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COMPUTER SYSTEMS NEWSLETTER

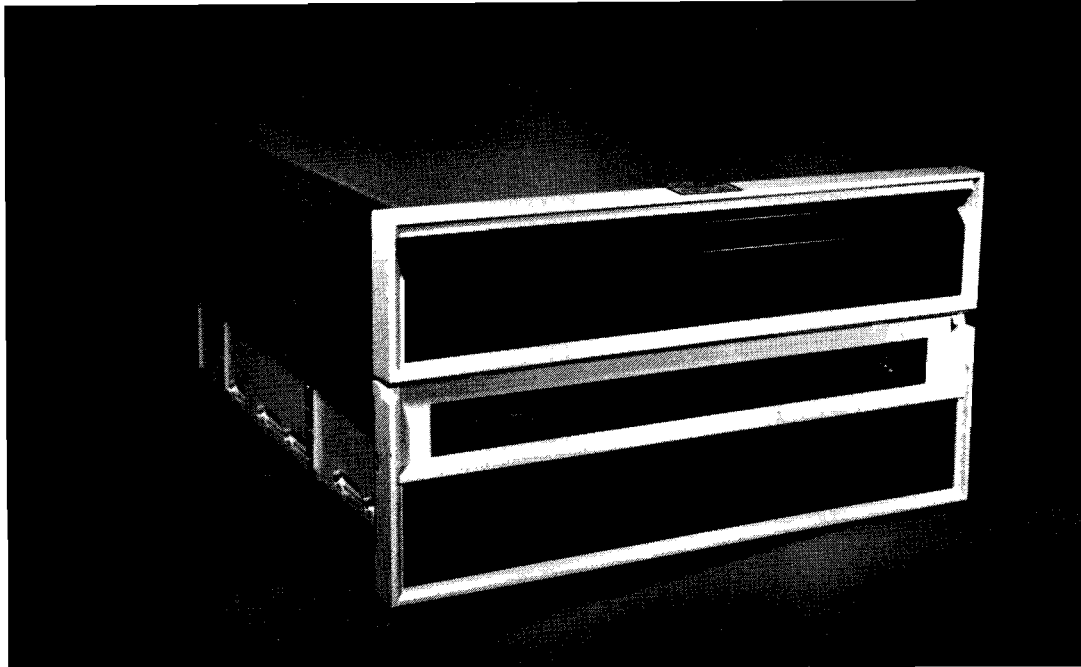
For HP Field Sales Personnel

HEWLETT  PACKARD

Vol. 3, No. 8
March 1, 1978

GSD Announces Major Price Reductions on HP 3000 Systems

DMD Announces



The 7906 Cartridge Disc Drive

- 20 Mb Formatted Capacity
- 60 Second Start-Up Time
- 7905 Controller and Cartridge Compatibility
- Enhanced Reliability

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BOISE DIVISION NEWS

Product News

New Options for 2630 Family

By: Larry Andrews/Boise

The 2631A can now be ordered with Cyrillic or math symbols as alternate character sets. Cyrillic is Option 007, and HP 2640-Series compatible math symbols is Option 010. U.S. list price is \$150 for each option.

Also a paper catcher can now be ordered as option 002 to the 26097A and 26098A pedestals. U.S. list price is \$50.00

New 2631/2635 Data Sheets

By: Steve Davis/Boise

Updated versions of the 2631A Data Sheet (Part No. 5952-9424 REV. 1-78) and the 2635A Data Sheet (Part No. 5952-89425 REV. 1-78) are now available.

The new data sheets contain updated specifications for print head and ribbon life. Also the System Configuration charts have been revised to delete the serial interface to 264X CRT's. Finally, the duty cycle section has been reworded to more accurately define the print loads that the 2631A and 2635A can handle.

The new data sheets can now be ordered from Corporate Literature Distribution.

2631's and 2640's

By: Larry Andrews/Boise

Remember when selling a 2631 to be used with a 2640A or B that only the CRT's display memory can be dumped to the printer (80 columns only). A 2645 with device control firmware is required when data must go from the CPU directly to the printer.

Please be sure that the customer understands this limitation when ordering a printer for a 2640B. (Also see article by Tom Lee in the DTD section of this Newsletter.)

8th Bit Alternate Character Set Selection

By: Larry Andrews/Boise

As you know, secondary character sets on the 2631 can be selected by a shift-out character or the 8th data bit. Some interfaces, however, don't pass the 8th bit to the printer. The following 2631 interfaces support 8th bit protocol:

- 041 RS232C with modem control
- 046 HP-IB
- 051 RS232C with modem control and 2630-type edge connector

The following 2631 interfaces do not support 8th bit protocol:

- STD HP 1000 line printer interface
- 040 RS232C without modem control
- 042 Current loop
- 044 HP 2640-Series CRT interface (8-Bit TTL)
- 210 HP 1000 line printer subsystem interface
- 240 HP 2640-Series CRT interface (8-bit TTL)
- 300 HP 3000 line printer interface

13190B Obsolescence

By: Mike Harrigan/Boise

The 13190B multi-unit cable is obsolete as of March 1, 1978. This is a 20-foot long cable for daisy chaining an add-on HP 7970B mag tape drive to an existing HP 7970B mag tape drive. The 13194A is exactly the same cable, with the exception that it will work on both the HP 7970B and the HP 7970E mag tape drives. Therefore, if you have need for a 20 foot multi-unit (daisy chain) cable for any HP digital mag tape drive, you will now order the 13194A.

Please contact *Mike Harrigan* at Boise Division if you have any further questions.

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DISC MEMORY NEWS

Product News

The 7906 Cartridge Disc Drive: A Free 7900 With Every 7905?

By: Steve Germain/DMD

No, it's not a merchandising gimmick . . . it's the new 7906 Cartridge Disc Drive! On March 1, the Disc Memory Division announced to the world the arrival of the 20 Megabyte 7906 Disc Drive and the simultaneous obsolescence of its predecessor, the 7905A. The best news is that the 7906 will cost no more than the 7905, with first customer shipments starting in early March.

The introduction of the 7906 marks the beginning of a new era in HP cartridge-compatible disc drives. Nearly eighteen months of R&D effort have gone into the design of this new product. Starting with the basics of the 7905, several design enhancements have been incorporated into the 7906 which aimed at increased customer satisfaction and promoting confidence in our "rock solid" disc drives:

20 Mbytes For The Price of 15

The additional capacity of the 7906 has been made possible by doubling the track density of the fixed disc data surface. Now the entire drive can be backed up in only three cartridge changes as opposed to five for the 7905.

Start Up In Less Than 60 Seconds

Temperature compensated track following circuitry has been added to minimize the elapsed time to "Drive Ready" after each cartridge change. Approximately sixty seconds

are required for spindle start up and cartridge stabilization, even if the cartridge temperature differs from that of the disc by as much as 4°C.

Cartridge Compatible With The 7905

This feature speaks for itself. Your customer with an investment in 7905 hardware doesn't have to worry about moving cartridges between 7905's and 7906's.

Performance and Reliability Built In

Many subtle electrical and mechanical changes have been made to enhance the 7906's reliability and maintain our position of having one of the industries' highest performance cartridge disc drives. Despite the sophistication level of the 7906, it enjoys being in the enviable position of having the lowest BMCC over any of our competitor's counterparts!

13037B Compatible

The 7906 is completely plug-to-plug compatible with the 13037B Disc Controller. System upgrading is easy and additional flexibility in choosing the most advantageous mix of mass storage devices is possible.

Like its predecessor, the 7906 stacks up well against its two main competitors, DEC and Data General (see Figures 1 and 2). The 7906 represents a very attractive high performance alternative for the small to medium sized system requiring highly reliable and flexible medium capacity mass storage devices, especially when you consider the enhancements enumerated above.

The next question you may ask is how do I get one? The 7906 comes in two basic flavors—the rack mount version and in the low profile cabinet (our fancy name for the 29425A "mini-rack"!). Check out the accompanying table to see what you get and send us your orders; we'll be glad to accommodate you!

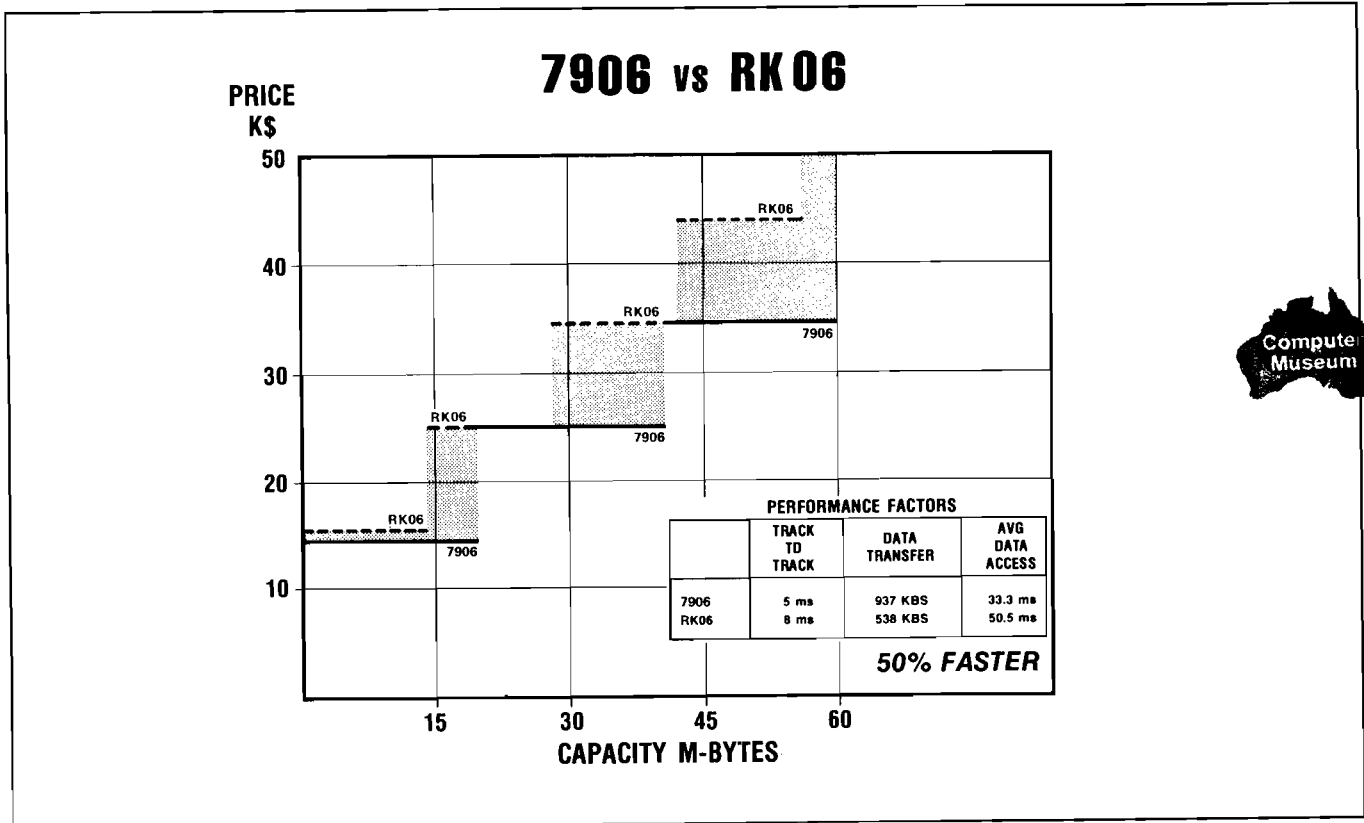


FIGURE 1

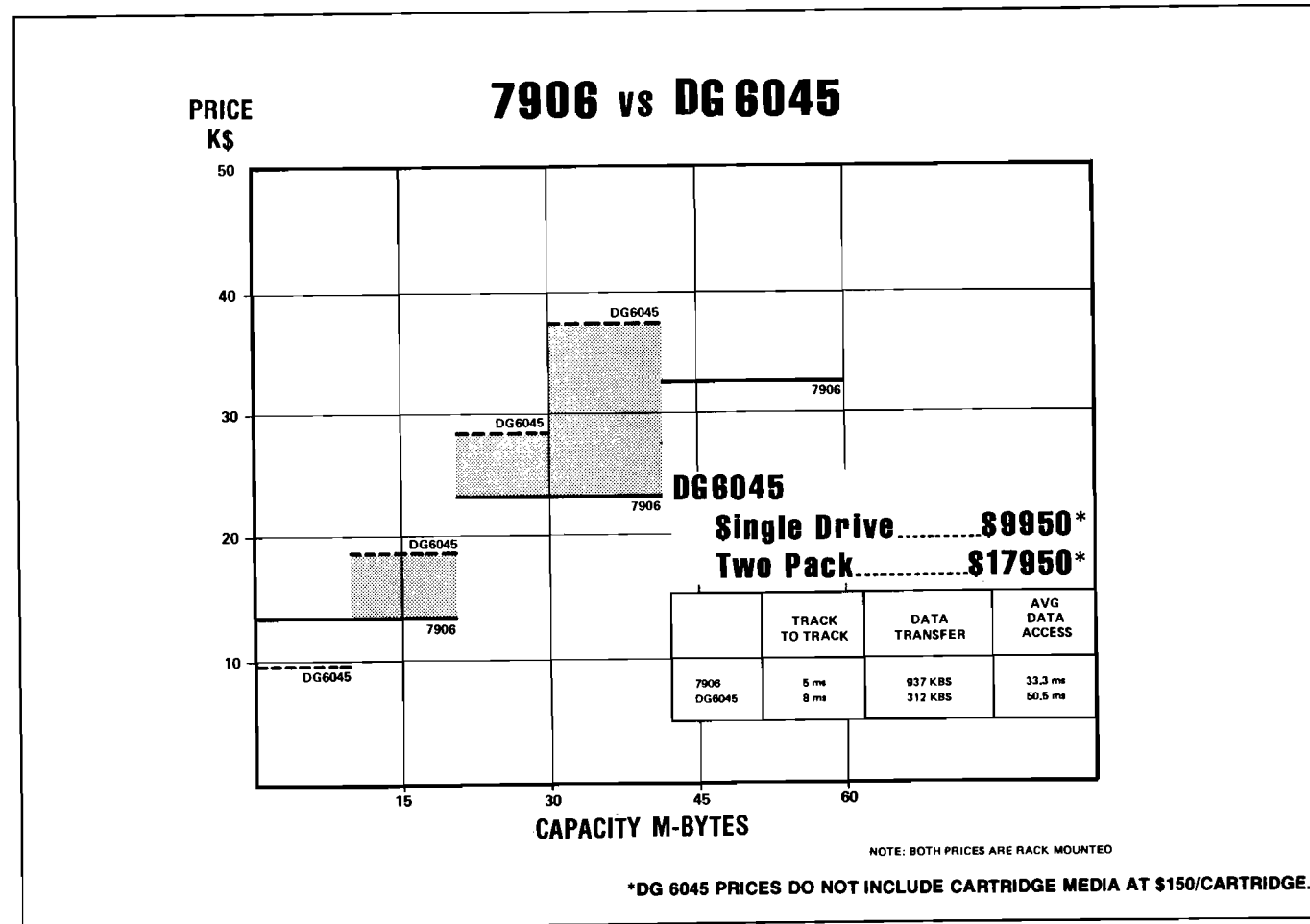


FIGURE 2

7906 Ordering Matrix

	Low Profile Cabinet		Rack Mounted	
	7606M	7906S	7906MR	7906SR
Disc Drive	7906	7906	7906	7906
Controller	13037B	—	13037B	—
Disc Cartridge	12940A	12940A	12940A	12940A
Multi-Unit Cable	13013A-001 (5')	13013A-001 (5')	13013A Std (12')	13013A Std (12')
Data Cable	13213A Std (10')	13213A-002 (50')	13213A Std (10')	13213A Std (10')
Low Profile Cabinet	29425A	29425A	—	—
Rack Slide Kit	—	—	12904A-001(28")	12904A-001 (2B")
Available Options:				
015-230V/50Hz	Yes	Yes	Yes	Yes
020-Substitute 30" Rack Slide Kit	No	No	Yes	Yes
List Price	\$14,000	\$10,500	\$13,000	\$ 9,500

7906 Technical Overview

By: John Bolt/DMD

On March 1, DMD announced to the world HP's newest cartridge disc drive—the 7906. Although cosmetically the drive is identical to the 7905A, it represents a quantum leap in customer satisfaction by virtue of several key features designed into the drive. Essentially, the drive is an enhanced 7905A. All evolutionary changes made in the 7905A and incorporated in the 7906 were motivated by efforts to increase customer satisfaction. These contributions include:

1. 20 Mbytes formatted capacity, including 10 Mbytes now on the fixed platter.
2. Temperature compensation circuitry provides start-up time of 60 seconds or less.
3. Design modifications for enhanced reliability.
4. Hardware/Software compatible with 7905A (on RTE systems) i.e., controller compatible.
5. Cartridge compatible with 7905A.

The 7906 is a cartridge-type disc drive with a fixed platter and one removable cartridge. The drive uses servo-track following positioning techniques, with one surface of the fixed platter dedicated to servo information. Like the 7905A, it also has a "voice coil" linear actuator, and an electrically commutated "DC" brushless motor. Performance is almost identical to the 7905A. In fact, except for those features enumerated above, the 7906 is identical to the 7905A. No need to contend with fear of the unknown!

The contributions made by the 7906 can best be presented by explaining the above features.

1. The extra 5 Mbytes are located on the data surface (lower surface) of the fixed platter. Doubling track density on this surface allows this extra capacity. Servo tracks on the top surface are formatted exactly the same as on the 7905A. However, within 1300 micro inches on either side of this servo-track lie data tracks. No longer does one data track lie directly under one servo-track, as on the 7905A fixed platter. Now by servoing to one servo-track, heads can select two possible data tracks. The effect is doubled track density. Heads are positioned over the servo track, then offset to the appropriate data track.
2. Temperature compensation circuitry provides a nominal head load time of 60 seconds, provided temperature difference between the fixed and cartridge discs is not greater than 40°C. Temperature sensors are mounted near the cartridge and fixed platter cavities. At power-on, temperature difference between platters is measured. A decaying exponential waveform that models the decrease in temperature difference with time is generated. This waveform is supplied to servo circuitry and produces servo offset that compensates for the instantaneous temperature difference. A 1°C temperature difference between platters causes an offset in cylinder alignment of about 200 micro-inch in cylinder alignment. This compensation circuitry allows the heads to follow track drifting due to thermal expansion as temperature differences vary.
3. Many design modifications were implanted in the 7906 to improve reliability over that of the 7905A. Examination of the 7905A warranty failure reports revealed the most common failure modes, which became targets of improvement for the 7906. Power board modifications

to reduce the number of components and head dissipation were implemented. Another major change was the addition of the 40019A Prefilter assembly on every 7906 shipped. This replaces the 40018A Plenum Assembly, which will be obsoleted. The new prefilter assembly has no fans or mechanical parts to fail, extends absolute filter life, and provides an additional level of filtration within the drive.

4. The 7906 is both controller-compatible with the 7905A and software-compatible on RTE systems using 7905A disc drives. Without re-generating the system, a 7906 can be substituted for a 7905A on current RTE systems, and the 7906 will operate in a 7905A mode, i.e., only 15 Mbytes can be accessed. By re-generating the system, subchannels can be defined to include all 20 Mbytes. Contact DSD Sales Development for system generation details using old versions of RTE II/III On-Line Generator.
5. Many will be pleased to know that the 7906 is cartridge compatible with the 7905A. Customers with 7905A's can interchange these cartridges on 7906's.

Such a deal! All these improvements and features for the price of a 7905A!

GOOD SELLING!

Comparison of 7905A and 7906 Disc Drives

	7905A	7906
Data Bytes per Sector	256	256
Sectors Per Track	48	48
Tracks Per Surface	400	400
		(800 on fixed disc)
Surfaces Per Drive	3	3
Formatted Capacity (Kbytes)	14,745.6	19,660.8
Transfer Rate—Megabits/Sec	7.5	7.5
Spindle Speed—RPM	3600	3600
Average Seek Time—Milliseconds	25	25
Average Latency Time—mS	8.33	8.3
Rotational Positioning Sensing	Yes	Yes
Track Density—Tracks per inch	192	192
		(384 on fixed disc)
Bit Density—Bits per inch	4682	4682
Drives per Controller	8	8
Height—inches	10-1/2	10-1/2
Weight—inches	19	19
Depth—inches	28-1/64	28-1/64
Weight—Pounds	162	162

HP 7906 CONTRIBUTIONS

FEATURES	BENEFITS
● 20 MBYTES FOR PRICE OF 15	◇ FREE LUNCH
● WARM UP LESS THAN 60 SECONDS	◇ FASTER CARTRIDGE INTERCHANGE
● 10 MBYTES ON FIXED DISC	◇ EASE OF SYSTEM BACK-UP
● EXTENDS 7905, 7920, 7925 DRIVE FAMILY PLUG-TO-PLUG COMPATIBILITY	◇ EASY SYSTEM UPGRADE
● 7905 CARTRIDGE COMPATIBLE	◇ DATA COMPATIBILITY
● 7920 RELIABILITY DESIGNED IN	◇ TROUBLE FREE
● HIGHEST PERFORMANCE	◇ LESS CPU TIME, GREATER THRUPUT

Division News

DMD Off and Running . . . In Boise

By: Jon Bolt/DMD

March 1 marks the completion of another miraculous accomplishment of Disc Memory Division—the announcement of one new disc product—the first disc product ever released from our new Boise Facility! Perhaps some background describing the explosive history of our young division can set this in proper perspective.

DMD has been officially located in Boise for only seven months. During this time, we moved the entire division . . . twice! The initial move was from Cupertino to Boise, where we shared Building 81 with the Boise Division. (Our thanks to the Boise Division for their hospitality!) We completed this move in September. Next, after Building 82 was completed, we faced the task of moving our entire operation once again. We have now settled in our permanent (I hope) home. During this unsettled period, we also hired the necessary manpower to keep the division fully operational and prepare for FY '78—over 400 people were hired! Despite the disruptions of two moves, manpower shortages, and bringing our young work force up to speed, we still had a terrific performance record. Total sales in excess of 47 megabucks, net profit of 9.1%.

With all this, we still invented one new product—the first released from our Boise location—the 7906A Cartridge Disc Drive . . . an indisputable case of talent rising to the occasion.

Congratulations are certainly in order for all those contributing to this success. Keep your eye on us in '78.

THE BEST IS YET TO COME!

Sales Aids

Disc Diagnostic Dilemma

By: John Bolt/DMD

Apparently some confusion has surfaced concerning the proper channels for obtaining diagnostics for our disc drives. I believe this can be remedied quite simply—ignore the data sheets.

Disc diagnostics cannot be ordered through DMD, and they are not included with any of our products. Supplying divisions for disc diagnostics are identified by the system on which the disc is configured. However, the tape itself must be ordered through CPC, since part numbers, not product numbers, are assigned to diagnostic tapes.

Here are the part numbers for appropriate diagnostics:

Diagnostic Part Numbers (Order through CPC)

System	7900	7906	7920
RTE	12960-16001	12962-16001	12962-16001
3000 Series II	Not Supported	Not Supported	Sleuth - 07
3000 Series I	Not Supported	Included With System	32230-90002

Order Processing

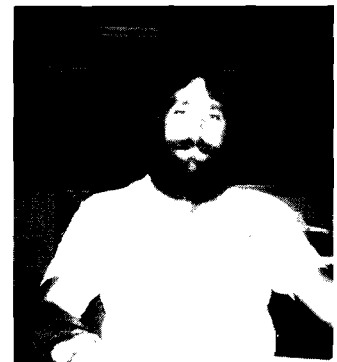
Two New Faces In The Crowd

By: Beth Olson/DMD

Pammy Valentine comes to us from the Boise Area as a new HP employee. Originally from Connecticut, she brings with her a good background in the working world (plus an accent). Her job responsibilities include contracts, statistics, and maintaining the Corporate Price List. Her extension is 2262.

Kirk Miller has taken a big move to O/P from our Shipping Department! *Kirk* is also a fairly new HP employee. He is very enthusiastic about his new responsibilities. *Kirk* is the Order Coordinator for one of our newest family members, the 7906, and related products. His extension is 2573.

Let's all welcome *Pammy* and *Kirk* to the wondrous land of Order Processing!



DATA SYSTEMS NEWS

New Applications

New Applications in ESR

By: Frank Jackson/DSD

Recent gains in the OEM marketplace by the Eastern Sales Reps include the two following applications:

1. On-line blood analysis equipment and patient data base of clinical data. These systems will be sold into both hospitals and doctor's laboratories. The customer picked HP equipment over three other vendors for the following reasons:
 - HP offered a complete line of equipment from small entry level systems to high performance large memory data base systems with upward compatibility across the line.
 - Best offering of intelligent CRT terminals with OEM versions for the customer's special requirements.
 - IMAGE & QUERY make the easiest data base Management System to implement and use in the minicomputer industry.
 - Because these systems will be sold worldwide and HP can offer complete maintenance and support on an international basis.

2. Complete energy management and control of industrial buildings in order to reduce energy usage. HP was chosen as the vendor from a field of five because of:
 - The best price/performance ratio in the mid-range mini market.
 - The customer's needs for large main memory with HP having 2 Megabytes — the largest offering of any mini vendor.
 - The easiest-to-use microprogramming capability and most capacity.
 - A discount structure for OEM purchases that best fit the customer's needs.

- Our reputation for highly reliable equipment — especially important in this application.

Sell OEM — these customers are good business for HP and you!

Product News

7906A 19.6 Mbyte Disc Now Available With HP 1000

By: Mike Scott/DSD

The 7906A 19.6 Mb disc will replace the 7905A 14.7 Mb disc in all 2171A and 2172A HP 1000 disc-based systems scheduled for shipment from DSD Cupertino facility after approximately the middle of March, 1978. YHP and Grenoble plan to do the same thing at a later date.

The removable cartridges of the 7905A and 7906A are completely compatible. A disc cartridge from a 7905A can be used just as easily in a 7906A. The extra 4.9 Mb of storage were obtained by accessing previously unused areas on the fixed platter.

The 7906A is a plug-for-plug compatible replacement for the 7905A at no extra cost! This should make disc-based HP 1000's even more competitive than they are now! More information on the 7906A can be obtained from Disc Memory Division.

Good News on 12966 Pricing!!

By: Bill Stevens/DSD

Taking advantage of manufacturing economies of scale the price of the 12966A Buffered Asynchronous Interface has been reduced to \$600 from \$750. The objective is to make it easier for you to sell large multi-terminal HP 1000 systems.

RTE drivers DVR05/DVA05 utilize the character buffer on the 12966A interface to communicate with 2631A Printers and 2635A Printing Terminals and 2640B, 2645A and 2648A CRT Terminals in *block mode*. The block mode data transfers are as large as 33 characters on output

and 64 characters on input thus making efficient use of interrupts to the HP 1000 processor.

Driver DVA05 was added to the 92062A RTE drivers packages last October. It supports both local hardwired connections and remote connections using full duplex asynchronous modems such as the 300 baud Bell 103 and 1200 baud Vadic VA3400. DVA05 provides the same user interface features as DVR05 — features like minicartridge support — but adds a modem capability to the hard-wired capability of DVR05.

GOOD SELLING!

Distributed Systems Packages Not Compatible with 2109 or 2113 Computers

By: Ted Proske/DSD

Another goof has been discovered in the 21MX Computer Selection and Configuration Guide (5953-0891). On page 20, the prerequisites column entries for 91703A, 91704A, and 91705A Satellite Communications Packages include code D, implying that those models work with the 2109B and 2113B Computers. Since the host BCS, RTE-B, and RTE-C operating systems for models 91703A, 91704A, and 91705A aren't compatible with 2109 or 2113 Computers, neither are the distributed systems packages. Please cross out the D in the prerequisite column for 91703A, 91704A, and 91705A in your master copy of the 21MX guide.

Sales Aids

Pick A Card, Any Card: Interface Card Selection Part II: Data Communications Interfaces

By: Dave Hannebrink & Bill Kaiser/DSD

Part II of this short series is intended to familiarize you with the interface cards included in the Data Communications section of the 21MX Hardware Data Book. The same approach used in our first article will be pursued, i.e., we'll spend some time discussing terminology and selection criteria, and then summarize in tabular form our current interface card offerings.

The "data communications" categorization of these cards is quite broad. We include cards used to interface devices that transmit/receive data in a bit-serial stream. These devices can range from teletypes, "dumb" terminals, and modems to minicomputers and large mainframes. Although data transmission using telecommunications equipment is sometimes part of a "data communications" definition, we will place no such restriction here; short distance, hardwired lines are included for our purposes.

As last time, the first concern to tackle is defining the characteristics of the device to be interfaced. These "data communications" characteristics differ a bit from those

used to describe the general purpose interface cards. However, we can make a similar type of analysis.

All of our current data communications interfaces are used in a point-to-point configuration, i.e. there is a single direct connection between two (and only two) devices. Typical examples would be a terminal-computer connection or a computer-computer connection. Multipoint refers to several devices sharing a single data link. Obviously, multipoint links can reduce hardware (both line and card) costs. Today we have no multipoint interface card capability; however, stay tuned to DSD for an upcoming multipoint card introduction.

The 21MX Hardware Data Book specifies three of our cards (12531C, 12531D, 12880A) as terminal interfaces. This categorization is historical. In the early days of computers the typical terminal was a Teletype ASR 33/35. These low speed (110 bits/sec) devices became a defacto industry terminal standard. These cards, being of early HP vintage, provide a basic ASR 33/35 compatibility in addition to the many more powerful features they offer. Hence, they've become known as terminal interfaces.

The 110 bits/sec transmission rate represents ten or eleven ASCII characters/sec (eight bits for the ASCII representation and parity, two or three bits as start/stop bits). Of course new terminals run at much higher rates; hence, the card's internal clock can be jumpered to accommodate rates up to 2400 bits/second. All these cards transmit data to/from terminals asynchronously. The terminal key depressing is temporally random and start/stop bits are inserted between each ASCII character. This wastes a good deal of time and is an important reason why asynchronous transmission is generally limited to 1200 bits/sec (1200 baud or 120 characters/sec) over telephone lines. With external (terminal) clocking 9600 baud transmission can be done at the cost of exorbitant CPU overhead; one RTE interrupt is handled per character, resulting in almost 100% CPU utilization. In synchronous transmission, a continuous stream of data (representing a true data message) bits is transmitted with no start/stop bits inserted between characters. Transmission speeds are generally higher and very precise timing between the sending and receiving devices must be maintained once the synchronizing signal initiates the data transfer.

Additional levels of sophistication are available using the "asynchronous communications interfaces" (12966A, 12968A, 12587B). Of these, the 12966A is clearly the most powerful and widely used. It features a 128 character buffer which can be partially filled before generating an RTE interrupt (see *Bill Stevens'* article, this issue). Hence, interrupt servicing time comes way down and CPU utilization is reduced dramatically. Additional capabilities of this card can be found in the table. For the higher speed (9600 baud) asynchronous applications areas, this card should be the only one considered. The 12968A and 12587B are additional asynchronous interfaces but due to the lack of hardware capability and software support, will not be cost effective.

By the way, the type of asynchronous data transmission implemented on the 12966A is referred to as block mode

(as opposed to character mode, which results in one interrupt per character) and is the method used to interface with buffered devices such as the 2645A/48A terminals. Block mode is essential when doing long data transfers via minicartridges. Unbuffered devices will most likely use one of the terminal interfaces.

There are few terminal devices that transmit data synchronously. Most synchronous data communication traffic occurs between CPU's. The most general purpose synchronous protocol (protocol being a term for data link management) is character-oriented (ASCII or EBCDIC representations); likewise the hardware of our "synchronous communication interfaces" is character-oriented. However, the use of these interfaces is limited because of the lack of general purpose software support. The 12618A interface set does have a bisynchronous driver (one that implements the IBM bisynch protocol) for use in a very specific application, i.e., IBM 2780 emulation for remote job entry to an IBM 360/370. The 12967A has no RTE driver whatsoever. Communications drivers usually implement very specific protocols; they are by no means trivial to write and only the most sophisticated users should attempt writing one. Also, in RTE, drivers handling synchronous devices must be privileged to guarantee fast enough response.

We see the next category of interfaces to be "computer" interfaces. Although very powerful cards in the sense that they are used in our Distributed Systems packages, they are not general purpose. They lack a general purpose driver and the available software and firmware (the DS/1000 driver is microcoded) takes advantage of the word-oriented hardware protocol of the cards making them unsuitable for communications with devices using a character-oriented protocol. Their word-oriented protocol allows for highest efficiency in data transmission between HP computers and is optimized for DS/1000.

Let's hold off covering the special purpose interfaces for just a moment. We first want to discuss a couple of more topics. For instance, what about the hardware linking the device to the interface card? This link either uses long distance telecommunications lines (modem based) or it doesn't. We refer to the latter link as being hardwired. The original teletype ASR 33/35 used hardwired links that sent signals via the presence or absence of a current in the signal loop. This type of transmission, strangely enough known as "current loop", allows devices to be located under ideal conditions (low noise environment, slow data rates) up to 10,000 feet away from the computer. Although most devices make use of 20 mA signal levels, no uniquely defined standard for current loop interfaces exists; current levels and pin connections differ from manufacturer to manufacturer.

On the other hand, a standard voltage interface has been endorsed by the Electronic Industries Association (EIA). Known as EIA standard RS-232C, it specifies a standard 25 pin interface with lettered pin assignments for ground, data, control, and timing circuits. It also specifies the mechanical and electrical requirements of the interface for an operating range up to 20,000 bits/second in bit serial, asynchronous or synchronous operation. It provides a

common meeting ground for manufacturers of various equipment types. A similar standard, CCITT V24, is widely used internationally.

The cable runs for RS-232C interfaces are generally limited to less than fifty feet. (Under ideal conditions this can be increased somewhat; however, it's not recommended.) The standard is not limited to hardwired applications. Modems (short for modulator-demodulator) are interfaced to data communications devices via RS-232C. Modems (also known as data sets) then change the digital signals used by a data communications device to (or from) analog signals transmitted over telecommunication lines, thus extending the length of the transmission path indefinitely. Modems are classified by their data transmission capabilities. Typical terms used are — 1) Simplex — transmission in one direction only, 2) half duplex — transmission in both directions but only one way at a time, and 3) full duplex-transmission in both directions simultaneously. They are also classified according to maximum bit speed and timing (asynchronous or synchronous). HP 1000 interfaces are compatible with full duplex modems which operate in half-duplex mode. The Bell System and Vadic Corporation are primary modem suppliers.

OK, why the departure from our card descriptions? The preceding discussion helps clarify a few things. First of all, 20 mA current loop interfacing can be done with two of our terminal interfaces (12531C/D). This is part of the teletype ASR 33/35 compatibility mode. So if you're looking to interface a similar current loop device, these cards are the place to start. However, be aware of another historical fact: the teletype units usually provided their own cable. Hence current loop cables must either be supplied by the user or be quoted as a DSD special. A current loop interface, suitable for long distance transmission, is not part of the standard 12966A card but may be quotable through Specials Engineering; contact us in Sales Development.

You say you want to interface a RS-232C device to a 21XX or HP 1000? No problem whatsoever if you're using an HP built device. Check the 21MX Hardware Data Book and you'll see most of the cards we've mentioned are RS-232C compatible. However, care must be taken when attempting to interface another vendor's RS-232C device to our computer. Why? Well, although EIA has a well-defined standard, it has allowed manufacturers some freedom in "customizing" their interface (using unassigned pins, etc.) for handling special purpose functions. We have no idea as to whether or not we can handle these user defined special functions unless we've either 1) encountered a specific instance of a customer successfully interfacing the device in question, or 2) we've looked at the interfacing details (pin assignments, etc.) usually found in the device's operating and service manual. If you have any doubts, contact DSD Sales Development. We may know of someone else who's interfaced the specific device or we may request you to get the appropriate documentation from the customer so DSD can determine whether it can be interfaced to our standard cards. Of course, if non-standard software is needed to fully support the device operation it must be quoted through Specials Engineering.

As for modem support, make sure you consult the 21MX Hardware Data Book for specifications concerning modem compatibility for our interface cards.

Another requirement often needed in data communications applications is error detection and correction. That is, if data integrity is lost during transmission, the devices must be made aware of the errors or more ideally, the errors should be automatically corrected. The crudest means of error-checking is parity checking. Parity checking is not available on the terminal interfaces; it is available on the asynchronous and synchronous interfaces. Considerably more sophisticated error checking schemes are available on the computer interface cards. The 12889A uses a Cyclical Redundancy Checking (CRC) method while the DS/1000 interfaces (12771A, 12773A) make use of a microcoded longitudinal/vertical/diagonal redundancy checking (LRC/VRC/DRC) routine provided with the DS/1000 package.

With some card options, cables may be provided; check our table and the 21MX Hardware Data Book.

What about software for these cards? The terminal interfaces use the RTE Multi-device driver DVR00. The 12966A uses either DVR05 or DVA05 depending on the requirements of the device. These drivers, it should be noted, have been written to support HP-built devices; using any other device with these cards may necessitate driver modification or rewrite. Again, consult DSD Sales Development if you have questions. There are three places where HP devices, interface cards, and drivers are cross-referenced in order to provide you and your customer with the viable alternatives. They are 1) p. 3.6, HP 1000 Technical Data Book, 2) p. 9, DSD Product Compatibility Guide and 3) p. 2-11, 21MX Software Data Book.

As our chart indicates, the other cards either have very specialized drivers or none at all.

Finally, we show some special purpose data communications equipment. The 12589A is used to interface the Bell 801 Automatic Calling Unit (ACU) or equivalent to the 21MX family of computers. It is used in conjunction with a synchronous or asynchronous communications interface and the appropriate modem. No standard RTE software driver support is available. Software, however, may be quotable through DSD Specials Engineering. Contact Sales Development with the specifics of your customer's application in order for us to consider such a special.

The 12920B is a low speed asynchronous multiplexer that provides a way to interface up to 16 data communications devices to the computer. Software support is available only through Specials and we urge you to read *Don Rowe's* article "On Quoting the Special Mux Driver," Volume 3, Number 4, *CS Newsletter*, before contacting the factory.

And that's the way it is with our current data communications capabilities. Again, this should get you and the customer started. We've added the following references to augment the list given last time.

References

1. Guidebook to Data Communications (5955-1715)
2. HP 1000 Technical Data Book (5953-0867)
3. 21MX Software Data Book (5953-0804)
4. DS/1000 Technical Data Book (5953-0868)
5. DS/1000 Network Manager's Manual (91740-90003)
6. DVA05 Data Sheet (5953-0887)
7. DTD *Newsletter* Reprints (Consult Data Terminals Sales Development)
8. "On Quoting The Special Mux Driver" *CS Newsletter*, Volume 3, Number 4, p.6

Table 2A: Data Communications Interfaces — Terminal Interfaces

Card & Name	Applications	Relevant Technical Specifications	Compatibility and Support	Comments
12531C Terminal Interface	Used to interface ASR-33/35 teleprinters or Bell type 103 (or equivalent) modems to 21MX computers. Modem operation must be manual only.	Can operate current loop (to certain devices) or EIA/CCITT jumper-selectable baud rates with internal clock: 110, 220, 440, 880, and 1760 bits/second. With external clock, can go up to 2400 baud. Simplex, half duplex, or echoplex operation. 8-bit character with one or two stop bits.	21MX-M, E. RTE-M, RTE-II, RTE-III. Uses DVR00, which is included in 92062A RTE drivers package. 24396A-F diagnostic library contains required diagnostics.	Requires approx. 1220 bytes. Uses one I/O channel. Option 001 adds 25 ft. EIA terminal cable. Option 002 adds 25 ft. data set cable. Cannot operate in block mode.
12531D Terminal Interface	Used to interface a variety of slow terminal devices to 21MX computers, either locally or via Bell type 103 (or equivalent) modems. Modem operation must be manual only.	Basically the same as 12531C, except speeds. Jumper-selectable baud rates with internal clock: 150, 300, 600, 1200, and 2400 bits/second. With external clock, can go up to 9600 bits/second.	Same as 12531C.	Requires approx. 1220 bytes. Uses one I/O channel. Option 001 adds 25 ft. EIA terminal cable. Option 002 adds 25 ft. data set cable. Option 004 adds 50 ft. HP 264X or 263X cable. Cannot operate in block mode.

Table 2A: Data Communications Interfaces — Terminal Interfaces (Continued)

Card & Name	Applications	Relevant Technical Specifications	Compatibility and Support	Comments
12880A Terminal Interface	Used to interface 2640B, 2645A, or 2648A CRT terminals (<i>without</i> mini-cartridges or auxiliary printer) to local 21MX computer. No modem capability.	Operates in EIA/CCITT mode only. Designed to operate at speed set by interfaced terminal, up to 9600 bits/second. 8-bit character with one or two stop bits. Simplex, half duplex, or echoplex operation.	Same as 12531C.	Requires approx. 1220 bytes. Uses one I/O channel. Base product includes 50 ft. EIA terminal cable. Option 001 replaces 50 ft. EIA terminal cable with 50 ft. HP 2640 CRT terminal cable.



Table 2B: Data Communications Interfaces — Asynchronous Communications Interfaces

Card & Name	Applications	Relevant Technical Specifications	Compatibility and Support	Comments
12966A Buffered Asynchronous Communications Interface	Used to interface Bell type 103 or type 202 (or equivalent) modems to 21MX computers. Also used for local or modem interfacing of 2631A printers, 2635A printing terminals, or 2648A CRT terminals (<i>with</i> mini-cartridge I/O and/or auxiliary printer) to 21MX computers.	EIA/CCITT compatible. Simplex, half duplex, or echoplex operation. With secondary data channel. Jumper — or program — selectable baud rates with internal clock from 50 to 9600 bits/second. 9600 baud max. rate with external clock. 128 character buffer & special character recognition/interrupt capability with 256 byte RAM special character memory. Program-selectable character size, stop bit selection, and parity checking. DMA compatibility. Hardware break detection.	21MX-M 21MX-E (date-coded 1629 or later). Option 001 supported by DVR05 and DVA05 in 92062A RTE drivers package. Otherwise supported by 24396A-F diagnostics and user-written assembly-language driver. Option 001 use supported in RTE-M, and RTE-III.	Extremely versatile card. Base product includes 50 ft. EIA terminal cable. Option 001 replaces standard cable with 50 ft. cable to 264X terminals or 263X printers. Option 002 replaces standard cable with 50 ft. Cable to modem option 003 replaces standard cable with 25 ft. cable to HP 2749. See DSD sales development for info on current loop special. To go > 50 ft.
12968A Asynchronous Communications Interface	Less capable than 12966A.	Same as 12966A, <i>except</i> only has two-character buffer and no special character recognition/interrupt capability.	Same as 12966A except date codes for 21MX-E compatibility must be 1630 or later.	Options 001, 002, and 003 same as for 12966A.
12587B Asynchronous Communications Interface	Used to interface Bell type 103 or type 202 (or equivalent) modems to 21MX computers. 12966A is usually a better choice.	EIA/CCITT compatible. Simplex, half duplex, or echoplex operation with secondary data channel. Jumper-selectable baud rates with internal clock from 45 to 2400 bits/second. 9600 baud max. rate with external clock. Program-selectable number of stop bits. 1-character buffer. Software break detection with Bell type 202 modem.	21MX-M Support limited to 24396A-F diagnostics. Requires user-written assembly-language driver.	Simple asynchronous modem interface. Uses one I/O channel. Includes 50 ft. modem cable.

Table 2C: Data Communications Interfaces — Synchronous Communications Interfaces

Card & Name	Applications	Relevant Technical Specifications	Compatibility and Support	Comments
12618A Synchronous Communications Interface	Used to interface Bell type 201, 203, or 208 (or equivalent) modems to 21MX computers.	EIA/CCITT compatible. Half or full duplex operation. Up to 9600 bits/second with independent send & receive channels. Program-selectable parity checking, sync character, character size, and special character recognition. Two character buffer.	21MX-M 21MX-E Software supported by 91780A, Opt. 001 RJE package, which includes bisynch driver and IBM 2780 emulator for certain IBM 360/370; also supported by supplied diagnostic, which is included in 24396A-F diagnostic library. Not supported under RTE-M.	Uses two I/O channels. "Receive" card goes in lower select code, "send" card in next lower, and 12620A breadboard I/F (as priv. int. fence) in next lower. Includes 50 ft. branched modem cable.
12967A Synchronous Communications Interface	Basically same as 12618A.	EIA/CCITT compatible. Half duplex only. Up to 20,000 bits/second. Secondary data channel allows reverse interrupt capability. Program-selectable parity checking. 8-bit character. Two character buffer. Program-controlled status monitor.	21MX-M 21MX-E Software support limited to supplied diagnostic, which is included in 24396A-F diagnostic library. User-written assembly-language driver.	Uses one I/O channel. Includes 50 ft. modem cable.

Table 2D: Data Communications Interfaces — Computer Interfaces

Card & Name	Applications	Relevant Technical Specifications	Compatibility and Support	Comments
12771A Computer Serial Interface	Provides hardwired link between two 21MX computers equipped with 91740A/B DS/1000 software/firmware.	Up to 60,606 bytes/second at up to 600 ft. Up to 3124 bytes/second at up to 10,000 ft. Shielded, dual twisted pair cable. Optically isolated input. Further speeds & distances in 21MX hardware data book. Error control by retransmission.	21MX-M 21MX-E RTE-M, RTE-III using DS/1000 (91740A/B).	Includes two cards (one for each computer) and male & female cables (each 12 ft. long). Longer cables available.
12773A Computer Modem Interface	Used to interface full-duplex modems to 21MX computers equipped with 91740A/B DS/1000 software/firmware.	EIA/CCITT compatible with full duplex operation. Bit-serial, synchronous, or asynchronous operation. Async transfer rates from 75 to 1200 bits/second. Synchronous speed depends on modem selected. (Max. rate 19.2K bits/sec.) Error control by retransmission. Also requires 12620A to be used as privileged interrupt fence. See 21MX hardware data book for compatible modems.	Same as 12771A	Requires two I/O channels — one for 12773A card and one for 12620A. 12 ft. cable included.
12889A Hardwired Serial Interface	Used for high-speed, asynchronous, long-distance, point-to-point communications between two 21MX computers. (Configuration would be one 12889A per CPU & two coax cables — send & receive). Also used on 21MX end of 21MX-to-HP 3000 communication.	Up to 250 Kbytes/second at up to 2000 ft. for base product. Up to 125 Kbytes/second at up to 2000 ft. with Option 001. (Actual rates will be lower due to software overhead). Bit-serial, asynch. transmission. CRC error checking.	21MX-M 21MX-E RTE-M, RTE-III only with DS/1000 (91741A).	Uses one I/O channel. Base product includes 10 ft. hood & coax. cable and 15 MHz clock. Option 001 replaces standard clock with 7.5 MHz clock. 30220A cable required to interface to 3000.

Table 2E: Special Purpose Data Communications Interfaces

Card & Name	Applications	Relevant Technical Specifications	Compatibility and Support	Comments
12589A Automatic Calling Unit Interface	Used to interface 21MX-M computer to Bell type 801A/C (or equivalent) auto-calling unit. 21MX-M must be equipped with modem interface.	EIA/CCITT compatible.	21MX-M See DSD sales development for software support information. No standard RTE support.	Uses one I/O channel. Includes cable & test connector.
12920B 16-Channel Asynchronous Multiplexer	Used to connect multiple terminals or modems to 21MX computers. <i>Support is constrained by devices used and performance expected.</i> See MUX package distributed Jan. '78 for details.	EIA/CCITT compatible. Program-selectable data rates, character length, speed detection, split speed operation, and parity checking. Automatic break detection and answering. 16 transmit and 16 receive channels. Asynchronous bit serial communication. Logic levels: <i>Command & status lines</i> "1": > +3V "0": < -3V <i>Data Lines</i> "1" < -3V. (mark) "0" > +3V. (space)	See MUX package distributed Jan. '78.	Uses three I/O channels, 2 data interface cards & 1 control interface. Option 001 adds an additional control interface card & cable (12 ft.).

New Demo Center to "Knock Your Customer's Socks Off"

By: Stan Ratcliffe/DSD

To more effectively demonstrate DSD's product capabilities, the Cupertino Demo Center is being given a face lift. In an effort to make each visit more meaningful and to "knock the socks" off your customer, we soon will have a dynamic new facility to show virtually all of the HP 1000 Series capabilities.

To further develop a more useful demonstration area of HP products and their features there will be some changes in the current Demo Center set up. The physical location has been moved and is presently being remodeled. This new facility should be completed by the end of March and will be structured around the Models 81, 30 and 20.

The HP 1000 Model 81 will show the maximum configuration of the 1000 System. Primary attention will focus on Operations Management. This unit will function as the main node in a DS 1000 configuration and will include DS 1000/3000 and RJE/1000 communications software, 7920 Disc and emphasis on Multiterminal Data Base Management Software.

The HP 1000 Model 30 system will stress Computational and Graphical applications. The system will utilize high speed memory, the latest version of RTE, WCS for Microprogramming and other new soon-to-be-announced products. For graphics applications the system will include a 2648A CRT, Color TV Interface and 4-color plotter.

The HP 1000 Model 20 will feature instrumentation. Using a flexible disc, it will demonstrate the capabilities of RTE-M and will also present a 3070 controlled HP-IB measurement

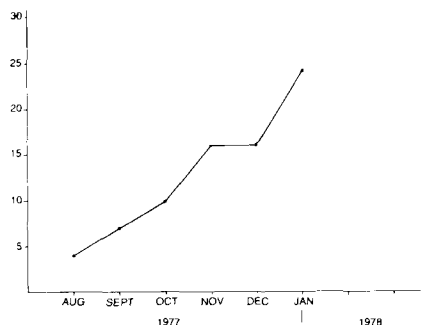
station, 2240 measurement station and interactive system console. Fault control memory will be included to address factory-floor reliability.

All three HP 1000 systems will be incorporated in the DS 1000 Network allowing demonstration of all DS 1000 capabilities.

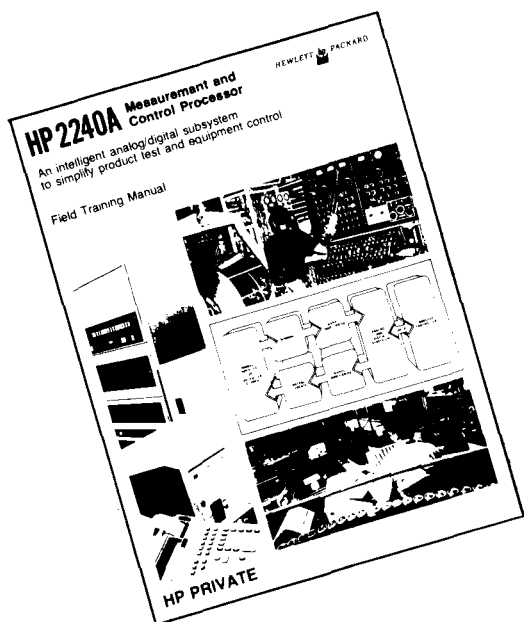
Here at DSD, we are as interested in impressing your customers as you are. With that in mind, remember that a well planned Demo Center Demonstration may just be the most effective way to close that "Big Order". Please notify your Sales Development Contact as to the particulars of your customer visit so we may adequately prepare a demonstration. If you know of any special products that need to be seen, contact us in advance so that we may incorporate these as necessary.

2240A Sales Take Off!

By: Peter Palm/DSD

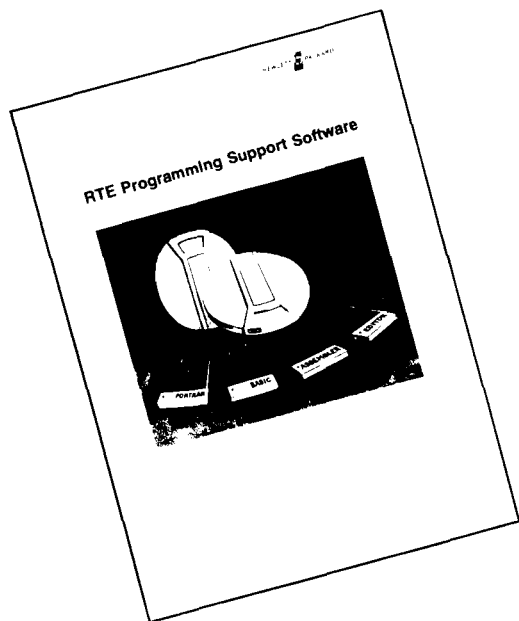


The 2240A sales have really taken off! We reached 24/month in January. To help you sell more 2240A's, we've sent you a new Field Training Manual. Let me know if you didn't receive one.



Everything You Ever Wanted, But Less

By: Jane Seligson/DSD



If you're one of the growing number of devoted lightweights whose taste insists on the best but whose back rejects the prospect of carrying around extra pounds of baggage, we've got your ticket! The new RTE Programming Support Software Handbook (5950-3780) was designed with you in mind. One handy 7x9 format book packs in the identical contents of 5 regular division publications: BASIC 1000D, BASIC 1000M, RTE Editor, RTE-M Editor, RTE Assembler and FORTRAN IV.

The first example of a proposed 7-volume set, incorporating HP 1000 systems publications, has been mailed worldwide to all 1000 System SE's. We think the new format and the new look will have great appeal to both our regular HP users and new customers as well. These handbooks are available from DSD at \$2.93 transfer cost and a list price of \$12.50. Why not order a few for your best potential customers?

If the old adage still holds, that you get what you pay for, then the Software Programming Support Handbook is the best bargain around.

P.E.P. Does It Again

By: Frank Jackson/DSD

Once upon a time an unexpected RFQ arrived at the Paramus Sales Office. Although the issuing company was well known to the Computer Sales Rep. he had had little contact with that particular requesting division. The RFQ was for a quantity of "foreign" board level CPU's, or equivalent. It certainly did not reflect, nor did the purchasing agent indicate, that the company was actively looking for a Computer System vendor who could offer both entry-level and high-performance systems.

In fact, the purchasing agent recommended a "No Bid" on the RFQ. However, our *persistent* sales representative did not give up that easily. By devious means he found himself in the appropriate engineering department. Through his *enthusiasm* he sold HP and the computer product line. His *product knowledge* allowed him to satisfy all the customer requirements and all of his P.E.P. brought him a brand new OEM customer who we anticipate will purchase over 100 systems per year.

CONGRATULATIONS SUPER SALESPERSON

P.S.

1. If you need assistance with P.E.P. please call *Bill Richion* of Computer Systems Group.
2. Don't overlook RFQ's and other leads.

Hospitals Come to HP For Cure

By: Dave Bunch/DSD

Computer systems from Hewlett-Packard have recently made broad incisions into the Hospital/Clinic market. These systems have been able to cut patient scheduling costs and aid in automating blood analysis, to name only a few applications.

DSD Sales Development is in the process of compiling a data base on applications of the HP 1000 in the medical field.

If there are any HP 1000 applications that you know of in your territory, please respond with the following:

Hospital Name: _____
 Address: _____
 Sales Representative: _____
 Installation Date: _____
 Software/OP System: _____
 Hardware Configuration: _____
 Special Interfaces: _____

This user list should become available sometime in May and will be distributed to anyone who requests it.

Please send all information/requests to *Dave Bunch* at Data Systems Division.

Division News

HP-ATS — The Star of ATE Seminar/Exhibit

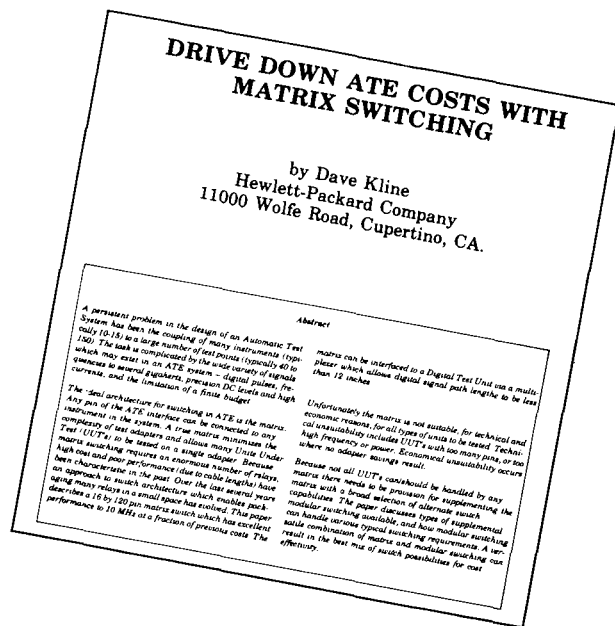
By: *Andy Mills/DSD*

Over 400 ATE'ers jammed the Marriott Hotel in Los Angeles, California from January 30 through February 1 to attend the "Automated Testing for Electronics Manufacturing Seminar/Exhibit". The Circuits Manufacturing Magazine sponsored convention, the only one of its kind, is devoted entirely to the ATE community. Virtually all major commercial ATE suppliers and potential users of ATE were in attendance. The show had a unique format in that it combined presentations of technical papers, workshops on specific testing problem areas, and display of automatic test products, into a hectic but informative three-day session.

To take advantage of this unique opportunity, DSD shipped an HP 1000, an HP-ATS demo unit with a modular switch, and a matrix switch. Santa Rosa Division sent an 8581A calculator-based Automatic Spectrum Analyzer and Loveland Instrument Division completed the display with a calculator-based LCR Measurement System.

Our display highlighted the theme of "A total spectrum of products and services for the automatic test market" — from individual instruments and controllers through large general-purpose computer-controlled automatic test systems. This complete offering was unmatched and easily the star of the show.

Hewlett-Packard was well represented at the technical session with an excellent paper presented by *Dave Kline* entitled "Drive Down ATE Costs with Matrix Switching". This paper aroused a great deal of interest with the audience as evidenced by the activity in the booth area. A copy of this paper is reprinted in the Field Training Manual for HP switch products.



Andy Mills also presented a vendor paper which summarized HP's full spectrum of products and services for the ATE market.

Special thanks to *Mike Leavell* and all the Los Angeles area FE's and SE's who helped man the booth and keep things running smoothly.

At a \$200 admission charge, the visitors to the booth were indeed serious about their requirements. A potential customer list, gathered at the show, is being formulated and will be arriving at your office shortly.

SELL HEWLETT-PACKARD AUTOMATIC TEST AND MEASUREMENT SYSTEMS!

DSD Goes All Out In Japan

By: Jim Eckford/DSD

The DS 1000 introduction NPT made its last stop at YHP's factory in Hachioji, Japan. Over 80 people attended, including Lok Lin and Wen Ko from Taiwan and some YEW people from YHP's parent company.

The DSD "most valuable player" award for outstanding sales work, (a leather brief case), was given to Kenichi Itoh by Matsuji Tezuka and Bob Puette. Everyone is waiting to see how long it takes him to fill it with 1000 orders.

After initial comments from Katsuo Kohtani, Ken Uyeminami and Bob Puette the program split off into separate sessions featuring DS 1000, competition, selling to the automation OEM and future directions.

One of the highlights of the two days, thanks to Mari Takahashi, was a great dinner party which allowed everyone the chance to get to talk to each other. The Japanese folks did great with their speaking of English, but the DSD guys felt lucky to learn a few words of 日本語



Ken Uyeminami making a strong point of saying "Sell more DSD products in '78".



Kenichi Itoh receiving his award for "most valuable player" from Joe Schoendorf, Matsuji Tezuka and Bob Puette.



Bill Shelloe gets a few laughs as he leads one of the competitive sessions.



Wen Ko from Taiwan making sure he gets to know everyone.

DATA TERMINALS NEWS

Product News

2649A/2648A Memory \$ Savings

By: Michael Tarens/DTD

Do you have an OEM customer who wants to order a 2649A configured as a 2648A? If you do and have followed the configuration guidelines in the DTD Price List, you will note (if your customer has not already) that the basic price for the 2649A/2648A is higher than the basic price for the 2648A product (\$5890 vs. \$5500). Naturally, with the OEM discount the price will be reduced substantially below the 2648A product price. But is there also a way of reducing the base 2649A price? Yes, there is! The 2648A requires an 8K RAM memory board. The price list calls for a 13297A (8K RAM board) with a price of \$500. This memory module can be replaced with the 93982A module which is also 8K of RAM. The 93982A is the standard RAM memory board in the 2648A product and costs only \$425. Thus, a net price list savings of \$75 which reduces the 2649A to \$5815.

There are differences between the 13297A and the 93982A, however. The 13297A is our new universal RAM board which provides bank switching, top and bottom plane connectors and the capability to add additional RAM (up to a maximum of 32K). The 93982A does not offer these features, thus it is extremely important that customers be made aware of the differences. If the customer does not require the 13297A features and has no desire to upgrade to more RAM in the future then the 93982A would meet his needs. This memory board is available as a special and should be noted on the sales order. It is also available for the OEM discount.

One final note as a reminder: the 93982A may *only* be ordered in a 2649A product when that product is to be configured as a 2648A graphics terminal.

Customize 264XX Keyboards with KLD

By: Eric Grandjean/DTD

Some applications may require that certain keys of OPERATIONAL 264XX keyboards be disabled to prevent unauthorized or accidental use of specific characters or functions. Locking individual keys is now a snap!

All you have to do is literally snap a KLD under the keycap to be locked! KLD stands for Key Lock Device, a small plastic open ring. The part number is 5041-1433 and the price is approximately 4 KLD's for a dollar. KLD's are being set up at the parts centers and should be available very soon.

To install a KLD requires disassembly of the top section of the keyboard (5 screws) and temporary removal of a keycap next to the key to be locked. If a blank keycap is necessary, order P/N 0370-2792.

Due to mechanical clearance restrictions, KLD's cannot be used to lock any of the small control keys on the top section of the keyboard, but this is just as well!

Several overlay styles are available or can be specially made to cover any key of that particular top section of the keyboard. To occasionally activate the function of any covered key only requires snapping the overlay open with the little flat opening key provided with each terminal and pressing the key stub.

GOOD SELLING!

New Colors for 264X Terminals (Correction)

By: Carl Flock/DTD

Two articles appeared by mistake in the last issue of the Newsletter (Feb. 15) that suggested that there is an optional way to get the old colors on 264X terminals.

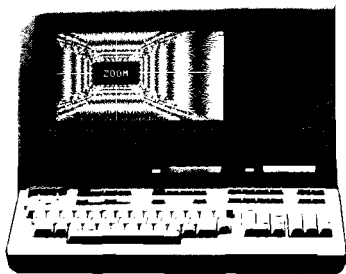
Actually the color change for the terminals is final and complete. There are no color options and there will not be any. The new colors match the 2631-35A and all new products of GSD.

Product	Old Colors	New Colors
all 264X CRT's	264XX-18	264XX
all 132XXX products	132XXX-18	132XXX

Order Processing

Ordering Graphics Terminals

By: Larry Roth/DTD



Some Ordering Hints:

There are some subtleties in configuring our products that you need to keep in mind when helping your customers determine what they should order. Here are some typical configurations:

Graphics Terminal with Tapes and 13260B

- 2648A Graphics Terminal
 - Opt. 007 Add Tapes
 - Opt. 030 Delete Std Data Comm
- 13260B Extended Data Comm
 - Opt. 003 2648A Data Comm Firmware (No charge, but required)

Graphics Terminal Without Tapes and Printer Interface

- 2648A Graphics Terminal
- 13238A Duplex Register
- 13261A Device Support Firmware
 - Opt. 003 2648A Graphics Firmware (No charge, but required)

2649A Configured as 2648A with Tapes and Data Comm

- 2649A Terminal/Controller
 - Opt. 007 Dual Tapes
 - Opt. 100 Upper Case Character Set
 - Opt. 101 Lower Case Character Set
 - Opt. 202 2648A Keyboard and Interface
 - Opt. 400 24K ROM Module (2 required)
 - Opt. 480 Graphics Controller
 - Opt. 548 2648A Main/Keyboard Firmware
 - Opt. 803 3-Wide Top Plane Connector
- 13260A/B Data Comm
 - Opt. 002 Delete ROM/Keyboard Overlay
 - Opt. 003 2648A Data Comm Firmware
- 13261A Device Support Firmware (Required with Opt. 007 on 2649A)
 - Opt. 003 2648A Device Support Firmware
- 13297A 8K Bottom Plane Memory (or you could order a 93982A, instead of 13297A)

Sales Aids

Printers — 80 or 132 Character Lines

By: Tom Lee/DTD

There has been some confusion lately concerning the capabilities of hardcopy printers while connected to various 264X terminals. Remember from your Field Training Manual, the 2640B can only print the entire contents of its memory. It cannot print a line at a time or a specific number of lines at a time. You must print everything in the memory at once. The 2640B does not have the 2645A addressing capability. As a result, the 2640B is limited to

80, not 132 character lines. After printing the contents of memory, the 2640B will transmit a form feed to the printer as its last character.

The 2645, on the other hand, has the capability of "printing" lines to more than one device; i.e., display and/or tapes and/or printer. This can be done on a record-by-record basis. The 2645 also has the capability to print lines of more than 80 characters, since data does not have to transit through display memory!

So, if your customer is going to print small volumes, usually of listings, or just a quick copy of something on the screen, then the 2640's printing capabilities will probably be sufficient. Otherwise, he should purchase a 2645.

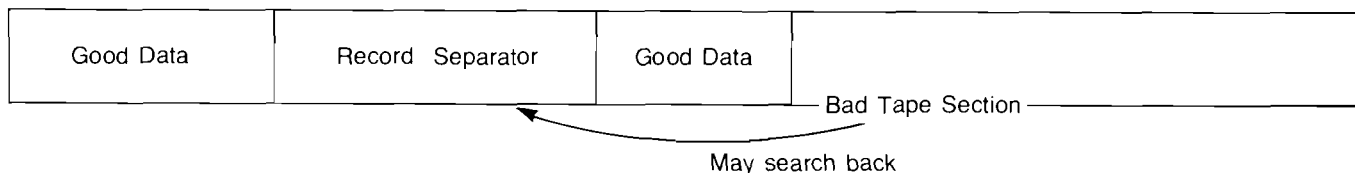
READ AFTER WRITE — How to Make It Foolproof! Softkey Application Note #19

By: Carl Flock/DTD

The Problem:

READ-AFTER-WRITE is available on the 2641, 2645 and 2648 terminals to provide a lute data security of recorded data. Does it work? Yes — some of the time. WHAT?!?!

The logic for READ-AFTER-WRITE was designed to detect even minor errors such as dust on the tape. But major tape problems such as totally bad tape for an inch or two may fool the terminal. It turns out the 264X tries to rewrite and retest written data 8 times. How does it rewrite? It searches back to the last valid record separator on the tape.



Now, the possibility exists that the 264X will overwrite the last good data with the new good data, test it and find out everything is O.K. — a false conclusion. How can this problem be resolved? Never retry is the answer. The following modification can be made to the 264X when the application can not take any chance with data security.

The Solution

Never let the 264X retry when an error has been detected on a READ-AFTER-WRITE operation. To do this, send the following (or press the softkey) to the terminal before you enter the READ-AFTER-WRITE mode of operation. The code that follows changes the terminal's operation and allows for no retries:

```

ESC & L
ESC & c 177120a72d145d377d346d200d310d16d1d311d110545a303d120d376D
    
```

Remember all "ESC&c" sequences given are contributed and not supported by HP. If they work use them for your benefit, if not well . . . let Sales Development know, but there are no guarantees.

2649 Without a Datacomm Card

By: Wendi Brubaker/DTD

Today more and more customers are using the 2649 in a stand-alone environment. This is great! We just wanted to remind you that the terminal needs data communication firmware whether or not a 13260 card is being used. This means ordering option 701 for the 2645A point-to-point firmware or option 702 for the 2648A.

KEEP ON SELLING THOSE 2649's!

Hier sind 24 Gründe, warum Ihr Computer mehr leisten kann.

Die neue Hewlett-Packard Bildschirm-Station 2645A

- | | |
|--|---|
| 1. Schneller Massenspeicher. | 12. Großes, leicht lesbares Schirmbild. |
| 2. Frei definierbare Funktionstasten. | 13. Einfache Korrekturen. |
| 3. Datenübertragungsrate bis 9600 Baud. | 14. Asynchroner oder synchroner Betrieb (BSC). |
| 4. Auch für Pollingbetrieb. | 15. Einstellbare Zeilenbreite. |
| 5. Erstellung von Eingabemasken. | 16. Auch negative, halbhelle oder blinkende Darstellung und Unterstreichen. |
| 6. Modulare Konstruktion. | 17. Abnehmbare Tastatur. |
| 7. Mikroprozessorsteuerung. | 18. Zeilenüberlauf. |
| 8. Eigenprüfung des Gerätes durch Tastendruck. | 19. Darstellbare Steuerzeichen. |
| 9. Speicher für mehrere »Seiten«. | 20. Druckeranschluß. |
| 10. Prüfung von Feldern. | 21. »Durchblättern« von Zeilen oder »Seiten«. |
| 11. Verschiedene Zeichensätze. | 22. Zeichen- oder Blockbetrieb. |
| | 23. Mini-Magnetband-Kassetten. |
| | 24. Geschützte Felder. |



Hewlett-Packard GmbH/Vernieb
 Berner Str. 117, 6 Frankfurt/M. 56
 Telefon: (069) 50041

BILDSCHIRM-STATION HP 2645A

Hewlett-Packard GmbH/Vernieb
 Produkt-Informations-Service
 Berner Str. 117, 6 Frankfurt/M. 56

Ich möchte mehr wissen über diese Bildschirm-Station.

Name _____
 Stellung _____
 Firma/Institut _____
 Anschrift _____
 _____ Tel. _____

2645C Z 1



GENERAL SYSTEMS NEWS

Product News

GSD Announces Major Price Reduction on HP 3000 Systems

By: Fred Gibbons/GSD

Cupertino, Calif., March 1 — Hewlett-Packard announced today an across-the-board reduction of \$11,000 in the U.S. price of every model in the HP 3000 Series of business computer systems. *Edward R. McCracken*, manager of the firm's General Systems Division said, "These reductions place the HP 3000 10 to 15 percent below the price of comparable equipment from other sources. The reduction in the price of the HP 3000 Series I is 17%, bringing the base system price down to \$64,000."

The HP 3000 Series I is a multilingual business computer system with 128 Kbytes of main memory and 50 Mbytes of disc storage, easily able to support eight users simultaneously doing separate on-line jobs. It is field-upgradeable to one of the larger HP 3000 configurations, including the HP 3000 Series II Model 6, now \$99,000 compared with the former \$110,000, and the Model 8, now \$129,000 compared with \$140,000.

A typical 3000 Series II System configuration is now priced at \$153,560 and consists of a 320 Kbyte Model 6, 2 each 50 Mbyte Discs (HP 7920's), 1600 bpi Mag Tape, HP 2640 CRT Console, 300 LPM HP 2613 Line Printer, 16 port Terminal Controller, a 9600 bps synchronous communications controller, and the following purchased software: MPE operating system, SPL (System Programming Language), COBOL, BASIC and Multileaving Remote Job Entry capability for IBM mainframes.

"This aggressive stance in our price posture is possible because of the decreasing component costs, particularly semiconductor memory parts and increased shipping volume," *McCracken* added. "For example, the one-thousandth HP 3000 Series II system to be produced since introduction in May of 1976 was shipped in January to General Mills' Consumer Food Group, Minneapolis, Minn. This level of acceptance has resulted in manufacturing economies we are passing on to our customers," he concluded.

These price reductions are retroactive to February 1. All other prices, options, upgrades, etc. are unchanged. This affects you in one of three ways:

1. As you submit new orders they will be accepted by order processing at the new lower prices. No HEART overrides are required.
2. For all your orders which have not shipped yet you should send in a change order which specifies the new prices. GSD order processing will solicit these change orders from each of you with orders in the backlog.
3. For all your orders which shipped in February at the old prices you should send in a credit/rebill. GSD order processing will solicit these credit/rebills from each of you that is affected.

GOOD SELLING WITH THESE NEW AGGRESSIVE PRICES!

For Inquiry Applications . . . HP 2026 Is Fast!

By: Dick Baumann/GSD

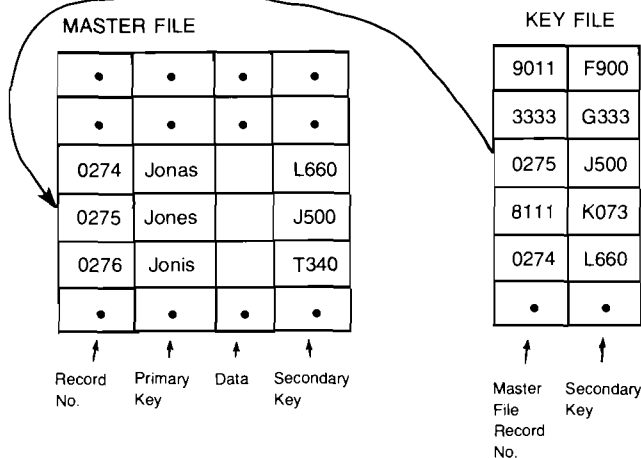
If you have a prospect who wants to do file retrieval applications, the HP 2026 may be a great solution. If there's an additional need for data communications and/or source data entry, where the data must go through some sophisticated checks against files, the HP 2026 may be the perfect answer.

Let's talk a little about the 2026's file retrieval capabilities. Disc files may be searched in one of two ways: binary search or serial search. A binary search can locate any record in a sorted file in less than 1/3 of a second — regardless of the size of the file. Typically we use binary searching on large files which are pre-sorted by the primary key. A very impressive "standard demo" that we like to run is a simple file retrieval from a 30,000 record employee file using a binary search. It's very fast, and takes only 3 edit instructions (binary search, file retrieval, and display). A trained chimpanzee (MBA preferred) or product manager can develop the whole thing in 5 minutes. Serial searching goes at approximately 1000 records per second. This is the type of searching you use on smaller files which may not be sorted.

When you have a large master file where records are being added during the day, add the new records to a temporary file then merge them into the larger sorted file at the end of the day. Have your retrieval program do a binary search against the master file and, if it doesn't find the record, do a serial search against the "change file." It's still a trivial DEAL program to do this.

While we're on the topic of disc files, an individual file may contain up to 8.4 Mbytes of data (that's 32767 256-byte

sectors). A file may be accessed by up to 11 different keys . . . one primary and ten secondary keys. For each secondary key a sorted key file must be produced. Each record in the key file contains the address of the master record containing that key.



So, a retrieval using a secondary key is also fast . . . a binary search against the key file to get the pointer to the master file and then a direct retrieve of the master file record. That's the HP 2026's equivalent of an indexed access method.

A newer member of our sales force (who came to us from one of our biggest competitors in the data entry area) made the statement that HP 2026 response time for inquiry applications is as good or better than anything he's ever seen. As far as programming is concerned, he estimates a 10 to 1 reduction in lines of code using DEAL versus a "conventional" programming language, such as COBOL. Fast response time and fast application development time . . . two good reasons to look at the HP 2026!

Competition

Let's Put Prime Into Perspective

By: Jon Jacobson/GSD

We keep hearing from you who are selling in the major metropolitan areas that Prime Computers are coming on strong in the commercial general purpose computer market. Prime's aggressive marketing effort promises HP 3000-like capabilities, but some misconceptions are being formed. This article will address Prime as a competitor and perhaps set the record straight. We've highlighted the key points that Prime offers versus the HP 3000. Now let's have a little history.

Where Did Prime Come From?

Prime entered the computer market in 1972 with the announcement of the P200. This was an upgraded version of the Honeywell Series 16 that was developed at NASA and entered into public domain. Since that time, they have offered a range of products that have the characteristics that:

1. Support up to 63 concurrent users, each with up to 512 Mb of virtual storage.
2. Can be configured with up to 8 Mb of MOS memory.

What About Their Operating System?

Primos is a time-sharing operating system written primarily in FORTRAN and designed to support a multiterminal, multi-programming environment.

Primos utilizes stack architecture, like the HP 3000, to separate code and data. It also supports re-entrant code and virtual demand paging. The systems look like this:

P300 — provides up to 128 Kb of virtual memory in 1 Kb pages for up to 31 partition users.

P400 and P500-provides up to 512 Mb of virtual memory in 2 Kb pages for up to 63 partition users. The memory manager combines paging and segmentation by reserving half of the virtual space for the partition and half to be shared with other processes. The code segment limit is 128 Kb.

Gasps! How Do We Compete Against That Kind of Capability?

It's true that Prime provides a great deal of real and virtual memory to each partition user. This allows Prime to handle the computation of larger matrices than the HP 3000. However, they pay a premium in overall system efficiency since they must configure a large amount of memory to support each partition user, regardless of whether he needs it or not. Benchmarks in the field have substantiated this fact by indicating that though Prime could effectively process the large number cruncher, the user suffered in the area file manipulation. In fact, field benchmarks have shown the HP 3000 has the competitive advantage when processing programs that require primarily file handling capabilities. Therefore, when you're competing against Prime, and they start configuring a system with more memory than is currently available on the HP 3000, remember Primos is going to require more memory to support the same level of activity on the HP 3000. For example, Prime recommends a minimum of 192 Kb of memory to support COBOL and RPG II. If you wanted to add RJE and DBMS, the recommended memory jumps all the way to 1 Mb. This is probably the reason why Prime doesn't offer DBMS on the P300. We at HP can effectively support all of these subsystems on the 128 Kb Series I with up to about 6 terminals.

Well Then, Where Does The HP 3000 Gain the Competitive Edge Over Prime?

At a quick glance Prime seems to be marketing a line of products that closely resembles the HP 3000. However, when you take a closer look at Prime, it can't match the HP 3000's maturity, quality, and reliability. HP has put a great deal of effort in making the interface with the non-technical user as smooth as possible. This is where the HP 3000 shows the advantage over Prime. Since Prime markets itself as the company where software is first, let's try an apples to apples comparison.

FORTRAN

Prime has an extremely strong FORTRAN compiler (ANSI X3.9). When this is combined with the large amount of main memory and an operating system written mainly in FORTRAN they support very fast computational programs. The P500 also has a floating point box that increases this power.

COBOL

Apparently Prime has two COBOL compilers, one for fast compilation and the other for fast execution. (Some of you will remember years ago when the HP 3000 had COBOLA and COBOL.) There seems to be a problem in Prime's COBOL in that programs compiled by one compiler will create syntax errors with the other, indicating their lack of compatibility. On the Series I where we do have two COBOL compilers, they are totally compatible.

Though Prime has a '74 implementation of COBOL, some very significant features are not supported. They do not support the Sort or Select verbs and encourage users to use the Utility Sort. Prime does not support Move Corresponding. There is also some question about the Boolean Logic needed to support nested If statements. All of these are supported and proven on the HP 3000.

RPG

Prime states that their RPG II is highly compatible with IBM System/3 Model 10 RPG II. Then Prime states that once these programs are converted to Prime the user should take advantage of Prime's other languages to expand their programs.

DBMS

Prime's Data Base Management System is CODASYL compliant, multi-level, and hierarchical. The size of any data base is only limited by the maximum amount of disc storage available on any given system. However, access to the data base can be only made through FORTRAN or COBOL programs. There is no QUERY capability and Prime encourages non-technical interface to DBMS to be made through FORMS. FORMS is a subsystem very much like DEL in that CRT screens are maintained and cataloged to be called by the COBOL or FORTRAN programmer. This obviously forces the DBMS user into requesting programming support each time he wants to interrogate his data base in a different manner.

MIDAS

Prime's multiple Index Data Access System is a KSAM-like subset of DBMS. It allows one primary and 19 secondary keys. Since it is a subset of DBMS, Midas existent file structures can be accessed by DBMS.

Other Aspects Of Prime Software

Prime's Editor, though powerful, is a pointer-oriented Editor as opposed to a line oriented one. This definitely would add to the training time for the non-technical person. Prime does not support a batch and spooling concept like the HP 3000. Batch jobs are run as background to the partition user. Spooling of both input and output processes is on a first-in first-out device available basis, where neither the user nor system operator can alter processing priorities.

Since Primos was initially designed to support the interactive user and support of batch jobs was added later, the batch job is forced to accept a lower processing priority. The HP 3000 on the other hand will allow the system operator to give a batch job the same or higher processing priority than the interactive user if the operator needs this capability. Prime at this time does not support APL nor do they have an SPL like language.

As an overall concept in comparing Prime's software to that available on the HP 3000, Prime is going to require highly technical people to keep their system together.

This may not be a major concern to the DP manager since technical expertise is his forte and a healthy backlog in programming requests helps justify his budget. However, those people who are his users, may view this in another perspective. It makes a lot more sense to hire a clerk to use QUERY and get the information you need, than to hire a high-priced COBOL programmer.

Hardware

Prime offers an extremely wide range of configurations and peripherals. Prime will market the fact that they are a different type of manufacturing company. This is because they virtually OEM everything they sell. Prime will say this is to their advantage since it allows them to concentrate on software development. I'm sure all of you are aware of Hewlett-Packard's dedication in developing both hardware and software to produce both technically advanced and high quality products.

The real truth to this can be seen in the difference between Prime and the HP 3000 in terms of cost of ownership. If you look at Chart #3 the price of a 64 Kb MOS memory board on a Prime System will cost \$8,500 while a 64 Kb MOS memory board on the HP 3000 is only going to cost \$3,700. This should be a definite indication that upgrading a Prime system is going to be expensive.

The other thing you should note is the difference in BMMC for hardware support. Prime's tape drive is \$170/Month vs the HP 7970E which is only \$70/Month. Prime's 40 Mb disc is \$225/Month vs the HP 7920 which is only \$54/Month. These are definite considerations that should be passed on to the customer. Prime may very well offer some significant discounts on the original sale, however the cost/month in owning a Prime system may soon make that discount transparent.

As A General Summary

When you're competing with Prime the thoughts you should leave in the customers mind are:

1. HP 3000 has a flexible, powerful operating system which utilizes less memory than Prime's Primos which is not only less configurable but which assigns system resources without regard for application.
2. HP 3000's memory prices are lower thus making it less expensive to expand to meet the growing needs of the customer.
3. Prime's two COBOL's are incompatible whereas HP's are totally compatible.
4. HP 3000 can be configured to prioritize batch versus interactive utilization of the system.
5. Prime has no APL or SPL-type language
6. HP 3000 is much more user-oriented as a system, both in software usage and training.
7. HP is a company with a long-standing reputation for product excellence, in-depth technical support; example: bug reporting, software and manual distributions and a worldwide service facility.

CHART #1

PRIME 300 —	Up to 31 users. 16 K to 512 Kbytes of MOS memory (64 Kb recommended); BASIC, FORTRAN, COBOL & RPG II Languages.
PRIME 400 —	Up to 63 users; 128K to 8 million bytes of MOS memory, 2K bipolar cache memory; BASIC, FORTRAN COBOL, and RPG II Languages; DBMS, HASP/2780; and FORM UTILITY Language.
PRIME 500 —	Up to 63 users; 128K to 8 million bytes of MOS error correcting memory; 2K bipolar cache memory. Fast Floating Point hardware; Extended instruction set; BASIC, FORTRAN, COBOL, and RPG II languages; DBMS, HASP/2780 and FORM UTILITY Languages.

CHART #2

PRIME VS HP 3000 SOFTWARE COMPARISON	
PRIME	HP 3000
FORTTRAN	FORTTRAN
COBOL	COBOL
RPG II	RPG II
BASIC	BASIC
MDP (Assembler)	—
—	SPL
—	APL
DBMS	IMAGE
—	QUERY
FORMS	DEL
MIDAS	INDEX,KSAM
2780/HASP	2780/3780
PRIMENET (X.25 Protocol)	DS3000
CDC UT200	—

CHART #3 PRIME vs HP 3000 PRICE COMPARISON

PRODUCT	PRICE	BMMC	PRODUCT	PRICE	BMMC
HP 3000 Series I W/128 Kb Core Standard Configuration			P300 64 Kb MOS	21,500	214
			Add 64 Kb MOS	8,500	55
			Terminet 30 Console	—	—
			Primos III Oper. Sys.	—	—
			*Peripherals from below	40,500	395
TOTAL	\$75,000	\$615	TOTAL	\$70,500	\$664
HP 3000 Series II Model 6 W/512 Kb MOS Standard Configuration			P400/P500 128 Kb MOS	69,900	448
			Add 2 ea. 64 Kb MOS	17,000	110
			Add 1 ea. 256 Kb MOS	26,000	220
			Terminet 30 Console	—	—
			Primos IV Operating Sys	12,000	100
			*Peripherals from below	40,500	395
TOTAL	\$136,000	\$776	TOTAL	\$165,400	\$1273
			NOTES:		
			Primos IV Operating System	15,000	150
			P400/P500 W/2 Kb Cache & Floating Point	+4,700	-100
			P500 W/2 Kb Cache Floating Point Hardware, Extended Instruction Set for Packed Decimal	+43,100	+92
			*Peripherals used to match HP 3000 Standard Configuration		
			Pertec Tape 800/1600 bpi	17,000	170
			CDC Disc 40 Mb	23,500	225
			TOTAL	\$40,500	\$395
			Not Included:		
			CDC Disc Upgrade to 80 Mb	+4,000	—
			Infoton CRT 24x80-1200 Baud Block Mode, Protected Fields	4,200	26

CHART #3 PRIME VS HP 3000 PRICE COMPARISON (CONTINUED)

SOFTWARE					
COBOL	1,500	100	Transact Package	\$17,000	\$141.67
RPG II	1,500	50	— Includes — COBOL, RPG II, FORMS & PRIMOS IV		
DEL	300	100	DBMS	\$20,000	\$166.67
IMAGE/QUERY	3,000	125	2780	1,500	8.34
2780/3780	750	25	HASP	2,000	16.67
NOTE: FORTRAN & BASIC will probably be bundled into the basic system price.					

NOTE: These are Prime's standard list prices as of 4/1/77. Prime has been very effective in discounting.

MRJE/3000 vs 3780 Emulation in a Production Environment

By: Richard Scott/GSD

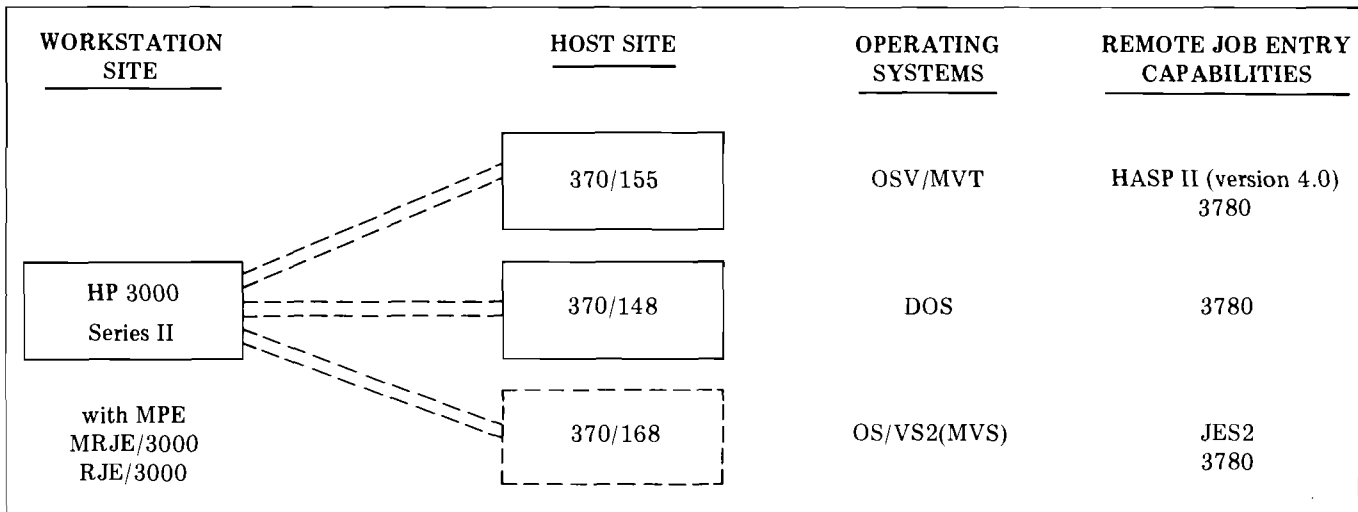
How does MRJE/3000 perform relative to 3780 in a heavy use environment? This is the question we put to one of our initial test site users who converted one of his two 3780 (RJE/3000) lines to an MRJE/3000 link.

Previously he was operating his RJE lines (one for input, the other for output) at nearly 100% line utilization, 24 hours a day, six days a week. Each day he was accessing two different hosts, a 370/148 with DOS and a 370/155 with OS/MVT. The customer had developed his own software utilities for dividing his massive output in several print and microfiche streams but even at 9600 bits per second per line, he still needed more job throughput.

When we proposed a MRJE/3000 test for his site, he eagerly accepted. After some initial test site debugging, the results were in the customer's words "... a 20% increase in throughput and a 'no comparison' improvement in the ease of job entry!" Even with 8 terminal sessions accomplishing IMAGE data base inquiry and 3 batch jobs running concurrently, the system still retained its 3 to 5 second terminal response time.

Now, the customer is planning for additional concurrent remote job entry to a 370/168 with OS VS2 (MVS) using JES2. In addition, he has ordered two additional 7920 discs and an upgrade to 512 Kbytes to accomplish an even more intensive interactive use of the system.

The point is that MRJE/3000 can free up machine resources, invite new uses of the HP 3000, and result in new peripheral and upgrade orders for existing heavy RJE/3000 users. MRJE/3000 — a real sales lever!



Data General M600 Competitive Summary

By: Fred Gibbons/GSD

Data General has been receiving quite a bit of press lately on its new 1 Megabyte Eclipse system called the M600. DG themselves have positioned it from both a price and performance point of view against the HP 3000 Series II and DEC's 11/70. DG is targeting it for users who want to offload applications (typically business oriented with need for up to 64 terminals) from their mainframe.

Before passing judgment on the M600, here are the facts as reported in *Electronic News* and *Computerworld* and how they stack up against the Series II.

	DG M600	HP 3000 Series II
Max. Memory	1024 Kbytes	512 Kbytes (today)
Max. # of Terminals	64	64
Max. Disc Storage	6 billion bytes (32 190 Mbyte drives)	400 million bytes (today) (8 7920's)
High Speed Disc I/O	Burst Multiplexer Channel 10 Mbytes/sec	Selector Channel 2.86 Mbytes/sec
Med Speed Peripheral I/O	Data Channel	Multiplexer Channel
Low Speed Peripheral I/O	IOP (Eclipse S130)	IOP
Processor Cycle Time	200 nanoseconds	175 nanoseconds
Memory Cycle Time	500/700 nS Read/Write	350/700 nS Read/Write
Operating System	AOS	MPE
Maximum Virtual Memory Size	6 billion bytes	8 million bytes
Virtual Memory Technique	Demand Paging	Demand Segmentation
Languages Available	FORTRAN IV, V BASIC DG/L (Assembly) PL/1 COBOL (future) No data base management	FORTRAN BASIC SPL APL COBOL IMAGE
System Price	320 Kbytes, 96 Mbyte disc, 1600 bpi tape, 60 char/sec terminal, 300 LPM printer, 8 terminal ports, 2400 bps synchronous comm card, AOS, PL1, FTN, BASIC, RJE	320 Kbytes, Mod. 6, 2- 7920's (100Mb) 1600 bpi tape, 2640 CRT, 2613 printer (300 LPM), 16 ports SSLC Comm card MPE, SPL, FTN, BASIC, RJE (prepaid)
	\$164,100	\$152,060
Memory Price	\$8500/64 Kb (MOS)	\$3700/64 Kb (MOS)

Reviewing these facts in the order listed, it looks like DG has a temporary edge in maximum memory size, but is it ever expensive to go to 1 Megabyte! They charge \$8500/64 Kbytes versus \$3700 for HP. So it's to our advantage to quote big (512 Kb) memory configurations against DG.

DG claims to be able to support 32 disc drives for a total of 6 billion bytes versus 400 million bytes (8 7920's) for HP. It's probably not practical to place 32 drives on any system, but DG does have a temporary edge in total disc capacity.

From an I/O point of view, the M600 has two unique features: a very fast disc channel (versus the 3000's selector) and a separate front end processor to handle terminals (an Eclipse S130). These are probably the major contribution of the M600. However, it's not clear whether the Eclipse can really run at the full 10 megabyte-sec bandwidth of their channel or whether the separate low speed I/O processor will significantly reduce the CPU's workload. Only benchmarks will tell. If you do any benchmarks against the M600, let us know in Product Management or Sales Development. We'll see to it that it passes along to the rest of the field.

Regarding processor and memory speeds, it looks to be about a draw between us. However, when it comes to the operating system, it's no contest. AOS is still unproven and in fact AOS has some new software that resides in the front end Eclipse S130. MPE is 5 years old, reliable, and still state-of-the-art.

The M600 has a large virtual memory address space (coincidentally equal to their maximum disc capacity of 6 billion bytes). The 300's 8 million byte address space has been adequate to date. It's not obvious that having 6 billion bytes buys you very much.

DG has gone to a demand paging virtual memory management technique versus HP's demand segmentation technique. The academic community has been debating which is better for years. Pages are fixed segments and have the advantage of using less system resources to be brought into memory. Conversely, HP's variable length segments can allow memory to be more efficiently used. The pros & cons continue on. At best, it's a draw.

From a languages and data base point of view, the 3000 has the edge with COBOL, RPG, and IMAGE. COBOL is coming from DG, the question as always, is when.

Computerworld and *Electronic News* quoted DG as saying that the M600 is priced under the Series II. Using our new system prices, this doesn't seem to be the case. In fact, for the 3200 Kb configuration listed, HP is \$12,000 lower. This differential would increase to \$26,440 in HP's favor if the M600 and 3000 are expanded to 512 Kbytes.

Overall, the M600 has an edge in disc capacity and memory size. An edge which will be short-lived. From a CPU and memory speed point of view, the M600 is the same old Eclipse.

Regarding pricing, the 3000 is very aggressive with almost a 15% edge for 512 Kb configuration. We're clearly in front with languages, data base management and operating system. Overall the 3000 continues to look better and better as we see the newest and best our competitors have to offer.

Order Processing

SIS and SAS

By: Taylor Pohlman/GSD

Several orders have been received recently for SIS/3000 (Student Information System — 32900A). This product has been made a combination of the previous Education Application products SIS/3000 and SAS/3000 (Student Assignment System — 32901A). Although the products are now sold as one, for shipping purposes the following procedure should be used:

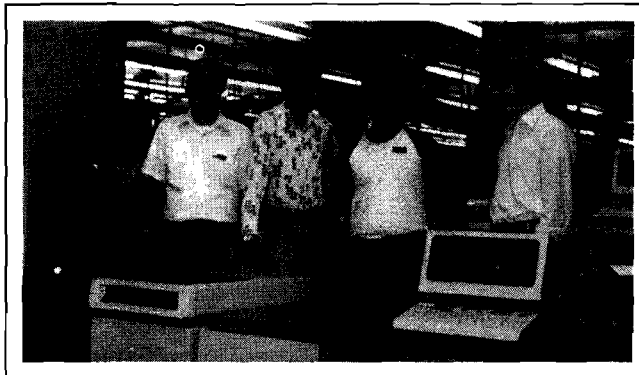
order SIS/3000 (32900A) as per the price list
order SAS/3000 (32901A) at NO CHARGE

This will insure that all the proper manuals and tapes are shipped. The necessity for this special procedure will be corrected soon, probably concurrently with a new release of the product. Call your GSD Sales Development contact or me if additional information is required.

General News

First HP 2026 with Big Disc Ships to Canada

By: Dick Baumann/GSD



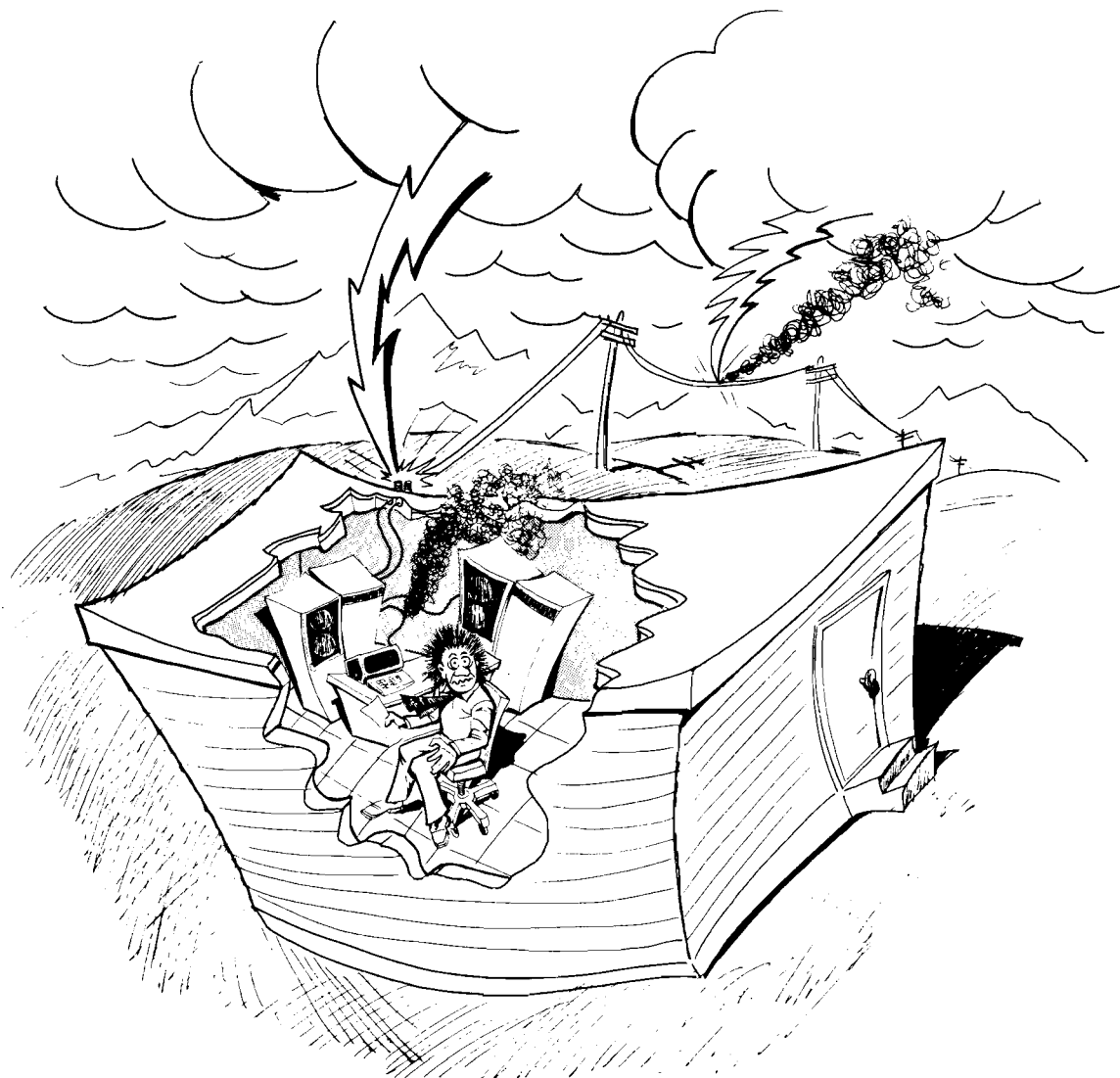
Holding a little "bon voyage" ceremony for the first 7920-based HP 2026 produced by GSD are (left to right) *Chuck Hudson* (System Test Supervisor), *George Cullison* (System Integration Section Manager), *Eugene Terrell* and *Jim Correa* (System Assembly Area), and General Manager, *Ed McCracken*.

The system is on its way to Vancouver, British Columbia, — here it will be the fourth system in a network of six. It will take care of order entry and inventory applications in the customer's regional distribution center, and transmit data to central 2026. There the data will be passed to an HP 3000 system which will handle the major processing load in the network, generating invoices and administrative reports and maintaining backup copies of regional product, customer, inventory, and open-order files.

The 19702A Option 10, which replaces the standard 7905 disc drive with the 50 Mbyte 7920, went on the Corporate Price List January 1, 1978. U.S. price for the option is \$4200. Early indications are that it's going to be a popular option!

Getting Zapped? (. . . Lightning and Communication Lines)

By: Larry Hartge/GSD



Are your customers having problems with lightning induced noise on their communication lines? If your customers are in the Colorado, New Mexico, Arizona or Northern Florida areas (the lightning intensity peaks in the U.S.), they undoubtedly are!

Regardless of where your customer is located, Lightning Elimination Associates of Downey, California (Phone: (213) 923-1268) may have the solution to your customer's problem. In addition to providing a consulting service, they produce the following products:

- Transient Eliminators: Prevent passage of unwanted electrical disturbances on signal lines (e.g., phone lines).
- Surge Eliminators: Prevent passage of unwanted electrical disturbances on power mains (e.g., to power supply of 3000).
- Lightning Warning Systems: Give warnings that lightning may strike.
- Dissipation Array Systems: Prevent lightning strikes in any protected area.

Our Lab personnel attended an IEEE presentation by the President of Lightning Elimination Associates and felt that those customers having communications line problems with lightning might consider purchasing the Transient Eliminators. The Transient Eliminators typically range from \$35 to \$70, and would be useful for protecting terminal (ATC) and data communication (SSLC, HSI) lines running around in the customer's site.

HP GRENOBLE NEWS

Sales Aids

All About OMR Characters and HP Printers

By: Alic Rakhmanoff Boise

Customers who want to implement turn-around document applications must know which options of HP printers are recommended with the HP 7260/61 Optical Mark Reader.

Each card of the continuous fan-fold stock is normally divided in three sections:

- An alphanumeric field where the line printer prints alphanumeric characters useful for the person using the card.
- A fixed data field containing binary code characters (also called "slug" or "block") characters. This binary code references the transaction to be made on the card, and is for computer data processing via OMR.
- A variable data field containing the boxes in which the user will record data with pencil marks.

Optical Mark Readers read rows of data with the same spacing as lines printed every other line by the printer (adjusted to standard 8 lines per inch). That is why OMR characters can be printed by printers on cards (using fan-fold continuous form) and then read by Optical Mark Readers.

All specifications to implement this kind of application are described in the brochure entitled "Form Design and Turn-Around Documents for HP Optical Mark Readers" (07260-90015).

The most important point is that the OMR character (■) is black enough, especially in the center, to absorb the light emitted by the Optical Mark Reader. That is why another character is not recommended because it usually isn't dark enough. The only way to replace the OMR character is to overprint 2 or 3 characters to form a black mark similar to the

OMR character. But some printers won't overprint. A good combination, for example, is to overprint left bracket, capital I, right bracket. With HP printers you can have the following possibilities:

- **HP 2613A/2617A/2618A**
These three printers can be ordered with the free option 002 (for 64 characters/drum) or free option 003 (for 96 characters drum) which gives the OMR character as octal 144 (replacing the backslash character). Character overprint can be done and sensitivity of the 7260 can always be adjusted if needed.
- **HP 2607A**
This printer ordered with option 001 has the OMR character as octal 177 instead of the rubout (or delete) character. To use the OMR character with this printer, the sensitivity of the 7260 must be adjusted and a good quality ribbon must be used because character overprint cannot be done.
- **HP 2631A/2635A**
These printers offer in the standard set the OMR character as octal 177 (instead of the rubout character). The usage of the compressed mode to print the OMR character combined with the overprint possibility gives an excellent, very dark OMR character. A good feature with the 263X is the possibility of adjusting the distance between the printing head and the paper. It enables the ribbon to be far enough from the fan-fold paper so it won't drag on the paper and leave smudged tracks that can be interpreted by the 7260 as marked data. A new release of the 263X interface will add a switch to accept or delete the OMR character according to the application. Also, when using the 263X linked to a 264X CRT, the OMR character can be used only if it is sent in binary, otherwise the data communication handler of the 264X will delete it. The best way to do this is to write a subroutine for the HP 3000 or to use the "binary write" instruction for the HP 1000 (see 2645 Reference Manual, page 4-4).

HP Boise and Grenoble offer you printers and Optical Mark Readers which are ideally matched for turn-around document applications.

7260A Optical Mark Reader with 2635A Printer: A Perfect Match

By: Alic Rakhmanoff/Boise



Customers who use cards for their stock control, production tracking or registration and need a printed report of

transactions will find the 7260A/2635A combination very attractive.

If the building where transactions are recorded is distant from the computer room, the HP 7260A can be used with half/full duplex modem and be connected to the 2635A printer. The two devices will use only one telephone line and enables the user to log-on, run programs, print reports from the 2635A, read cards and select invalid cards with the 7260A.

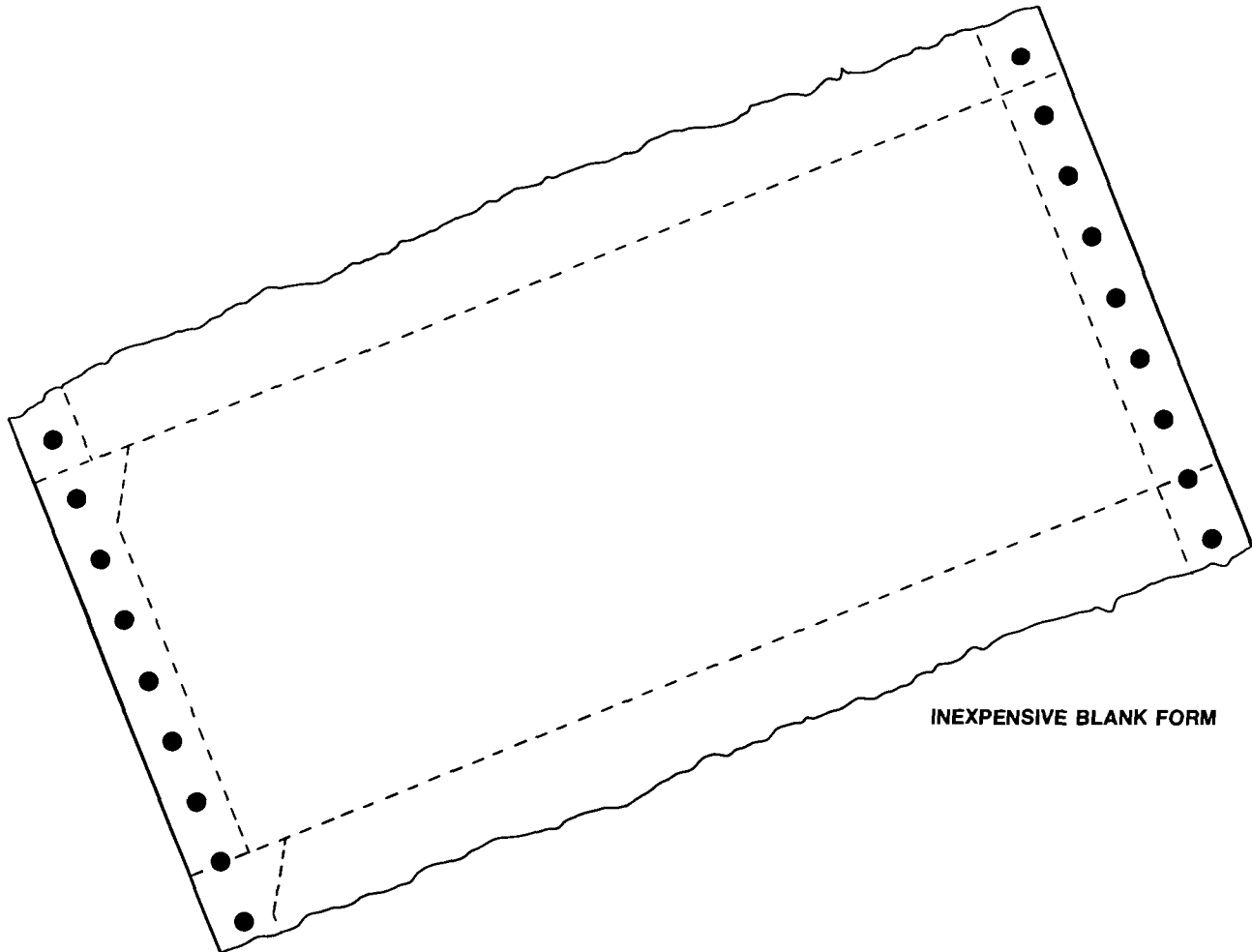
Your customers will have for only \$7,770.00 a perfect RJE station for HP 1000, HP 2000, HP 3000 or non-HP computers.

A Revolution for Setting up a Survey

By: Alic Rakhmanoff/Boise

How many times have people thought that it would be nice to do a survey on this or that subject? The cheapest way to do this is to mail response cards that can be marked with ordinary pencil. The cards are then read by an Optical Mark Reader and the computer printer gives complete results of the survey.

It looks good, but one of the main reasons why people don't do this very often is that for each survey, cards must be printed by a printing company which have clock marks (also called "timing", "format" or "strobed" marks) and marking boxes (in reflective ink). The position on the card, the number of clock marks and marking boxes are specific to each survey. The typesetting and printing of the cards contained in a fan-fold continuous form can be expensive and a long turn-around time can be asked by the supplier.



The new way of doing this is to use only blank fan-fold continuous form, print the clock marks and the marking boxes by the computer printer. Also, if the names and addresses of those surveyed are in a database on the computer, mailing address can be printed by the computer printer on each survey card. So by using window envelopes you don't have to print and stick mailing labels. Printing with the address a reference code (by using OMR characters) enables you to find the reference of each addressee in the database when cards are read by the OMR. The survey report can also show who has not answered or given results sorted by criteria relative to the addressee.

This is possible because the HP 2631A/35A printer can have the line spacing changed by program control to get 6, 8 and 12 lines per inch spacing.

To print OMR characters on the card, as data marks, 8 lpi must be used. But to print OMR characters as clock marks, the spacing from the last printed row (row 9 of the card) must be switched from 8 lpi to 6 lpi. Then in order to print data

marks on the next card at the right location a line must be stripped with the 12 lpi spacing.

The printing of one card will be as follows:

1. Set 8 lpi spacing.
2. Skip one line or print characters other than OMR characters (not read by OMR).
3. Print one line, including OMR characters if needed (pencil marks on this line).
4. Repeat steps 2 and 3 eleven times (for the 12 rows of the card).
5. Set 6 lpi spacing.
6. Print one line with OMR characters (for clock marks).
7. Set 12 lpi spacing.
8. Skip one line.
9. Repeat steps 1 to 8 for next card.

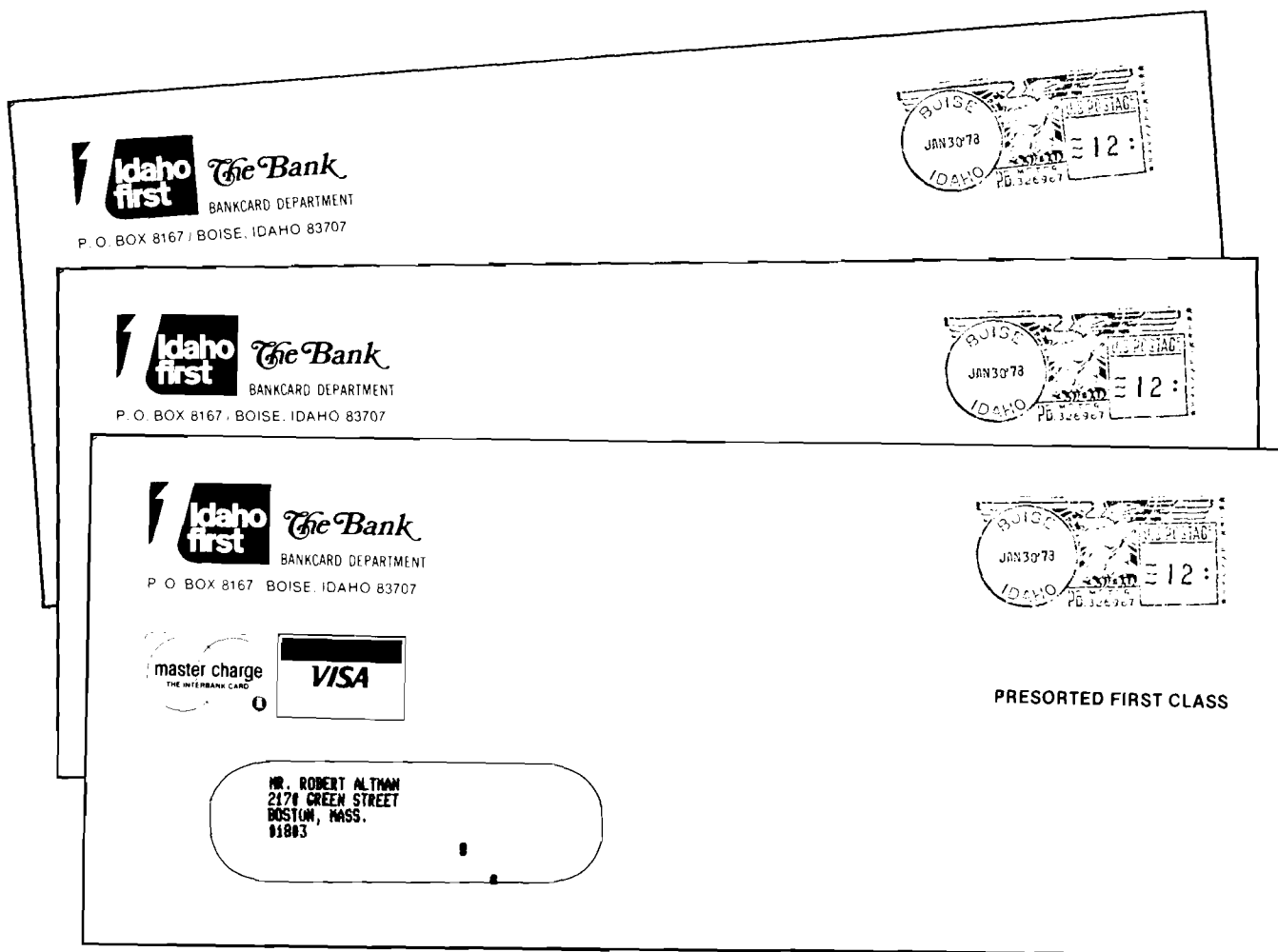
The diagram shows a fan-fold survey card with several sections and instructions:

- Top Section:** "PLEASE MARK ANSWERS BY FILLING BOXES WITH A #2 PENCIL" followed by a row of four small circles.
- Survey ID:** "SURVEY #28" (appears twice on the card).
- Recipient Address:** "MR. ROBERT ALTMAN
2174 GREEN STREET
BOSTON, MASS.
01843"
- Product Quality Section:** "PRODUCT QUALITY:" followed by four options: "EXCELLENT ()", "GOOD ()", "AVERAGE ()", and "POOR ()".
- Service Section:** "SERVICE:" followed by three options: "GOOD ()", "AVERAGE ()", and "POOR ()".
- Purchase Section:** "PURCHASE:" followed by two options: "CASH ()" and "CHARGE ()".
- Bottom Section:** "PLEASE MARK ANSWERS BY FILLING BOXES WITH A #2 PENCIL" followed by a row of four small circles.
- Bottom Right:** "FORM PRINTED BY A 2631A"

The card features a series of circular OMR marks along its right edge and a dashed line indicating the fold.

The marking boxes can be made, for example, by printing left and right bracket characters. Those 2 characters won't be read by the OMR because only a very small area (same length as the clock mark) in the center of the marking box is scanned by the OMR. This is why the compressed mode and the overprint must be used to print OMR marks (see accompanying article "All about OMR character and HP Printers".) Clock-on-data-only can be used with these marking boxes.

A program, (asking a number of questions along with text of each of them), can be made enabling one to do as many surveys as needed for an extremely low cost and using only regular blank fan-fold continuous forms.



READY TO MAIL

This method can also be used for test scoring, metering, production tracking, stock control and etc.

If you have any questions on how to implement this application, give me a call.

HP 726X Optical Mark Readers and HP 263X Printers make life easier.

SELL THEM!

CS GROUP NEWS

CSG News

Fort Collins Division Joins CSG

By: Doug Chance/CSG

The following COMGRAM was sent on February 6th to all CSG Factory Managers, Calculator and CSG Regional Managers, Area Managers, District Managers and National Sales Managers:

AS YOU KNOW, WE HAVE HAD TWO MAJOR PROJECTS UNDER DEVELOPMENT IN THE COMPUTER SYSTEMS GROUP AND THE CALCULATOR PRODUCTS GROUP. AFTER CONSIDERABLE THOUGHT, THE COMPANY HAS CONCLUDED THAT, IN ORDER TO ACHIEVE AN EFFECTIVE USE OF COMMON RESOURCES AND TO INSURE COMMON STRATEGIC DIRECTION, THE FORT COLLINS DIVISION SHOULD MOVE INTO THE COMPUTER SYSTEMS GROUP AND REPORT TO PAUL ELY.

TO INSURE THE CONTINUED STRONG TIES OF OUR FIELD SELLING PROGRAM TO THE GROUPS, WE HAVE DECIDED TO MOVE THE COMMERCIAL CALCULATOR SPECIALIST AND APPLICATIONS ENGINEERS OVER TO CSG SALES ORGANIZATION.

WE WILL BE WORKING CLOSELY WITH NATIONAL, REGIONAL AND DISTRICT SALES MANAGERS TO INSURE AN EFFECTIVE TRANSITION IN A MANNER THAT HOPEFULLY MATCHES WELL WITH PERSONAL GOALS.

WE ASK YOUR HELP TO MAKE SURE THAT WE CONTINUE TO PROVIDE EFFECTIVE SUPPORT OF OUR CUSTOMERS DURING THE CHANGE.

DOUG CHANCE/CSG AND
BOB ROGERS CPD

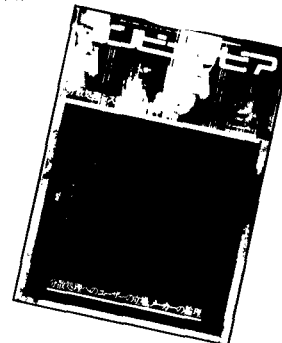
We're looking forward to working with the Fort Collins gang, both in the factory and in the field.

WELCOME ABOARD, FCD!

YHP News

Computopia Features HP 3000 At Matsushita

By: Masaaki Tagami/YHP



The February 1978 issue of *Computopia* (published in Japan by Datamation) ran a feature article on Distributed Systems.

Included in this issue was a description of the HP 3000 Distributed System installed in the Stereo Group at Matsushita Electric Co.

Prior to buying the HP 3000, the Stereo Group had been using an outside computer service which they had found to be very expensive.

Their buying decision was based on five main factors:

1. To have better cost/performance than an outside service
2. To offer TSS
3. To connect to a graphic display or a plotter
4. To have a DBMS
5. To communicate with an IBM mainframe

There were several competitors for the sale, including DEC and Data General. Only the HP 3000 could satisfy all five of Matsushita's needs.

Our YHP sales force has been using this article to good advantage.



TSS利用を基本にしたM社の分散処理システム

〈ケース・スタディ6〉

分散処理システムといえば、常識的にはビジネス・アプリケーションが想定される。つまり、これまでの事例でみてきたようにビジネス・データ処理がその典型的なアプリケーションとなっている。しかし、大学、研究機関等では科学技術計算や問題解決型の処理が主流となっており、この分野で分散処理システムが志向されるとすれば、これまでみてきたビジネス分野とは、やや異なった形のシステムが実現されることが予想される。ここで

とりあげるM社（電気機器メーカー）のシステムは、こうした科学技術計算、問題解決型の処理を中心においた分散処理システムのよい例であると考えることができる。M社は各事業部ごとに完全独立採算制がとられており、計算機利用に関しても各事業部独立の方針が採用されている。たとえば、1つの事業部がほかの事業部の計算機を利用する場合、その扱いは外部計算センターを利用するのと何ら変わらないという徹底した独立制を採用して

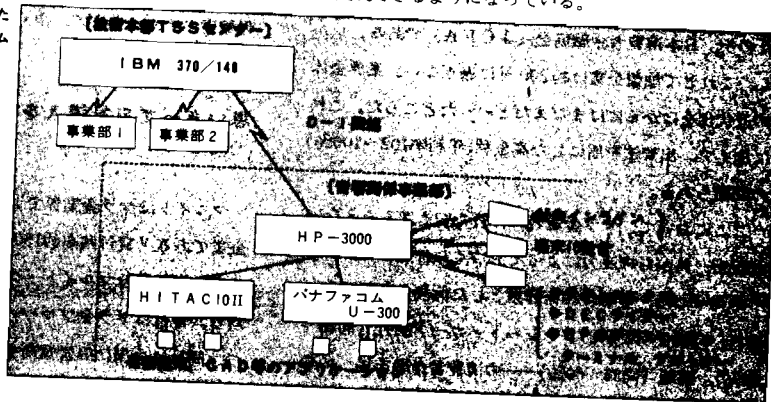
COMPUTOPIA 1978-2

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ミニコンは以前からCAD等のアプリケーションで使われていた。同事業部のTSS利用の90%はHP-3000で処理されており、RJEのみをセンター・マシンIBM370/148に依存する形をとっている。処理コストは、現在の処理量で前と同じであるというから今後処理量が増えるにしたがい、コスト・パフォーマンスが改善されてゆくことになる。

同社の場合、機種選定の理由としては次のようなポイントがあげられている。①外部サービス利用から、独自運用に切り替える上でコスト正当化ができるような適正な価格システム（ミニコン）、②TSSができること、③グラフィック・ディスプレイ、プロッター等のインタフェースが容易であること、④DBMSが完備していること、⑤ホスト接続が可能であること。こうした観点から

図6 TSS利用を基本にしたM社の分散処理システム



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Le Trait d'Union

Le HP 3000 Série II constitue le trait d'union entre le petit système informatique et le gros ordinateur central.

Resoudre encore le vide existant entre ces deux systèmes est un problème. Pour les petites et moyennes entreprises, le coût du gros ordinateur est prohibitif et cependant la nécessité de gérer les travaux par lots est de plus en plus importante. Le HP 3000 Série II répond à cette exigence. C'est un système universel et rapide, il peut fonctionner simultanément plusieurs modes de traitement. Et cependant son prix correspond à celui d'un ordinateur nettement moins puissant.

La clé: un système d'exploitation polyvalent.

Notre modeleur de multiples priorités permet une utilisation simultanée des ressources du système. Pendant l'exécution des travaux par lots, plusieurs utilisateurs peuvent dialoguer avec l'ordinateur en temps partagé à partir de ses terminaux locaux ou éloignés. Le système dispose d'une mémoire centrale qui permet d'exécuter de longs programmes.

Il peut aussi gérer, de façon relativement petite, des applications par lots, couvrant au maximum 1000000 octets, et développer un programme interactif sous 20000 octets, en utilisant notre éditeur interactif qui permet d'effectuer en traitement par lots des tâches complexes.

Gestion de base de données: un autre avantage du "gros ordinateur".

Le système INACL 3000 qui constitue notre système de gestion de base de données pour le HP 3000, vous permet de créer et de gérer une base de données. Et notre langage d'interrogation interactif SQL ERY à base de mots anglais vous permet d'accéder facilement à la base de données. Vous pouvez établir des états, faire des mises à jour, à la demande sans écrire de programmes et même mettre à jour des données.

Le système d'exploitation admet tous les langages de programmation et de développement de programmes de haut niveau de programmation, des tableaux, des fichiers et des bases de données.



Exploitation des données brutes. Le système HP 3000 permet de gérer des données de façon interactive.

Prise en charge de gros problèmes de gestion par un petit ordinateur.

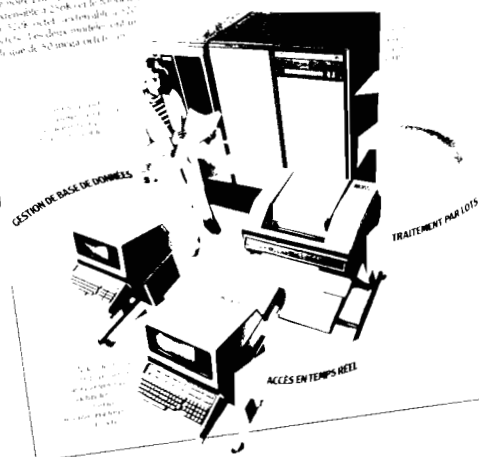
Le HP 3000 Série II a conçu pour résoudre simultanément les problèmes de gestion par lots et de gestion interactive. Le système dispose d'une mémoire centrale de 256K octets et de 128K octets de mémoire tampon. Les données sont stockées sur des disques de 80 mégabits.

Le système dispose d'une mémoire centrale de 256K octets et de 128K octets de mémoire tampon. Les données sont stockées sur des disques de 80 mégabits.

Les composants du système sont fournis par Hewlett-Packard. Toute configuration peut être complétée par des cartes d'imprimantes, lecteurs de cartes et de perforateurs de données, de demandeurs de données et de lecteurs de données.

Progrès technologiques: vitesse et fiabilité.

Le processeur central du HP 3000 travaille à la vitesse maximale, même dans le cas d'un accès à la mémoire centrale de 256K octets. Le système dispose d'un correctif automatique de la mémoire et d'un test de la mémoire. Le système est conçu pour fonctionner de façon fiable et durable. Le système est conçu pour fonctionner de façon fiable et durable. Le système est conçu pour fonctionner de façon fiable et durable.



HEWLETT **hp** PACKARD



COMPUTER SYSTEMS NEWSLETTER

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