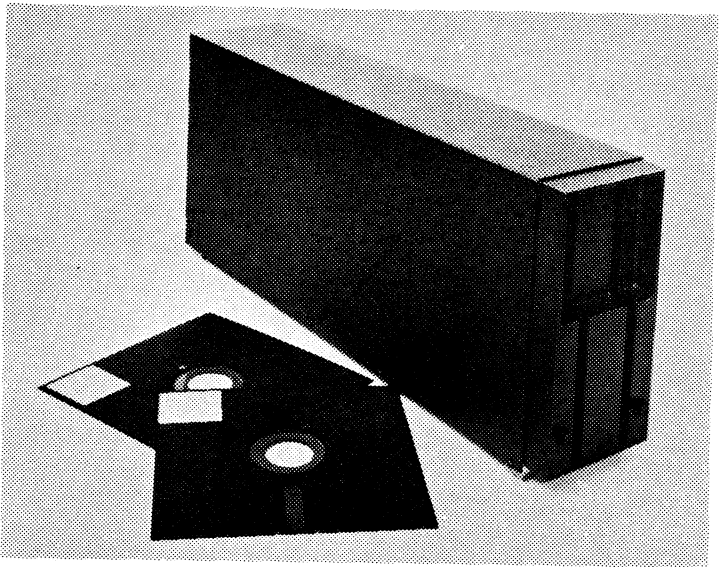
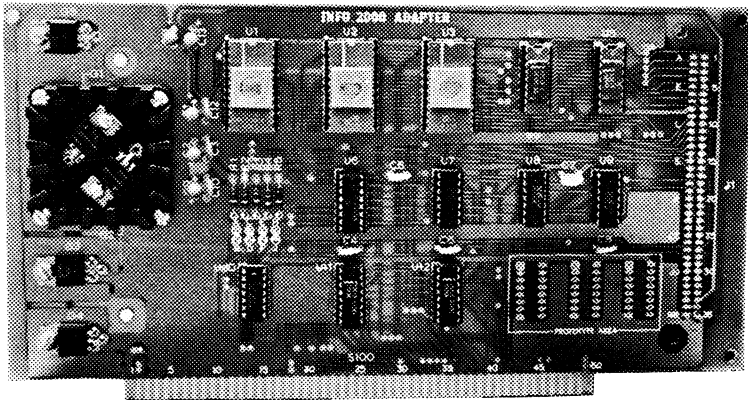


INFO 2000 DISK SYSTEM

FOR: HEATHKIT H8
DIGITAL GROUP
ALL S-100 COMPUTERS

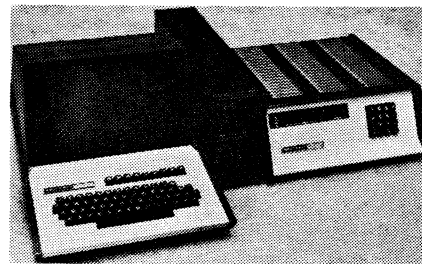
The INFO 2000 Disk System is the fastest and most technically advanced dual diskette system that you can buy for your S-100, Digital Group, or Heathkit H8 microcomputer, and it is supported by the most extensive library of operating software available anywhere.

INFO 2000 combines the high-performance PerSci 277 Dual Diskette Drive, a self-contained power supply, and a filtered positive-pressure air circulation system in this attractive Slimline case. The complete package (right) is less than half the size of competing two-drive systems.



The INFO 2000 S-100 Adapter (left) interfaces the PerSci 1070 Intelligent Controller to the S-100 bus, provides power regulation, and provides for 3K of EPROM and 1K of RAM. Similar Adapters are offered for Digital Group and Heathkit H8 busses.

Now INFO 2000 offers a high-performance dual diskette system for the Heathkit H8 (right), and upgrades the H8 from 8080 to Z80 in the process. The INFO 2000 Z80/Disk Board simply replaces the regular Heathkit 8080 CPU board. With the INFO 2000 Disk System installed, the H8 operates in either of two switch-selectable modes: one for Benton Harbor software, the other for all INFO 2000 software including CP/M and the TDL library.



ATTENTION: HEATHKIT H8 OWNERS

YOUR QUESTIONS ANSWERED.....

WHAT IS THE INFO 2000 DISK SYSTEM?

The INFO 2000 Disk System is a complete dual floppy disk system for your S-100, Digital Group, or Heathkit H8 microcomputer. It incorporates the fastest dual diskette drive (PerSci 277) and the most sophisticated intelligent controller (PerSci 1070) available to provide the highest performance and greatest functional capability of any mass-storage system you can buy for your microcomputer. INFO 2000 supports this Disk System with the best and most complete library of operating software available anywhere. The complete INFO 2000 Disk System is delivered assembled and fully tested to assure you of an uneventful plug-in-and-go installation in your microcomputer.

WHAT KIND OF COMPUTERS CAN USE THE INFO 2000 DISK SYSTEM?

If you have a Digital Group Z80 or 8080 system, a Heathkit H8 system, or any S-100 bus computer which uses the 8080, 8085, or Z80 microprocessor as its CPU, the INFO 2000 Disk System and supporting software library will work with it. INFO 2000 provides its customers with the unique service of customizing its software to operate with whatever I/O configuration you are using (within reasonable limits) at no additional cost. The INFO 2000 Disk System and software is being used today with Altair, BYT-8, Cromemco Z-2 (at 4 Mhz), Digital Group, Heathkit H8, IMSAI, Poly 88, Processor Technology SOL, TDL Xitan, T.E.I., Vector Graphic, and other microcomputer mainframes.

I OWN A CROMEMCO Z-2 (OR IMSAI 8080, OR PROCESSOR TECHNOLOGY SOL); WHY SHOULD I BUY A DISK SYSTEM FROM INFO 2000 INSTEAD OF FROM CROMEMCO (OR IMSAI, OR PROCESSOR TECHNOLOGY)?

These three companies are first-rate microcomputer manufacturers, and all three have had the technical insight to select the PerSci 277 drive for their products. However, they are not disk system specialists as INFO 2000 is. Frankly, our hardware is more capable and less error-prone than theirs, our software library is broader and better than theirs, our prices are lower, our delivery is faster, and our service capability and turnaround is outstanding. In addition, INFO 2000 is an organization that prides itself on providing individual personal attention to the hardware, software, and support requirements of its customers to an extent that the major microcomputer manufacturers simply cannot afford to match.

WHAT ARE THE TECHNICAL DIFFERENCES BETWEEN THE INFO 2000 DISK SYSTEM AND OTHERS?

The INFO 2000 Disk System is the only one which has an intelligent controller with its own on-board microprocessor and file management firmware. It uses the industry-standard single-density FM recording technique and soft-sectored diskettes to provide nearly complete immunity to read/write errors. (Double-density recording is extremely intolerant to speed variations, dirty heads, flawed media, etc., and so is an order of magnitude less reliable.) It offers the most complete software support of any disk system. It is available for S-100, Digital Group, and Heathkit H8 systems with total file and program interchangeability. And only INFO 2000 offers its Disk System with complete device driver software in EPROM which is customized for your particular microcomputer and I/O configuration.

WHAT MAKES YOU SAY THAT YOUR PRICES ARE LOWER THAN OTHERS?

Look at the cost of the INFO 2000 Disk System in comparison to comparable disk systems from Cromemco and Processor Technology. These prices are for an assembled and tested dual drive system using 8-inch diskettes, with case, power supply, cables, and an S-100 controller:

| | |
|--|---------|
| Cromemco Model PFD-W Drive + Model 4FDC-W Controller | \$3,090 |
| Processor Technology Helios II Dual Floppy System | 2,895 |
| INFO 2000 S-100 Disk System Complete | 2,850 |

If the cost of software is included in the comparison, the INFO 2000 cost picture looks even more favorable. INFO 2000 offers the Digital Research CP/M disk operating system plus a set of EPROM-resident device drivers customized for your specific I/O configuration, all included in the \$2,850 price. Other manufacturers charge \$75 to \$100 extra for their monitors, and do not offer the customization service at any price. Similar "apples-with-apples" price comparisons between the INFO 2000 Disk System and competitive systems from IMSAI, iCOM, and Digital Systems yield similar results. However, we want you to buy the INFO 2000 Disk System because it is the best on the market, not because it is the cheapest!

CAN'T I SAVE MONEY BY GETTING A SINGLE-DRIVE DISK SYSTEM INSTEAD OF A DUAL?

Yes, but then you cannot perform disk-to-disk copies to back up your important program and data files. For all practical purposes, any serious disk system user cannot get by with less than a dual drive system.

HOW ABOUT THE TWO-DRIVE MINIFLOPPY SYSTEMS THAT ARE UNDER \$1,500?

Minifloppies seem like quite a bargain, until you realize that they are about half the cost of the full-size 8-inch diskette systems but offer only one-third of the capacity and one-sixth of the speed! Our experience indicates that minifloppies are an attractive alternative to cassettes for loading programs, but are simply not viable for serious data management work such as business applications.

CAN I SAVE SOME MONEY BY BUYING THE INFO 2000 DISK SYSTEM IN KIT FORM?

Sorry, no. INFO 2000 offers its Disk System only in assembled and tested form, because we feel strongly that something as intricate and expensive as a disk system must be completely checked out at the factory. When you purchase a disk system from INFO 2000, your disk drive, controller, adapter, power supply, and cabling are rigorously tested together as a matched system and run through an automated sequence of worst-case tests which require nearly two hours per system and which involve some 50,000 discrete disk operations without error before the system is allowed to be shipped to you. INFO 2000 is building its reputation on high quality rather than low cost, and we are unwilling to do anything (such as selling kit disk systems) which will erode our ability to ensure that quality.

HOW LONG DOES IT TAKE TO OBTAIN AN INFO 2000 DISK SYSTEM?

INFO 2000 promises delivery within four weeks after receipt of your order and certified check, although we usually deliver in about two weeks. (This is much shorter delivery time than you can get from PerSci directly, but INFO 2000 is one of PerSci's biggest customers and receives a constant flow of drives and controllers.) We accept COD orders with a 20% deposit, but we offer a 5% discount to retail customers who prepay in full at the time of order. Where else can you get a 5% return on your money in two to four weeks?

DETAILED DESCRIPTION OF THE HARDWARE

The INFO 2000 Disk System is made up of five major subassemblies:

- . PerSci Model 277 Dual Diskette Drive
- . Power Supply
- . Slimline Case
- . PerSci Model 1070 Intelligent Diskette Controller
- . Adapter Board (for S-100, Digital Group, and Heathkit H8)

each of which merits separate description.

THE PERSCI MODEL 277 DUAL DISKETTE DRIVE

The outstanding performance parameters of the PerSci Model 277 Dual Diskette Drive set it apart from any other diskette drive available today. All other floppy disk drives use an incremental stepping motor for head positioning. The unique PerSci drive is built with an entirely different type of positioner, a miniaturized version of the linear motor (also called "voice coil") positioning mechanisms which are used in large-scale hard-disk drives. This mechanism is about twice as fast as a stepping motor on short seeks, and increases its speed advantage to as much as eight times on long seeks (see Table 1).

Another unique aspect of the PerSci Model 277 is that it combines two diskette drives into a package the same size as an ordinary single drive. The 277 dual drive shares a single positioner and a single spindle motor between the two diskettes. The dual drive is smaller and less expensive than two singles, has drastically reduced power consumption (28 watts for one PerSci dual drive as compared with 140-180 watts for two conventional singles). One dual drive has over 500,000 byte capacity using the conservative IBM-compatible soft-sectored format which is the industry standard.

| Diskette Drive (Positioner Type) | Min. Seek (ms) | Max. Seek (ms) | Average Latency (ms) | Average Access (ms) | Average Accesses per sec. |
|--------------------------------------|----------------------|----------------------|----------------------------|---------------------------|---------------------------------|
| PerSci 277 Dual (linear motor) | 10 | 95 | 83 | 136 | 7.4 |
| Shugart SA850 (3ms stepper) | 18 | 243 | 83 | 214 | 4.7 |
| iCOM, Wangco (6ms stepper) | 18 | 468 | 83 | 326 | 3.1 |
| Shugart SA800 (10ms stepper) | 18 | 768 | 83 | 476 | 2.1 |
| Shugart Minifloppy (40ms stepper) | 50 | 1370 | 100 | 810 | 1.2 |

Notes:
 (1) Seek times include settling time.
 (2) Average access time = average latency time plus average of min and max seek times.
 (3) Average accesses per second = reciprocal of average access
 (4) Seek, settling, and latency times obtained from manufacturers' specifications.

Table 1. Performance of floppy disc drives.

THE INFO 2000 POWER SUPPLY

The INFO 2000 Disk System incorporates its own regulated multi-voltage power supply which provides for all power requirements of the PerSci drive. Many microcomputer diskette systems rob power from the computer mainframe to run the diskette drives (this is especially prevalent with minifloppies). This is risky from an engineering point of view, because the current surges required by the positioner and the RF generated by the spindle motor can create serious noise problems in the entire microcomputer power distribution system. This explains why INFO 2000 chose to provide a completely separate power supply for our Disk System. A movable jumper is provided to select either 120 or 240 volt power (50 to 60 cycles), making the INFO 2000 system ideal for use overseas.

THE INFO 2000 SLIMLINE CASE

The PerSci drive and the power supply both fit snugly into a custom-designed Slimline case which is only 4.5" wide by 9" high by 19" deep. This is about half the size of other PerSci-based systems, and one-third the size of conventional two-drive systems. The case incorporates a quiet filtered positive-pressure air circulation system to ensure that dust cannot enter the diskette drive, thereby increasing the error-free reliability of the system even further.

THE PERSCI MODEL 1070 INTELLIGENT DISKETTE CONTROLLER

The PerSci Model 1070 controller is a remarkable piece of engineering. Built on a tiny 4.5" by 7" circuit board, it incorporates its own 8080 microprocessor and associated support chips, a Western Digital FD1771B single-chip LSI diskette controller, 4K bytes of EPROM containing extensive file management firmware, 1K bytes of RAM used for input/output buffering, and an eight-bit parallel microcomputer interface. In short, the PerSci controller is a single-board computer devoted to managing the disk subsystem.

The exciting thing about an intelligent controller like the PerSci 1070 is that the controller's firmware can take care of the complexities of controlling the diskette drives and managing the disk files. To the host microcomputer, the disk subsystem looks no more complicated than a paper tape reader. This makes it exceptionally easy to use the disk with non-disk-oriented monitors, language processors, and other software.

The controller firmware supports the following functions: diskette format initialization with optional sector interleave; maintaining and searching the directory of files on each diskette; allocation, deallocation, and reclamation of diskette space; sequential, random, stream, and direct file access methods; blocking and unblocking of both fixed-length and variable-length records; creating, deleting, renaming and copying of files; error detection and error retry; and diagnostic testing of the diskette drives.

INFO 2000 ADAPTERS (FOR S-100, DIGITAL GROUP, AND HEATHKIT H8)

Because the PerSci 1070 controller does not interface directly with any commonly-used microcomputer bus structure, INFO 2000 provides Adapter boards for this purpose. The PerSci controller mounts piggyback on the INFO 2000 Adapter board, firmly clamped on each end, and the entire assembly slides into a slot on your microcomputer's motherboard.

The INFO 2000 S-100 Adapter provides all necessary interface logic and power regulation for the S-100 bus. In addition, the S-100 Adapter has provision for 3K of 2708-type EPROM and 1K of RAM to support bootstrap loaders, monitors, buffers, and scratchpad space.

The INFO 2000 Digital Group Adapter interfaces the Disk System to the Digital Group system by occupying one memory slot. Because the Digital Group boards are physically larger and because no on-board power regulation is required, the INFO 2000 Digital Group Adapter has room for 5K of EPROM and for one or two optional RS232 serial interface ports with switch-selectable baud rates from 50 to 19,200 bits-per-second.

The INFO 2000 Z80/Disk Adapter Board for the Heathkit H8 replaces the normal Heathkit 8080 CPU, and combines a Z80 microprocessor with all support chips, all logic necessary to interface the Disk System, and provision for 7K of EPROM and 1K of scratchpad RAM. An on-board switch selects either Benton Harbor mode (8080 interrupts, ROM in low memory) or INFO 2000 mode (Z80 interrupts, RAM in low memory).

DETAILED DESCRIPTION OF SOFTWARE

The INFO 2000 Disk System is supported by the most extensive library of operating software available in the microcomputer field. All software offered by INFO 2000 operates with 8080-, 8085-, and Z80-based microcomputer systems, except that the TDL software requires a Z80. Unless otherwise indicated, all software requires 16K of RAM minimum.

DIGITAL RESEARCH CP/M DISK OPERATING SYSTEM

CP/M is an advanced disk operating system which has been in wide use for more than three years. As a result, it is a very mature and stable operating system for which a vast library of software is available. CP/M provides rapid access to programs and data by means of a comprehensive file management system which supports dynamic allocation of disk space, and named files with both sequential and random access. CP/M includes its own context editor, 8080 macro-assembler, 8080 dis-assembler, and dynamic debugging package, and supports both interactive and batch processing modes. Executing a program stored on disk is accomplished simply by typing the program name. Other CP/M commands include:

| | | | | | |
|----------|-----------|--------|------------|--------|--------|
| Assemble | Debug | Edit | Load | Save | Sysgen |
| Assign | Directory | Erase | Peripheral | Status | Type |
| Backup | Dump | Format | Rename | Submit | Verify |

INFO 2000 includes Digital Research CP/M on diskette plus an EPROM-resident CP/M bootstrap loader and device drivers as part of the basic price of the INFO 2000 Disk System, and provides the unique service of customizing the monitor to operate with whatever I/O configuration you are using (within reasonable limits) at no additional cost.

SOFTWARE SYSTEMS COMMERCIAL DISK BASIC (CBASIC)

CBASIC is an advanced BASIC compiler with numerous business-oriented extensions, and is an excellent applications development language for the professional programmer. Language features include decimal arithmetic with fourteen digits of precision, PRINT USING with commercial formatting facilities, random and sequential access to data files on disk, variable names up to 31 characters, and structured programming constructs. CBASIC requires at least 20K of RAM.

MICROSOFT EXTENDED DISK BASIC VERSION 4.4 (MBASIC)

MBASIC is identical to Altair Extended Disk BASIC but operates under CP/M. It is one of the most extensive 8080/Z80 BASIC implementations available. MBASIC is an interpretive implementation, not a compiler. Features include integer, real (7 digit), and double precision (16 digit) arithmetic, PRINT USING with elaborate COBOL-like formatting, automatic line numbering and RENUMBER command, EDIT command for character editing of programs, and both sequential and random access to disk files. Because it is an interpreter with especially good debugging facilities, MBASIC is a better choice than CBASIC for the non-professional programmer. MBASIC requires at least 28K of RAM.

TDL 12K SUPER BASIC (Z80)

TDL BASIC is an interpreter which is very similar in scope to MBASIC, but which requires a Z80-based system and takes advantage of the improved speed and size made possible by the Z80 instruction set. It includes most of the same language extensions provided by MBASIC, and certain unique features of its own, but provides only limited sequential access to data files on disk. TDL BASIC will run in only 16K, and it costs less than

MBASIC.

TDL RELOCATING MACRO ASSEMBLER (Z80)

This assembler includes every functional capability you would expect to find in an assembler for a large-scale computer. It has complete macro generation, infinite nesting of macros, conditional assembly directives, multiple location counters, complete listing control with headings and subheadings on each page, and lots of additional features. Although this is a Z80 assembler, it accepts standard 8080 instruction mnemonics, permitting existing 8080 source programs to be reassembled with only nominal text editing.

TDL TEXT OUTPUT PROCESSOR (Z80)

This is a general purpose word processing system which is used in conjunction with the Z-TEL text editor. It features automatic pagination, tabulation, justification, centering, and numerous other text formatting functions.

TDL Z-TEL TEXT EDITING LANGUAGE (Z80)

This is an exceptionally powerful context editing system for preparing general text files as well as source programs for the Macro Assembler and FORTRAN. Functionally, it is patterned after the well-known TECO editor on the giant DECsystem 10. Capabilities include: forward and backward context searches, string replacement, moving large blocks of text, defining text editor macro commands, conditional branching and looping, and many other advanced functions.

TDL ANSI STANDARD FORTRAN IV (Z80)

This is by far the most complete FORTRAN implementation on any microcomputer. It includes the complete ANSI Standard FORTRAN IV language plus many major extensions such as string variables and dynamic memory management. Extensive documentation of TDL FORTRAN is available from INFO 2000 for \$15. TDL FORTRAN requires at least 32K for compilation.

TDL MICRO-SEED DATA BASE MANAGEMENT SYSTEM (Z80)

Incredible as this sounds, Micro-SEED is a full CODASYL Data Base Management System which is used in conjunction with TDL FORTRAN, and which provides support of complex data base structures which until now has been available only on large mainframes! Micro-SEED requires TDL FORTRAN and a Z80 system with at least 48K. Write INFO 2000 for details.

STRUCTURED SYSTEMS GROUP SORT/MERGE PROGRAM (QSORT)

QSORT is a fast, general purpose sort/merge facility which may be used with files generated by BASIC or FORTRAN. It will sort up to a full diskette of data, using up to five key fields, alpha or numeric, ascending or descending. QSORT greatly facilitates the development of business applications.

STRUCTURED SYSTEMS GROUP NAME-AND-ADDRESS SYSTEM (NAD)

NAD is designed to fill the needs of small businesses by maintaining lists of names, addresses, phone numbers, and other related information. Programs are provided to update lists, select names based on a variety of selection criteria, and print reports and mailing labels.

INFO 2000

CORPORATION

PRICING AND ORDERING INFORMATION

| | |
|--|---------|
| INFO 2000 S-100 DISK SYSTEM COMPLETE | \$2,850 |
| INFO 2000 DIGITAL-GROUP DISK SYSTEM COMPLETE | 2,850 |
| 1st Optional RS232 Serial Port | 90 |
| 2nd Optional RS232 Serial Port | 70 |
| INFO 2000 HEATHKIT H8 Z80/DISK SYSTEM COMPLETE | 2,950 |
| (Above Disk Systems include dual drive, power supply, case, intelligent controller, adapter, cables, Digital Research CP/M disk operating system, and EPROM-resident CP/M loader with customized peripheral device drivers.) | |
| SOFTWARE SYSTEMS COMMERCIAL DISK BASIC (CBASIC) | 100 |
| MICROSOFT EXTENDED DISK BASIC (MBASIC) | 350 |
| TDL CP/M PACKAGE "A" (Also available individually) | 215 |
| TDL 12K Super BASIC | 95 |
| TDL Relocating Z80 Macro Assembler | 50 |
| TDL Text Output Processor (Word Processor) | 50 |
| TDL Z-TEL Text Editing Language | 50 |
| TDL ANSI STANDARD FORTRAN IV | 350 |
| TDL Micro-SEED DATA BASE MANAGEMENT SYSTEM | 1,300 |
| STRUCTURED SYSTEMS GROUP SORT/MERGE (QSORT) | 95 |
| STRUCTURED SYSTEMS GROUP NAME-AND-ADDRESS SYSTEM (NAD) | 80 |

INFO 2000 normally ships disk system orders within two to four weeks after receiving your certified check, cashier's check, or money order. C.O.D. orders are accepted with a 20% deposit. INFO 2000 extends a 5% discount to retail customers who include payment in full at the time of order. California residents must add 6% sales tax. Dealer inquiries welcomed.

INFO 2000 warrants its products to be free from defects in materials and workmanship for a period of 90 days following the date of purchase, and will repair or replace any defective system or component if returned postpaid to INFO 2000 within the warranty period. Refer to the INFO 2000 Corporation Limited Warranty for specific terms and conditions.

An increasingly important part of our business is helping customers to configure and acquire complete disk-based microcomputer systems optimized for their specific requirements. You may be interested in discussing the advantages of purchasing a total computer system from INFO 2000, and having us assemble and test the entire configuration together before it is delivered to you. INFO 2000 also offers a complete business system with all hardware and software for less than ten thousand dollars.

Please feel free to write or phone INFO 2000 with any questions you may have regarding our products. At INFO 2000 we take pride in providing personal consultation and support to our customers. We look forward to hearing from you.