, Postpaid ..... **39.95**

**Commsoft's Roots-89 Genealogy Software helps you track your roots.** It's designed to store, retrieve and display thousands of facts about your family. Roots-89 will list family members, display and print family group sheets and pedigree charts, compute relationships and show important anniversaries for each day of the year. Includes 100-page illustrated course in genealogy and operation of the package. Requires H-8 or H/Z-89 with 48K RAM, one disk drive and HDOS.

**SF-9008**, for HDOS systems, Postpaid ..... **124.95**

**With the SOFTSTUFF HDOS to CP/M File Converter, you can transfer HDOS files to CP/M disks — and vice versa.** Requires H-8 or H/Z-89 with 32K RAM and one disk drive. Also requires both HDOS and CP/M.

**SF-8512**, for HDOS and CP/M systems, Postpaid ..... **29.95**

**Sharpen your chess-playing skills by taking on Mychess.** Provides worthy, challenging competition. Winner at 1980 West Coast Computer Faire. Consistently beats Sargon. The Mychess Chess Game requires a Heath H-8 Computer with HA-8-6 Z-80 CPU Card — or a Heath H-89/Zenith Z-89 Computer — with 32K bytes of RAM, one disk drive and Heath CP/M.

**SF-9010**, for CP/M systems, Postpaid ..... **39.95**

**Play SOFTSTUFF's Air Traffic Controller Game — and run your own airport.** With this realistic game, you control all air traffic around your own airport — with planes taking off, in the air and landing. Requires an H-8 or H/Z-89 with 32K RAM, one disk drive and HDOS or CP/M (as indicated below).

**SF-9014**, for HDOS systems, Postpaid ..... **29.95**

**SF-9114**, for CP/M systems, Postpaid ..... **29.95**

**Keep your books up-to-date with SOFTSTUFF's General Ledger II Accounting Software Package.** This powerful software package includes versatile programs which facilitate the entry, maintenance, reporting and analysis of accounting data. Includes following features:

Custom Chart of Accounts, for determining account names and numbers. Use any numbering system, with or without decimal notation; Comprehensive Printouts upon request, in 96-column format; Double Entry and Automatic Entry Checking, which automatically checks the equality of debits and credits with each entry; Fast and Simple Data Entry, with one quick keystroke;

Account Verification, which prevents entries to non-existent accounts — and rejects account numbers already in use; New Account Facility, to open new accounts at any time with no disruption to the transaction being entered; Balance Reporting, to call up the balance of any account

during data entry. All balances are instantaneously updated with the entry of new transactions; Audit Trail, to provide source number and free-form description.

This is one of the easiest-to-use, most flexible systems of its type you'll find anywhere. Includes listings and sample printouts. Requires H-8 or H/Z-89 with 48K RAM, one floppy disk drive HDOS or CP/M (see below) and Microsoft BASIC Interpreter (page 84).

**SF-9004**, for HDOS systems, Postpaid ..... **124.95**

**SF-9104**, for CP/M systems, Postpaid ..... **124.95**

**General Ledger Software Manual.** Purchase price of manual refunded when complete General Ledger Package is purchased.

**595-2500**, Postpaid ..... **15.00**

**Keep track with our Small Business Inventory Package.** Designed to facilitate a complete analysis of a small business' inventory. Accepts alpha-numeric part numbers up to 12 characters long. Descriptions of individual parts can be up to 18 characters long.

Provide up to 12 items of information on each part — including reorder level, usage history by month and year-to-date, and much more. Printouts include all information, part number/description/price, reorder list. Requires H-8/H-19 or H/Z-89 with 48K RAM, HDOS, or CP/M (see below) and Microsoft BASIC Interpreter (page 84).

**SF-9005**, for HDOS systems, Postpaid ..... **89.95**

**SF-9105**, for CP/M systems, Postpaid ..... **89.95**

**Use our Full Screen Editor to program more efficiently.** Uses the video display screen of the H-19 Video Terminal or the H/Z-89 Computer as a window into a file. Changes can be typed anywhere on the screen. Function keys perform character and line insertion/deletion functions.

Also features a string search function and the ability to move and copy single or multiple lines — as well as scrolling of text in the window. Requires H-8/H-19 or H/Z-89 system with 32K RAM, one floppy disk drive and HDOS or CPM (as indicated below).

**SF-9000**, for HDOS systems, Postpaid ..... **49.95**

**SF-9100**, for CP/M systems, Postpaid ..... **49.95**

**Use the SOFTSTUFF Text Formatter with your Text Editor.** This Text Formatter performs fill and justification (straight right margin) functions on text prepared by your text editor. Features include page numbering, headers and footers, indents, hanging indents, centering and underlining. Inclusion feature allows the automatic insertion of up to 26 user-defined strings, as well as the merging of documents. Requires H-8/H-19 or H/Z-89 system with 32K RAM, one disk drive and HDOS or CP/M (as indicated below).

**SF-9001**, for HDOS systems, Postpaid ..... **54.95**

**SF-9101**, for CP/M systems, Postpaid ..... **54.95**

**The Computerized Phone System (CPS) gives you and your Heath computer access to more information.** This data communications interfacing utility program permits the transfer of data files between your computer and CompuServe's MicroNET Information Service.

MicroNET's large time-sharing computer provides features not available in a stand-alone microcomputer system. You can write and edit programs and data files, and store them on the system. You are able to run your own programs — and you can also access data files and programs in the large MicroNET library.

CPS features user-defined keys for auto log-in, mail check and more. Full error checking and an on-screen elapsed time clock are provided.

Easy to use on time-sharing systems, CPS gives your Heath computer system access to other computer systems. Requires H-8/H-19 or H/Z-89 system with 32K RAM and HDOS or CP/M (as listed below).

**SF-9003**, for HDOS systems, Postpaid ..... **39.95**

**SF-9103**, for CP/M systems, Postpaid ..... **39.95**

**RTTY Communications Processor adds fun to your Ham radio hobby.** Split screen means you can copy incoming messages — while editing outgoing messages. Complete system status (time, CW ID, ASCII or Baudot operation) is graphically displayed on screen. Disk-based autostart.

**SF-9006**, for HDOS systems, Postpaid ..... **99.95**

## Now from Heathkit/Zenith — an effective Pascal Programming Self-Instruction Course

**\$99<sup>95</sup>**

- Pascal...the ideal computer language for beginning programmers, as well as experienced computer users
- Our audio-tutorial self-instruction format simplifies Pascal programming

Now you can learn Pascal, a modular, sophisticated, powerful programming language. If you've been around programming languages or even if you're new to computers, you've probably heard about Pascal. It's the structured and adaptable programming language that has quickly swept into popularity.

Pascal incorporates these structured programming features: Top-Down Detail, where overall structure can be established before adding details; and Modular Organization, which makes fixing programming errors easier than with other programming languages. Segments of a Pascal program can be isolated and tested independently from the rest of the program.

**Proven audio-tutorial methods make learning easier:** Whether you're new to computer programming, or already accomplished in one or more languages, our approach makes Pascal easier to learn. Five audio cassettes guide you through the 500-page self-instruction text, letting you see AND hear each concept of the Heathkit/Zenith Pascal Language Programming Course as it is presented, so that learning is reinforced and made more effective. Our Pascal Course is the result of the combined talents of highly qualified programming instructors, with assistance from specialists in instructional design.

**An introduction** shows how to identify and write simple Pascal programs. In **Module 2**, students learn to identify and write self-contained procedures. **Module 3, Making Decisions** teaches students how and when to incorporate IF...THEN...ELSE and CASE statements in Pascal programs, as well as how to use Boolean variables. **Module 4** covers REPEAT...UNTIL, WHILE...DO and FOR loops. **Module 5** discusses Pascal data types and teaches how to declare your own data types. **Module 6, Arrays and Character Strings**, shows how to use

## Learn COBOL, the business computer language

**\$149<sup>95</sup>**

- Field-proven, audio-tutorial techniques make learning the COBOL Language easier than before
- Learn to write COBOL Language programs

Learn the language of business computers — COBOL — with this popular self-instruction course. The Heathkit/Zenith COBOL Course is the low-priced way to learn this important language. It covers the basics of encoding, input characteristics, program hierarchy, identification, environment, data and procedure divisions. Both the ANS 74 and ANS 68 versions of COBOL are covered in the course.

The Heathkit/Zenith COBOL Programming Course uses the effective audio-tutorial learning method. You get a clearly written self instruction textbook full of diagrams, tables, illustrative programs and unit tests.

A set of nine audio cassettes complements the student text, allowing you both to see and hear each concept as it is presented.

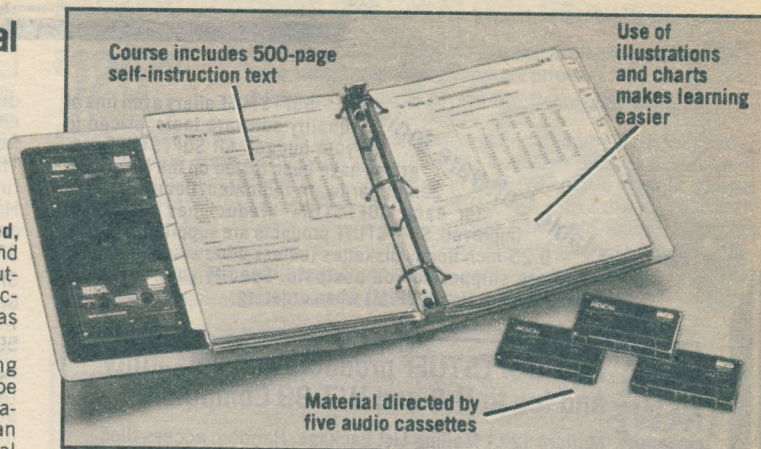
The student textbook covers these aspects of COBOL: a sample COBOL program; program variations; structure and syntax; simple arithmetic statements, comments and diagnostics; advanced arithmetic and control statements; additional data concepts; magnetic tape and disk concepts; and more.

A set of six practice COBOL programs is located at the end of the workbook. You can work on them at specified points in the course — or you may prefer to wait until the end of the text. A master COBOL coding sheet is also included. Use it as an aid in writing your COBOL programs.

If you pass the optional final examination with a score of 70 percent or better, you'll earn 3.0 CEUs and a Certificate of Achievement.

Learn the programming language that thousands of businesses use world-wide. Order the Heathkit/Zenith COBOL Programming Course today. To get the most out of COBOL Programming, we recommend that you use a H-8 (see page 72), H-89 (see page 70) or Z-89 (see page 78) computer system with floppy disk capability, the Heath CP/M Operating System (offered on page 83) and the Microsoft CP/M COBOL Programming System (sold on page 85).

EC-1105, Shpg. wt. 7 lbs. **149.95**



Course includes 500-page self-instruction text

Use of illustrations and charts makes learning easier

Material directed by five audio cassettes

arrays in solving problems. **More about Procedures, Module 7**, covers the writing of complete Pascal procedures to perform the desired tasks. **Students learn about Records and Sets in Module 8. Module 9, Pointers**, covers the difference between pointers, linked lists, stacks, queues, binary trees and other statements. **The last module** covers sequential files and standard Pascal files, so that you can store files or data on disks.

To earn 4.0 Continuing Education Units (CEUs) and a Certificate of Achievement, pass the optional final examination with a 70% or better score after completing this Heathkit/Zenith Course.

EC-1111, Shpg. wt. 7 lbs. **99.95**

**MONEY-BACK GUARANTEE:** If you're not satisfied with any Heathkit/Zenith Educational Systems Course, return course materials and proof of purchase for a refund of the purchase price.

## Learn BASIC the fast, easy Heathkit/Zenith way

**\$44<sup>95</sup>**

- BASIC is one of the easiest computer languages to use
- BASIC is easy to learn with this self-instructional course
- Use with any BASIC-programmable computer
- Programming experiments reinforce each concept

Here's the fast and easy way to learn BASIC Language. This course covers many BASIC Language versions, formats, commands, statements and procedures, plus special problem-solving tips you can use while writing your own programs. This course is divided into 14 easy-to-follow programmed-instruction segments which will teach you the standardized words of BASIC, and the operation that each standardized word causes the computer to perform. You'll get a grasp on the tools of BASIC Language programming — including numbers, statements, functions, loops,

lists, arrays and strings.

You'll participate in the decision-making factors which are part of writing a meaningful BASIC program — as well as the creative aspect of program writing. Learn to define and plan a program, format and write it, and how to adapt programs to suit your specific needs. Interactive experiments give you hands-on experience in writing and running BASIC Language programs.

The course material includes a programmed-instruction textbook explaining BASIC, a special workbook of programming instructions, and experiments you can perform on your own computer. Also included are handy reference cards with Benton Harbor BASIC Statements, ASCII number codes, BASIC direct command statements and a reference chart for math and Boolean algebra operations.

To earn 3.0 Continuing Education Units (CEUs) and a Certificate of Achievement, score 70 percent or better on the optional final examination after completing this Heathkit/Zenith Educational Systems Course.

See the classroom version of this Course on page 42.

EC-1100, Shpg. wt. 7 lbs. **44.95**

College-Level Examination. See page 31 for more information.

ECC-1100, Shpg. wt. 1 lb. **25.00**



## Microsoft BASIC Programming introduces you to this enhanced language

\$99<sup>95</sup>



- Learn to write and modify powerful computer programs, using this popular version of BASIC Language
- Audio-tutorial course uses programming experiments to give you actual hands-on experience with MBASIC

Microsoft BASIC is one of the most versatile languages available for microcomputers — with scores of practical programs available. If you use MBASIC on your H-8, H/Z-89, All-In-One, TRS-80 or Apple computer, now you can get the most from this language with our new 800-page course.

Audio-tutorial learning means you'll read, hear AND perform specific directed functions to achieve maximum learning.

Unit 1 is an Introduction to Computers and Programming — covering computers, programs, data, the computer system and programming languages. Immediate Mode, the second unit, discusses arithmetic in BASIC, numeric variable, intrinsic functions and strings. Sequences, branching and loops are the topics covered in Unit 3, Program Structures. Unit 4 has More about Decisions and Loops — including relational operators, counter driven loops and nested loops.

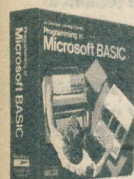
One-dimensional arrays, N-dimensional arrays and strings records are taught in Unit 5, Data Structures. User-defined functions and subroutines are the topics covered in Unit 6, Subprograms. Unit 7, Complex Structures, discusses logical operators, multiple branching and structured programming.

The last five units are dedicated to disk operations and extensions available on disk versions of the language. In Major Language Extensions, Unit 8, you'll learn about program editing; data type extensions; extended functions, operators, and statements. Sequential Disk Operations, Unit 9, covers program storage, program retrieval and sequential data files.



## FORTRAN Programming teaches you how to use this powerful language

\$99<sup>95</sup>



- Interested in FORTRAN programming? Heathkit/Zenith offers an easy, effective way to learn the language
- Audio-tutorial presentation and interactive programming experiments reinforce learning three ways

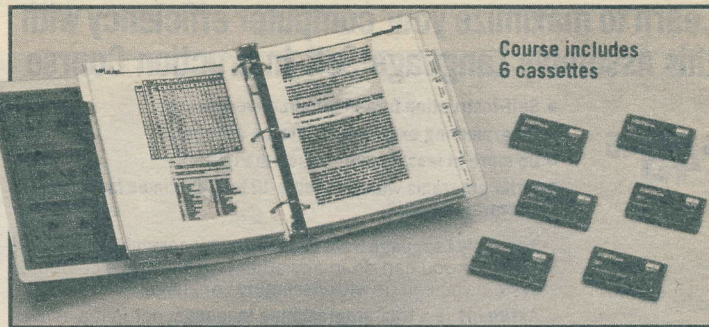
Are you ready for a language that takes on scientific tasks with ease? Our new course's effective audio-tutorial method teaches FORTRAN programming fundamentals. The 500-page text and 6 cassettes concentrate on programming — not on computers — for more complete learning.

Enclosed in an attractive three-ring binder, the 11-unit text includes a special Introduction to Computers:

Getting Started, Unit 1, shows you how to analyze a FORTRAN program, introduces you to statement types/elements and the character set. Unit 2 covers Arithmetic Operations. You learn about integer operations, real number and alphanumeric input/output in Unit 3, Elementary I/O.

Unit 4, Library Functions, covers elementary control statements, flowcharting and conditional transfer of control. Other Control Statements are taught in Unit 5. Unit 6 introduces you to Arrays. Programming Practices, Unit 7, covers different types of programming, coding considerations and debugging.

Other Variables, Unit 8, includes explicit type specification; logical and numeric data; and the implied DO statement. In Unit 9, you'll learn about Advanced I/O. Unit 10 covers Subprograms, including statement functions and common storage. Special I/O, Unit 11, discusses block data subprogramming; object time format specification; tape and disk command; and unformatted input/output.



Course includes 6 cassettes

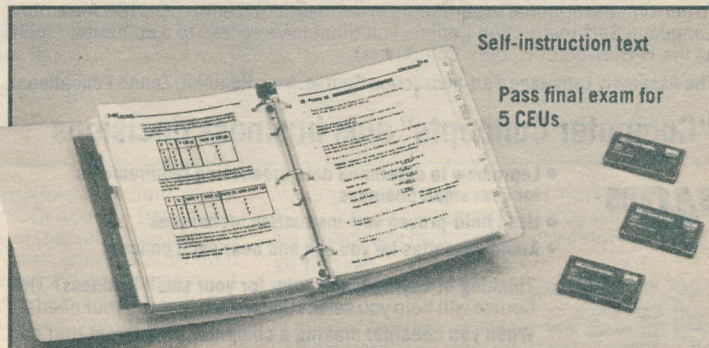
Unit 10, Random Access Disk Operation, covers random access buffers and fields — as well as storage and retrieval of numeric data. Error Trapping and Memory Conservation are the topics of Unit 11. Optimization and Machine Interfacing are covered in the final unit.

Self-test reviews let you check progress. Three cassettes reinforce the text. Experiments give you actual experience in writing programs.

The course emphasizes programming in Microsoft BASIC. It contains the features of our Microsoft BASIC software (p. 84), except for the TRON and TROFF debugging feature. To get full benefit, you must have a computer.

Upon completion, you will be able to write Microsoft BASIC programs that instruct a computer to perform specific tasks — such as sorting, plotting and organizing programs and data, and more.

To earn 5.0 CEUs, pass the optional final exam with a score of 70% or better. EC-1110, Shpg. wt. 7 lbs. .... 99.95



Self-instruction text

Pass final exam for 5 CEUs

Interactive hands-on experiments give you actual experience in writing FORTRAN programs — the necessary coding forms are included with the course. The text also offers extensive practice in writing FORTRAN programs and using the character set. Self-test reviews let you check your progress. And a comprehensive final examination is included.

When you complete this course, you will be able to write FORTRAN programs that instruct a computer to perform specific tasks — such as keeping track of student records, sorting, solving geometry problems and many more.

Earn 5.0 CEUs — pass the optional final exam with a 70% or better score. It's not necessary to have a math background — but a H-8 or All-In-One Computer with two floppy disk drives, HDOS or CP/M (p. 83) and Microsoft FORTRAN Language (p. 84) is highly recommended to get the most out of this course.

EC-1101, Shpg. wt. 7 lbs. .... 99.95



**NEW** Computer Dictionary is a complete reference source of computer terms

Need a dictionary to understand computer jargon? The Heathkit/Zenith EB-1020 Computer Dictionary: A Sourcebook of Computer Terms fills your need for knowledge. It's a handy reference for hobbyists, technicians, engineers or professionals who deal with computer-related terms.

It contains thousands of computer-related words

and phrases, along with complete definitions.

Browse through this dictionary and you can learn significant detail about the products, procedures problems and proliferating applications of the microcomputer revolution. Definitions are made clear and explicit throughout the text.

EB-1020, Shpg. wt. 2 lbs. .... 14.95



FREE delivery, within 50 miles of store, for phone charge orders that ship UPS.

COMPUTER EDUCATION/91

## Learn to maximize your computer efficiency with this Assembly Language Self-Instruction Course

**\$49<sup>95</sup>**

- Self-instruction format for effective learning
- Programming exercises reinforce concepts
- Do more in less memory space than BASIC
- Write programs which execute 10 to 1000 times faster than interpreted BASIC

**Assembly Language translates to greater computer efficiency!** Anything you can do in any other language on a computer system you can do with Assembly Language.

**Assembly is a true programming language**, not just a convenient notation for machine code. The use of labels, computed operands, comments and assembler directives allows the Assembly Language programmer to create a source code that is adaptable to the system and easily read. Assembly language uses a mnemonic for every machine operation. There's no time wasted in interpreting – so your programs require less memory space and run much faster.

**Assembly Language utilizes your computer system's memory more efficiently.** Shorter, more explicit codes allow you to store more data in less space. Symbolic notation and easy to implement documentation methods make program listings easy to understand.

**This unique Self-Instruction Course** teaches you to program your computer in Assembly Language. You learn the details at your own pace, using a specially designed 400-page text. An exercise workbook provides hands-on experience with programming exercises – you perform each exercise on your own computer system. The programmed-instruction text and workbook are so thorough that you learn to program your computer by studying them. You'll study flowcharting, device polling, code conversions, masking, subroutines, 8080 instruction set, I/O routines, multi-precision arithmetic and much more. To perform the optional experiments in the Heathkit/Zenith EC-1108 Assembly Language Self-Instruction Course, you must have access to a computer (such as the H-8, H-88 or H/Z-89 Computers).

The Assembly Language Self-Instruction Course, from Heathkit/Zenith Educational

## "Computer Concepts" aids business decisions

**\$49<sup>95</sup>**

- Learn how to determine data processing requirements for your small business
- Uses field-proven self-instruction techniques
- Audio cassettes let you see and hear each concept

**Thinking of buying a computer for your small business?** This Course will help you select the system that fits your needs.

**When you consider making a computer investment** that can run into thousands of dollars, you need to know as much about computers as possible – before making the investment. The Heathkit/Zenith Computer Concepts Course is designed to give you the knowledge you need to evaluate the usefulness of a computer in your business.

**Proven self-instruction methods** – using an effective text and three audio cassettes – teach you how to evaluate the benefits that a computer offers your business. Three appendices to the text reinforce course material.

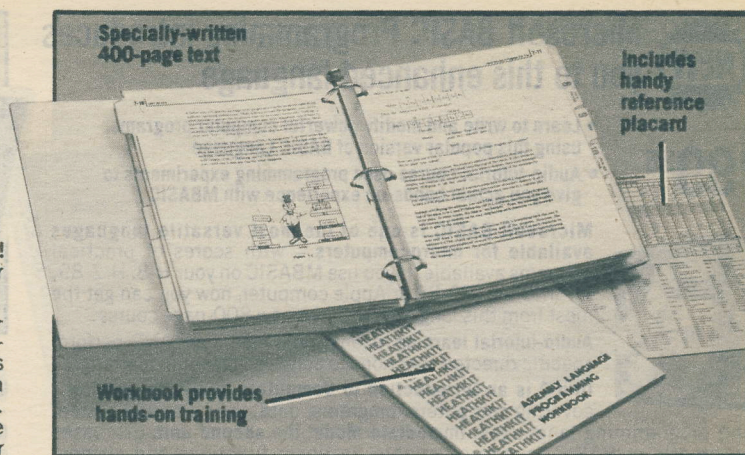
**The course is divided into four concise, easy-to-understand units** – which present computer concepts in business terms. **Unit 1 – The Computer and How It Works** – covers different types of memory, input/output devices, capabilities of different types of storage media and applications software. It explains what a computer can do in a small business environment.

**The Data Processing Department and Personnel, Unit 2**, teaches you how to organize a data processing (DP) department. It explains the roles of the DP manager, data processing engineer, systems analyst, operator and other personnel. **The third unit of this Course, Alternatives in Computer Services**, compares the advantages of owning your own computer system – versus a time-sharing arrangement or using a computer service bureau.

**How to Select a Computer, the fourth and final unit**, shows you how to define and fulfill your data processing requirements.

**A passing score of 70 percent or better on the optional final examination** will earn you 1 Continuing Education Unit (CEU) and a Certificate of Achievement from Heathkit/Zenith Educational Systems.

EC-1103, Shpg. wt. 5 lbs. .... **49.95**



**Systems**, is specifically designed for 8080/8085-based microcomputer systems which use standard Intel 8080 mnemonics. The Assembly Language taught in this course can be used with the Heath H-8, Heath H-88, Heath H-89 and Zenith Z-89 Computers. (The H-8, H-89 and Z-89 Computers use the 8080 subset of the Z-80 microprocessor).

**In addition to the programmed instruction text and workbook**, the Assembly Language Course includes a special Reference Placard which lists all 244 assembly instructions as well as an ASCII code chart. When you take the optional final examination for the course and achieve a score of 70 percent or better, you earn a Certificate of Achievement and 6.0 Continuing Education Credits (CEUs).

**Now is the time to learn the computer language** that puts you in command of your computer's full potential. Start your Heathkit/Zenith Assembly Language Self-Instruction Course... today!

EC-1108, Shpg. wt. 7 lbs. .... **49.95**

## Personal Computing explains computers

**\$39<sup>95</sup>**

- Learn how a computer can help you
- Explains computers in everyday terms, so little technical knowledge is required
- Self-instruction text, cassettes for effective learning

**Here's your chance to learn the basics of microcomputers and BASIC Language programming** – even if you have no prior technical background. The award-winning Heathkit/Zenith Personal Computing Course shows you how to determine if your particular problem can be solved by a computer. You'll cut through technical terminology, and understand what a computer can do – in easy, simple terms.

**No extensive math, electronics or computer background needed:** The effective audio-tutorial teaching format – featuring a self-instruction textbook and two audio cassettes, lets you see and hear each concept in our Personal Computing Course.

**Five easy-to-understand units** explain different parts of the computer system:

**In the first unit, Computers and Data:** you'll find out how to apply the capabilities of a computer to your specific problems. You will see how computers "understand" electronic data – and how to convert written words into the electronic data computers understand.

**Unit 2, Hardware**, shows you how to compare computers – by understanding how each computer performs. **Systems and Interfacing, the third unit**, teaches how to evaluate small computer systems by understanding how different components perform. You'll find out how the computer communicates with other components – and how to distinguish between analog and digital data. **Software, Unit 4**, shows you how to choose software programs that help solve your problems.

**In the last unit of this course, BASIC Language Programming**, you'll actually learn to write short computer programs – using BASIC.

**By passing the optional final examination with a score of 70 percent or better**, you'll earn 1 Continuing Education Unit (CEU) and a Certificate of Achievement from Heathkit/Zenith Educational Systems.

EC-1000, Shpg. wt. 5 lbs. .... **39.95**

