

# data systems newsletter

For HP Field Sales Personnel

FRANKFURT HEWLETT  PACKARD  
REINHARDT HELMUT

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1975

## DIVISION NEWS

### YHP REVIEW '75

by Kai Wu

YHP Review '75 was held in Tokyo, Japan, during the last week of May. It was attended by Messrs. Bickell, Doolittle, Negrete, Newman, Packard, Terry, Weindorf, and Young representing HP Corporate and Groups. Computer Systems Group was represented by Group Marketing Manager, Ben Holmes. Ben also spent a day at HP Taiwan reviewing its computer sales situation.



YHP sales review at Tokyo sales office. To the right of Mr. Packard are John Brown, Vice-President of YHP, and Matsuji Tezuka, YHP CSG Sales Manager.



John Young and Ben Holmes review computer systems sales. District Manager Mikuni (making presentation) and Takagi (seated).

Company Private

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Young and Holmes visit Tokyo sales office. From left to right: Messrs. Seki, Sato, Mikuni, Takagi, Young, Holmes, Ueda, Dunn, Muraoka, Tezuka, Wu, and Itoh.

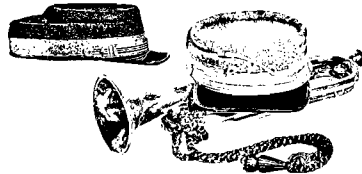
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Meeting at HP Taipei Office. From left to right: Messrs. Lok Lin, General Manager of HP Taiwan, Holmes, Robert Liu, Field Engineer, and Wu.

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## SALES DEVELOPMENT SUPPORT FOR THE SOUTHERN REGION



by Doug Hanson

The Sales Development Team for the South is now in full operation. With *Bob Hoke* now managing the Neely Sales development team, *Dave Bowers'* departure and *Ron Grace's* move to Mountain View to implement the REMICS system, the South has had to cope with several personnel changes at Cupertino over the past couple of months. We still have a secretary to hire to support both Neely and the South, however, we have firmed up the following responsibilities.

**Stu Kagan** who was a Field Engineer and, more recently, an SE for Neely, will be supporting the teams headed by *Dick Roberts* and *Ken Ferguson*. *Stu* has a strong 9600 background and will be offering his product expertise to support special 9600-oriented programs throughout the region. *Stu* was also in the factory prior to joining Neely, so he knows the ropes and will be able to get things done.

**Don Darms**, who has come to us from the CE 3000 group will be working with the teams headed by *Dennis McGinn* and *Ralph Godfrey*. *Don* also will be supporting the 3000 programs throughout the region. Having managed the Cupertino Data Center and 3000 CE Support Groups, *Don* has a lot of experience in getting things done at the factory.

I will be managing the Regional Sales Development effort for the South and supporting the DOS and 2000 access programs. We look forward to a good third quarter and an even better second half.

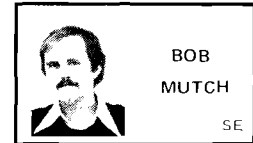
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# SALESMEN'S CORNER

## FURTHER EXPLOITS OF THE MIGHTY 3000 VS THE NEWCOMER 11/70

by Bob Ingols

Because of the well-organized efforts of *Sherif Alaily*, DM in Montreal, and *Bob Mutch*, SE in Dartmouth, we have sold a 3000 system to College of Cape Breton for both administrative and instructional use. They'll be running COBOL, RPG, FORTRAN and BASIC.



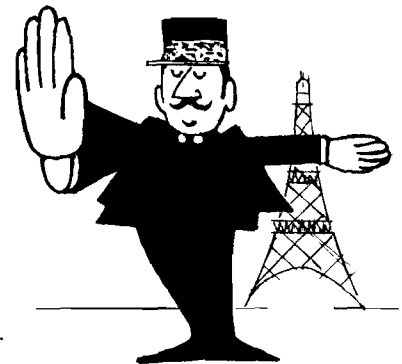
Significantly, we were able to win against the 11/70 and its planned IAS operating system. Initial sales activity convinced the customer of the need for a true multiprogrammed, multilingual, multiaccess machine. DEC promised that IAS would fill this need. The wise customer insisted on a visit to Maynard to run a benchmark.

He then went down to Rockville for a day of running his benchmark. This exercised the 3000 first in batch mode, then concurrent batch and timeshare, using four languages and a good job mix.

Sell with confidence and integrity. The 3000 is tops ... TODAY!!

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## 9600'S FOR AIR TRAFFIC CONTROL



by Gunther Kloepper

*Daniel Roman* of HP Paris recently closed one of the largest European 9600 deals ever. The order, in excess of \$200K, came from Eurocontrol, the European Air Traffic Control Authority. A 9700 Central will coordinate the activities of three 9640 satellites which in turn will each display flight data to controllers on 8 Telefunken light pen displays. Congratulations to *Daniel*, and thanks to the Boblingen SE team for their work in demonstrating the interfaceability of the Telefunken display. Great teamwork!

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## FIFTH 3000 FOR ALAN NONNENBERG!

by *Hugh Amick*

*Alan Nonnenberg* (Fullerton) recently sold a HP 3000 to the College of the Desert in Palm Desert, California to bring his total HP 3000 sales to five. This sale places him in a tie with *Denis Ferland* (St. Louis) and *Phil Maguire* (Santa Clara) as the most successful HP 3000 Salesman worldwide.

College of the Desert is a 2-year community college located 10 miles from Palm Springs. The College draws 12,000 students from several thousand miles of virtual desert.

As is common in educational accounts, the customer was seriously constrained financially which led to a battle of used computers. *Alan* and the 3000 competed successfully against a used Xerox Sigma 6 and a used DEC 10.

The HP 3000 will be replacing an IBM 360/20 for administrative applications and taking some of the load off an IBM 1130. The College has ordered several 2640A terminals to be placed in administrative offices to do student registration and accounting. In the near future, the College plans to add business budgeting and accounting to complete the administrative functions on the HP 3000.

This sale about polishes off *Alan's* sales quota for this year. Successes earlier this year at Kaiser, Microline, Sunkist, Riverside Community College, and San Bernardino Water District make this a great year for both *Alan* and Data Systems.



*Tom Bailey* (DM/left) wondering "Would you buy a 3000 from this man?" . . . *Alan* (obviously a card himself) replies "Why not?"

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## SUCCESS THROUGH ACCESS

by *Bob Ingols*

This is the look of a happy team just after closing the FIRST two HP 2000/Access Systems Model 30 (with 7905 disc drives) orders in April

The two systems are scheduled to be installed at College

St.-Laurent and John Abott College in the Fall. These colleges are part of Quebec's educational network run by SIMEQ (Service Informatique of the Ministry of Education of Quebec). The network is made up of two IBM 370/168's with our 100 RJE terminals (Type: Data 100) connected to them.

In June we obtained 2000 Access orders from two other schools in the SIMEQ "umbrella:" Universite of Sherbrooke and College Bois de Boulogne.

Main competition was DEC 11/40 and ECLIPSE, but HASP-TSB-ASCII files and the 2640A proved to be a winning combination. *Michel* hopes that these colleges and College Ahuntsic, presently a Beta test site for ACCESS, will be a launching ground for reaching more than twenty-five colleges in the network.

For those interested, J.A.C. will be running CIS/2000 for their Fall registration.

We're looking forward to more sales success from THE TEAM.



Computer  
Museum

From left to right: *Sherif Alaily*, DM; *Michel Girard*, FE; and *Rich Noble*, Analyst.

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## PRODUCT NEWS

### EXTENDED ENVIRONMENTAL TESTING FOR 21MX COMPUTER

by *Rich Ferguson*

Data Systems Division lab has recently concluded a series of environmental tests that go well beyond the Class B environmental specifications for the 21MX computer. These tests included such things as RFI/EMI, temperature/altitude, humidity and line frequency variations for power supplies and shock and vibration. These tests were designed to explore the ultimate capabilities of the 21MX design. Included in the report are recommendations for some minor modifications to improve the environmental performance of the MX. For those sales situations that require hostile environments, you can obtain a copy of the report from your Sales De-

(Continued on page 4)

## EXTENDED ENVIRONMENTAL TESTING FOR 21MX COMPUTERS - (Continued from page 3)

velopment contact. Please note one thing, that the information contained in this report is not to be construed as a warranty or guarantee of any kind for computer performance but this should be helpful in determining whether or not the MX computer will be suitable for a specific application that involves a hostile environment. Also, warranty may be affected if the customer elects to perform modifications himself, so call your sales contact for details.

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## 9600'S HAVE RECORD MONTH!

by *Dave Sanders*

The 9600 line had another all-time record sales month in June. At Cupertino we sold 28 systems, which is more than we've ever sold at any U.S. facility. And that doesn't even count Europe or Japan.

Our new GSA contract, coupled with the close of the U.S. Government fiscal year, was one of the big contributing factors. Another is that new-found optimism about the economy is starting to break loose capital funds that have been on hold in recent months.

All the economic indicators are starting to turn around, and the prospect of increased capital spending in manufacturing industries in the fourth quarter is an especially good sign for 9600 sales. As the economy improves, many firms will start to increase their capital equipment rather than re-hire some of the workers laid off last year. Since 9600's represent our highest potential product for factory automation, now is the time to start thinking about 9600's.

The 9600 team at the factory wants to help. Call Sales Development if we can help you SELL 9600's.

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## DISCU/15 — TURNING IT ON!

by *Vijay Kapoor*

For starters, we now have a DISCU ad. If you missed it in a recent issue of Electronic News, you'll see it in the leading computer magazines in the coming months. If the 2640 ad success is any indication, this one should prove an equally valuable lead getter. Besides, we are putting our image across as a premier mini disc supplier.

### A SUCCESSFUL FIELD TRIP WITH DISCU

Stan McCarthy from the Lab and I recently completed a successful field trip to the East Coast, demonstrating DISCU to 6 prospects. We used a 30" high HP cabinet built with a special transparent top to include the computer, 7905 and the SCU (see photo). The disc diagnostic was stored on the fixed disc — this way we didn't have to carry a photoreader;



a 2640 was borrowed from each of the local offices. We carried the equipment in a station wagon and drove to Boston, Paramus and King of Prussia for our customer visits. The ability to wheel the box in, bumps over stairs and all, plug it in and have it instantly run actual diagnostics was impressive to say the least. So much so that three out of the six companies we visited are excellent immediate prospects. The other three look good for a longer term. Two talked about interfacing DISCU to the PDP/11 line. Sound interesting? Contact us for more details.

### DIRECT MAIL — OR HOW WE ARE TRYING TO GET YOU MORE PROSPECTS FOR DISCU

Our next field trip is to the Florida area next week. This time, however, in addition to taking the hardware to a few customer locations, we are conducting DISCU seminars in three cities: Orlando, Miami and Tampa. Using the mailing list from T.I.D.S., invitations have been sent out to roughly 1000 people throughout Florida. Included were a preview of product introduction — otherwise known as an ad reprint, data sheet and a cover letter. If successful, we'll be glad to assist you in making similar local mailings using T.I.D.S. We have membership to T.I.D.S. for the balance of this year, resulting in reasonable mailing charges. You can check specific categories of prospects, and do it by zip code. This way, you can conduct a test mailing, before you go all out.

Finally, slide tests are available to give a pitch on the 7905, all this from the Peripheral Marketing Team, the same folks that brought you the 2640 . . . .

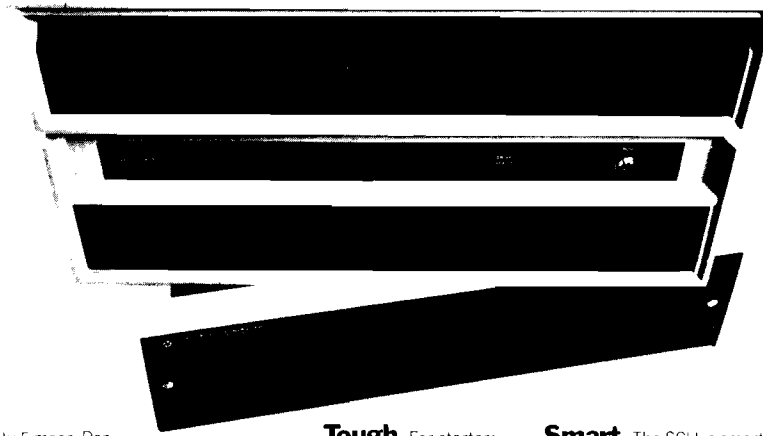
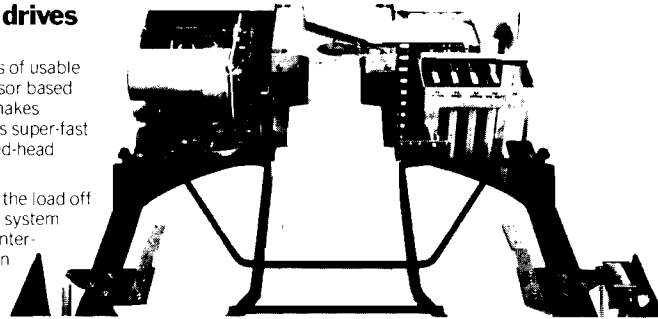
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# Hewlett-Packard Introduces: DISCU/15 for OEMs. Fast. Tough. And Smart.

## A new concept in disc drives especially for OEMs.

DISCU/15 combines 15 megabytes of usable disc capacity with a micro-processor based Storage Control Unit (SCU). This makes possible a moving head disc that is super-fast and rugged enough to replace fixed-head discs and drums.

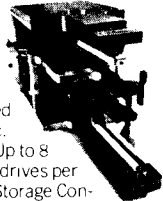
And it's smart. The SCU takes the load off your processor to make the entire system faster. Plus it's designed for easy interfacing, something OEMs have been waiting for.



**Fast.** Track to track in only 5 msec. Random average is 25 msec. The only 3600 RPM cartridge drive. Transfer rate is 937 kilobytes. More capacity in a cartridge: 10 megabytes of removeable storage and 5 megabytes on the fixed disc.



Up to 8 drives per Storage Control Unit give you ample capacity when you need it.



**Tough.** For starters, a rigid, precision-milled 40 lb. casting really stands up. An integrated spindle and DC Motor eliminates belts and pulleys. And it's designed for use on the open manufacturing floor. A separate blower keeps contaminants out even during cartridge change. The only cartridge disc using track following technology for outstanding reliability. The result: DISCU/15 guarantees interchangeability within the most severe environmental specs available in commercial discs. Easy service too. Even major sub-assemblies are modular for easy replacement. The only equipment you need for major servicing (including head alignment) is a compact Disc Service Unit.



**Smart.** The SCU is smart enough to be called a minicomputer. Here's what it gives you: multi-CPU capability. Error correction for up to 32 bits per sector. Track switching transparent to processor. Rotational Position Sensing. Command Retry. Plus, a high level interface for quick integration. That means you save time, money and headaches. For all the details, call your nearby HP field sales office.



**HP Discs.**  
They work for a living.

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Sales and service from 172 offices in 65 countries  
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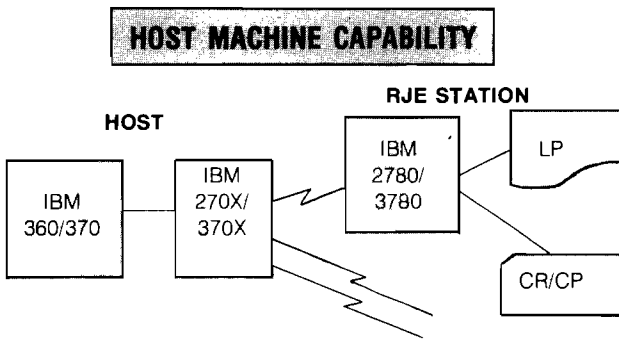
This Advertisement will first appear in ELECTRONIC NEWS, June 23, 1975

# WHAT'S THE DIFFERENCE BETWEEN 3000 ↔ 370 AND 3000 ↔ 3000 COMMUNICATIONS VIA 2780/3780?

by Jean Toth Kelley

Yes, there are differences! 3000 ↔ 3000 com is a subset of 3000 ↔ 370 communications capability via 2780/3780. The 3000 ↔ 3000 com has the same capability as 3000 ↔ RDTS. The following information taken from SE note #214 by Jim Willits outlines HP's capabilities that are here today.

## Sell HP communications!

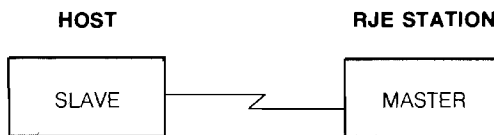


A "host" computer in a communication network implies an operating system ability to:

1. receive jobs from a remote input device
2. execute the jobs as if received from a local batch input device
3. send job listings to a remote output device after job completions
4. optionally service special commands sent from the remote which may control or request status of jobs previously submitted.

## RJE, REMOTE JOB ENTRY

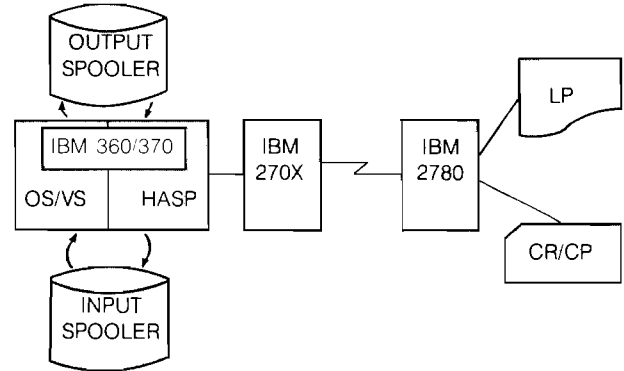
RJE refers to the capability of transmitting jobs and receiving job output between a host computer and a remote terminal (i.e. RJE station) as if the remote card reader/printer were "local," i.e. no additional commands or control cards required!



The host is "driven" by the remote RJE station because it must be ready to:

1. receive jobs or commands when they are input from the RJE station or
2. send completed job listing (if available) or command responses when the RJE station goes into receive mode.

The state of the communication line is either Host transmitting or Host receiving and is dictated by the IBM 2780/3780.

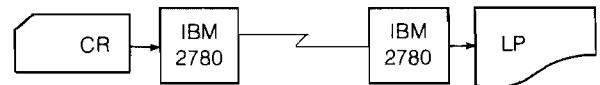


An example of a host computer is an IBM 360/370 running an OS/VS operating system using HASP for control of the communication with the remotes. HASP must service all communication lines as well as interface with the operating system OS/VS. HASP places jobs received in the input spooler and sends job listings in the output spooler to the appropriate RJE station. HASP also recognizes special commands received from the RJE station and takes appropriate action e.g. killing a waiting job.

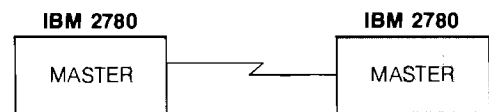
## IBM 2780/3780 CAPABILITY

The IBM 2780/3780 has the capabilities of:

1. Remote Job Entry to a host (described previously)
2. File Transfer to another IBM 2780/3780.



The file transfer capability allows a 2780's input file to be sent to a remote 2780's output file.



The IBM 2780/3780 does not have the intelligence of a host and is manually put in send mode or receive mode. It is this file transfer capability of the 2780/3780 that exists between 3000 ↔ 3000 and 3000 ↔ RDTS.

## HP's 2780 EMULATOR CAPABILITIES

HP has several 2780 Emulators which have about the same capabilities as the real IBM 2780. They are:

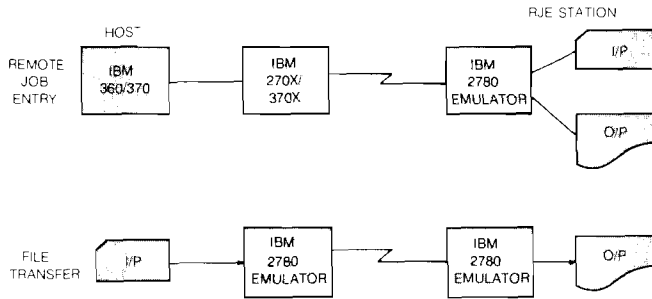
- HP 3000 -- 2780 Emulator, 30130
- RTE -- 91780 RDTS
- HP 9830 -- 11285A Data Comm and Batch Terminal Package
- BCS -- HPRJE

(Continued on page 7)

“ WHAT'S THE DIFFERENCE ” - (Continued from page 6)

Each Emulator has the:

1. Remote Job Entry Capability to a host
2. File Transfer Capability to an IBM 2780 or 2780 Emulator



**HP does not have a host capability for any of its CPU's. This means that an RDTs or 9830 cannot be used for RJE to a 3000 but they can do file transfer to the 3000.**

Some SE's have asked why the file received by the 3000 couldn't be a 3000 job and be streamed by a following STREAM Command. This is certainly possible, but there is no way to get the job output (\$\$STDLIST) back to the remote 2780 after the job has been run. The point is, the 3000 does not have the full host capability. Remember also, a host must be able to send or receive depending on the mode of the 2780. The 3000 2780 Emulator is strictly command driven and has no intelligence for selecting send or receive mode.

This is the first in a series of articles relating to "what's here today" with HP Distributed Processing.



## CABINETS: 2860'S AND 29400'S, ETC.

by Jerry Kleinberg

There are many questions regarding the HP cabinets. What is a 2860 cabinet? What is a 2940XB cabinet? What is the difference between the two? Why do we have two cabinet lines? This article will answer questions and give you some additional information to help you *sell cabinets*.

*First*, what are the 2940XB Series cabinets? The 29400B Series cabinets are the present day version of the long-existing HP Corporate cabinets. In 1969, they were the responsibility of the Palo Alto Division (PAD). They were transferred to HP Manufacturing Division in 1970. The model numbers in earlier times were 2940A, 2940B. In June, 1972, the model numbers were changed to five digit 2940XA/B. This was done to incorporate more configuration definition within the basic model number, such as height and number of bays. Previously, with the 2940A/B, the options designated the configuration. The differences insofar as structure were minor. The suffix A represents "old" HP standard colors. The "B" means new (current) HP standard colors. The product line now is the 2940XB Series. The product line started as, and remains today, an all aluminum, sturdy, dur-

able yet lightweight, general purpose equipment enclosure designed to mount 19" EIA rack instruments.

In 1975, the 29400B cabinet line and associated accessories were transferred to Data Systems Division and are manufactured at the Data Systems Mountain View facility.

The primary objective of this product line is to provide an equipment enclosure made by HP, to HP standards, for HP equipment.

An important point to remember is that the 2940/29400 A/B cabinets that HP has sold for many years are all basically the same structure. The changes over the years are colors as noted above, the power control system options, and the anti-tip Base options.

*Second*, What is a 2860 cabinet? A little more history will help. In late 1973, Data Systems needed a system cabinet with a more elaborate power control system than the power control system options available on the 29400's from HP Manufacturing Division at the time. These cabinets were needed for the 3000 type systems. A power control system was needed to conform to industrial requirements and standards such as U.L. Since this requirement was specialized for Data Systems, the power control system was developed at Data Systems rather than Manufacturing Division. The cabinet, with this new power control system, would also be sold by Data Systems rather than Manufacturing Division. Thus, the 2860 was born.

The 2860 cabinets are basically "subsystems" made from 29400 cabinets with the Option 001 base extension, and the Data Systems developed power control system. For example, the 2860D cabinet is actually a 29404B plus Option 001 and the DSD power control system installed. The colors are the same (moss grey/mint grey). On the 2860 cabinets, the black ID strip at the top has the HP logo plus "2000 Data System" lettered in white. On the 29400 cabinets, the ID strip just has the HP logo. Also, the lifting eyebolts (on top) and the instrument support rails are not included in 2860 cabinets, whereas in the 29400's they are supplied as standard.

What about this fancy power control system on the 2860's? The power control system in the 2860 cabinet performs the same basic functions as the power control systems available in the 29400's. That is:

- a. Provides a single input terminal for Main Power (single, split, or 3 phase)
- b. Provides system voltage control (on/off switch)
- c. Provides overcurrent protection
- d. Distributes AC power to power strips within the cabinet
- e. Provides cooling system

(Continued on page 8)

**CABINETS: 2860'S, 29400'S, ETC. . . .**  
 (Continued from page 7)

The 2860 power control system performs the above functions PLUS:

1. provides AC line filtering
2. handles more current than 29400 power options (30 amps per phase vs. 20 amps)
3. provides for later expansion w/o buying an entire power control system in each separate cabinet
4. U.L. recognized component
5. EMERGENCY OFF switch instead of ON/OFF switch.

The 2860 cabinets are modeled and optioned to provide cooling fans, power strips and either an add-on power system or a complete power control system. For example, the 2860B with Option 001 has a complete power control system. The 2860B standard has a power unit that connects electrically to an adjacent bay, *not* AC source power. Thus, the single bay 2860's (2860B, 2860C) can be add-on bays or master bays. A master bay is one having the power control system and emergency off switch on the front. The 2860 double bay cabinets (2860D, 2860E) have a complete power control system (master-bay) in the right-most bay viewing from the front. Figure 1 shows the combinations of master and add-on bays possible.

**What Should the Customer Buy!** A number of considerations come into account on this question. The first consideration is what the customer is planning to do. There are three basic situations:

(Continued on page 9)

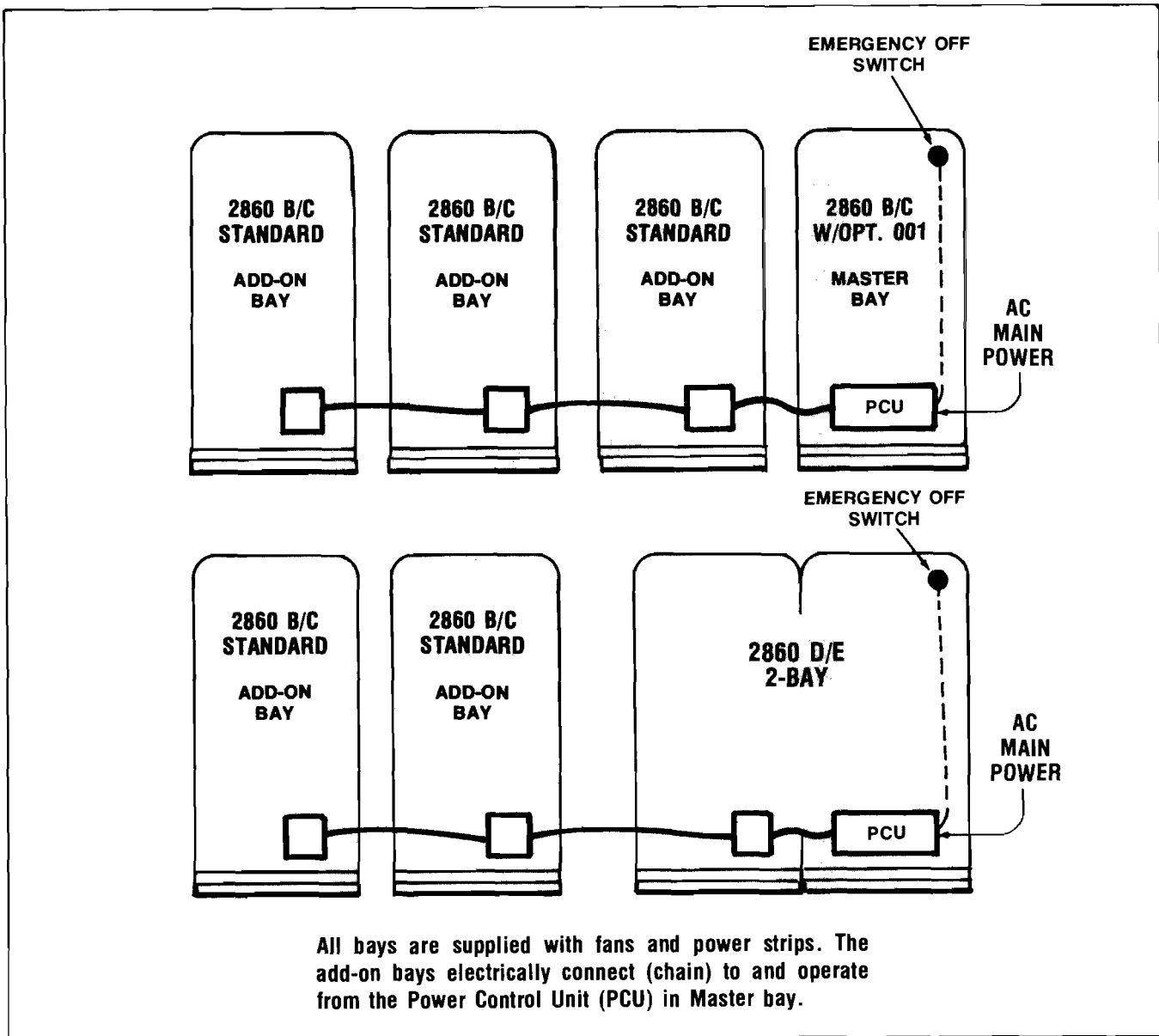


FIGURE 1



**CABINETS: 2860'S, 29400'S ETC. - (Continued from page 8 )**

1. Expanding an existing system — 2860 cabinets in use.
2. Expanding an existing system — 29400 cabinets in use.
3. Starting a new system — no existing cabinetry.

In the case of 1 and 2 above, the following guideline applies:

**Expand 2860 systems with 2860's**  
**Expand 29400 systems with 29400's**

In the preceeding, we have said that the 2860's and 29400's are essentially the same except for electrical systems and possibly the type of anti-tip base extension, but it is the difference in electrical control systems that make 29400's and 2860's non-mixable.

The *standard* 2860 single bay cabinets are configured for the purpose of being added to an existing 2860 cabinet. See *Figure 1*.

In the case of 29400 cabinets, expansion of existing 29400 systems is accomplished differently than with 2860's. When an additional 29400 cabinet bay is required for system expansion, it must have its own power control system and its own AC power input. This has some disadvantages in that the additional cabinet then has its own power switch and two switches have to be activated in order to shut the system down. This problem can be solved however if the customer has a main switch box wired in to control both AC power circuits going to the cabinets. An advantage of this configuration is that considerations as to the "vintage" of the power control system in the original cabinet are not necessary since the added cabinet has its own power system.

Note: System cabinet expansions as discussed thus far will not necessarily apply to defined systems shipped by Data Systems or other HP divisions. Many defined system configurations entail special modifications to cabinets to accommodate peculiar needs which may preclude use of standard 2860 or 29400 cabinets. Always check with the sales group of the responsible division before quoting cabinetry expansions on defined systems.

**Starting a New System.** For the customer who desires purchasing a cabinet and other rack mounted devices — what does he use for cabinetry?

The choices are, of course, 2860 Series or 29400 Series. The differences are as mentioned above — the power control systems and possibly the base configuration. The 2860 Series has, as standard, the extended base (same as Option 001 on the 29400's). This is the familiar "front porch" base. On the 29400's, one can order this base or the new pull-out extender feet (Option 002). For the power control system, it is primarily a choice between filtered power control system or non-filtered. The 2860 cabinets have an AC line filter in the power control system. The 29400's do not.

We have found that many computer system devices are sensitive to line noise (computers, discs, mag tapes). Symptoms manifest themselves in parity errors or other mysterious occurrences often times blamed on the hardware itself. In many cases, the addition of an AC line filter cleared up the problem. This is the reason for using filtered power control in the cabinets used for most of the defined systems shipped by Data Systems. The 9600's are the exception.

For the customer buying cabinetry and components to build his own system, the best approach is to use a filtered power control system (2860 cabinets). When in doubt, use 2860 Series. Many customers, however, may have data on the quality of AC power in their facility. Others may not be so lucky. Making this determination involves a multitude of variables. Considerations as to what exists between the Public Power Company and the substation, then to the service entrance of the facility, then to the point of utilization within the facility; . . . and what other types of apparatus may share AC power from the same service entrance, are necessary to even guess at what kind of line power is available. Most power companies can assist their customers insofar as the line power quality at a given point of utilization and offer suggested remedies for high line noise levels.

For those customer sites where line noise has not previously been a problem, or is known to be low, the 29400 Series and its power options should suffice.

**A Word About Cabinet Bases.** Whenever instruments that swing out or pull out are mounted in a cabinet, an anti-tip base is an absolute must. The 2860 cabinets utilize the extended base configuration (front porch); whereas on the 29400 cabinets, the base can be plain (no extension) or it can have the new anti-tip pull-out legs (Option 002). There has been a certain amount of discussion over the new pull-out feet on the 29400 cabinets. As for appearance, this is purely a personal opinion; but as to function, there are some advantages in the pull-out legs. The pull-out legs provide a somewhat greater anti-tip force than does the front porch. This is because the point where the feet on the pull-out legs hit the floor is further out from the front panel of the cabinet than that where the casters hit the floor on the front porch base. Another advantage of the pull-out legs is that they can be retracted when the system is moved. How many stories have we heard about cabinets being totally disassembled in order to get through a 32" doorway? With the pull-out leg option and the legs retracted, the cabinet is 30" deep over-all!!

I hope this article provides a little more insight into our cabinet product line. Consider this article as a first in a series, with more to come.

The following is a summary of documentation available on our cabinets for those who thirst for more:

2860	Data Sheet	5952-4541
2860	Installation & Maintenance Manual	02860-90001
29400	Data Sheet (Soon to come!!)	
29400	Installation & Maintenance Manual	02940-90256

HEWLETT  PACKARD

## MX UPDATE

by *Bill Senske*

The 21XX Product Marketing Team has written a series of articles to bring you up to date on the current status of our product line's unreleased products. Below is a table summarizing the currently unreleased 21XX product line products which you presently have in the price list. A brief description of the project status is given.

PRODUCT ORDER #	COMMON PRODUCT NAME	BEST GUESS SHIP DATES	COMMENTS ON PRODUCT STATUS
2112A	Computer	9/15	In order to insure effective reliability of product, there are several long term tests in process by Q.A. These tests are designed to verify the environmental limits and MTBF data of our published literature.  First production runs are in process and units will be released for shipment when all Q.A. tests are completed as scheduled. Schedule calls for first customer shipments to begin on 9/15.
21XX	Processor Board	Released	New modifications being incorporated (early Sept) to help dynamic mapping work better are holding up the dynamic mapping project. Upgrades will normally be made in field to new (1520) processor boards when customer buys dynamic mapping. He will also be upgraded when he enters the blue stripe program with a broken board.  ROM floating point problems have been repaired. Exchange ROM Control Store boards are available. Letters are being sent to customers telling them what to do (see below) to affect a repair. A similar problem exists in the Disc ROM Loader.
2101	16K Memory	Obsolete	Never to be shipped. A 16K 2102 module will be shipped instead.
2102-016	Memory	October	\$3375 budgetary price set to minimize order retransmittals.
2125	DISComputer	Sept-Oct	Many conversions from 2124 to 2125 going on now. Because of shortage of 7905 drives, it may be in HP's and customer's interest not to start converting to 2125 until Jan-Feb 1976. Availability is going to go out fast.
12990	Memory Extender	9/30	Shares 2112 Power Supply.
12976	Dynamic Mapping	Sept-Oct	Awaiting field stocking of updated 21XX CPU's (1520 date code), DMA's, MP's, Memory Controllers.

HEWLETT  PACKARD

## SENSKE INHERITS 21XX PRODUCT LINE

by *Bill Krause*

*Bill Senske*, recently the Neely Sales Development Manager, has taken over the 21XX component product line as Product Manager.

When asked what his job was, *Bill* responded that it was to "help others plan, price, product train, publicize, and peddle processors profitably". *Bill* emphasized that the key to our business is to make the salesman successful, so we will do whatever we can to that end.

*Bill* said he would like to solicit new ideas from you on how we can maximize your sales and our profits. Cards and letters are welcome, so send in any ideas that you have been kicking around so we can work on them. He mentioned that a new OEM price list is on the way now.

*Bill* would also like to hear from you whenever you get a competitive surprise. "They lowered their price, they told them about the 1980 model . . . etc." The real world plays the music we all dance to, so keep us posted on the latest tune, and in turn we will try to supply you the best product line in the industry.

## 16K MEMORY PROGRESS REPORT

by *David Carver*

The 16K X/2 Memory Module is undergoing extensive MTBF tests and is making steady progress towards becoming a shippable product. We anticipate introducing the product in October, at which time volume shipments will be immediately available.

Because you have been doing an outstanding job of getting orders, we are adopting an introductory strategy for this product that will have minimal impact on your deliveries. The introductory price will be \$300 to \$500 higher than the price of two 8K modules to minimize the number of conversions and order retransmittals.

Remember that the 16K model will be fully compatible with the X/2 controller and other X/2 modules, and that X/1 memory will no longer be a product. Remember also that you can expect memory price reductions in the future as 4K RAM chips continue to decline in cost.

HEWLETT  PACKARD

## DYNAMIC MAPPING DESIGN IMPROVEMENTS

by *Wayne Gartin*

In order to allow for continuing fast response in our RTE systems, some design improvements were required in the dynamic mapping product.

These improvements as well as the loss for a year of the designer, *Jack Elward*, to Howard University, have resulted

(Continued on page 11)

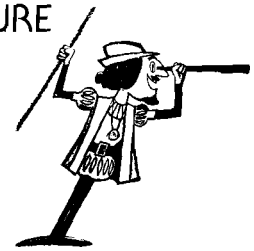
## DYNAMIC MAPPING DESIGN IMPROVEMENTS - (Continued from page 10)

in a delay of the project. The CPU design change also complicates installation of the product since now the DCPC, memory protect, CPU, backplane, and memory controller all have to be updated to the 1520 date code level to be compatible with Dynamic Mapping. The "date code" is the prefix of the serial number on your customer's machine. 1520 denotes a machine whose last design improvement was made in week 20 of 1975. This all means that service kits need to be updated to the 1520 level before product shipments start. As you can imagine, with a three to six month backlog, it is difficult to squeeze an additional 100 CPU's out to service kits.

In spite of these extra challenges, we should be out in the market delivering products by late September.

HEWLETT  PACKARD

## BETTER SIGNS FOR FUTURE OF FLOATING POINT IN MX



by *LeRoy Nelson*

As you may be aware, there is a problem in the floating point algorithm in all machines shipped with date codes earlier than 1520. The problem results when the binary arithmetic creates an overflow. The result is that in some cases the SIGN bit is inadvertently toggled and not corrected, in other cases the answer is wrong. We are sending the following letter to all your customers who have machines with defects. Enclosed with the letter is some software to tide them over until their new floating point board is installed. From that point, Floating Point should result in nothing but good SIGNS for you since it is supplied at such a competitive price.

HEWLETT  PACKARD

DATA SYSTEMS • 11000 Wolfe Road, Cupertino, California 95014, Telephone 408-257-7000, TWX 910-338-0221

July 14, 1975

Dear 21MX Owner:

This letter is to notify you of an oversight that has been discovered in the floating point algorithm of the 21MX Computer. We believe that the error is minor, but that you should be notified of its existence.

After a thorough review of the defective instructions, we documented on the attached sheet a description of the conditions which will cause erroneous results.

Without going into great detail, the faulty calculations are caused by a defect in the algorithm stored in the microprocessor's "Read only memory." We are taking immediate steps to correct the problem and replacement parts will be available after the fifteenth of August.

There are two things you should know about the condition:

- 1) Two of the 128 computer instructions are involved, floating point add/subtract.
- 2) Your computer is fully usable by following the procedures on the attached sheet.

If you feel that this design error hampers your use of the computer, Hewlett-Packard will be glad to repair the computer at our expense. To have us do so, just call your local customer engineer (CE) and ask him to order a replacement board. When you receive the board, feel free to call your CE for installation assistance.

HP will be glad to make available replacement boards at no cost through June of 1976. We would appreciate your returning the extra board when installation is complete.

We sincerely regret any inconvenience this may have caused you, and hope that you are otherwise satisfied with your Hewlett-Packard product.

Sincerely

*William Senske*

William M. Senske  
21MX Product Manager

## SALES AIDS

### 2460'S — WE WANT TO HELP YOU RENT

by Ed Hayes

Want to sell more 2640's? Then help us help you. We want the names of rental companies that have already rented our terminal or would be willing to do so. We would consolidate this list and send it out to you, with such comparative ratings as extent of coverage, costs, etc.

We are sure this will make your job of renting THIS HOT PRODUCT easier. Thanks to you, our 2640 business is booming. Just keep it up.

HEWLETT  PACKARD

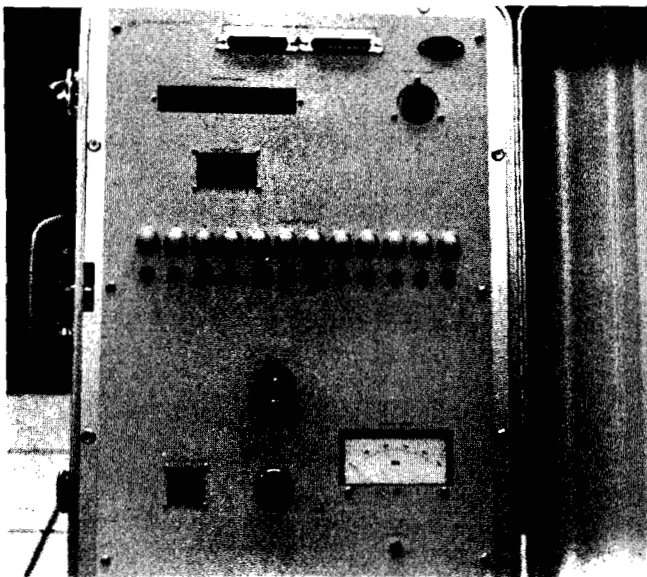
### 9600 LAUNCH TOUR

by John Streeter

The Neely portion of the 9600 Launch Tour has just recently been completed. Four one-day sessions hosted by Jack Caffey, Neely Staff Engineer, and John Streeter were held at two different sites, with an average of 32 attendees. The RTE-B, 96MX and DS1B were successfully demonstrated.

The Launch Team Seminar can be repeated to audiences interested in "Improving Manufacturing Efficiency and Quality and Computerized Systems." This seminar is a very effective way to reach some of those accounts that you haven't had time to call on.

The demo panel (see photo) provided a means to simulate industrial application problems. "Hands-On" experience was available to all attendees who wanted to try developing a Real-Time Basic program.



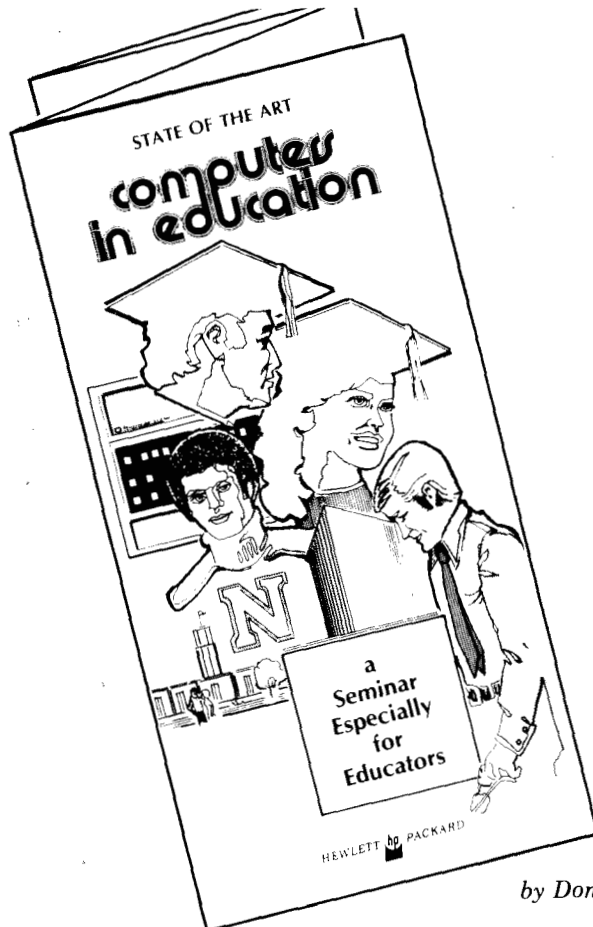
Demo Panel

Duplicate copies of the demo panel can be ordered (at only \$1,300) for those sales offices which want this Measurement and Control Demo capability. Get your orders in now.

Contact your Regional 9600 Sales Development Engineer for details: Bob Kresek, ESR; Jim Eckford, MSR and Canada; Don Darms, SSR; John Streeter, NSR.

HEWLETT  PACKARD

### THE DESIGN OF SEMINAR INVITATIONS



by Don Lund

The following ideas stem from my experience of designing the "Computers in Education" seminar invitation. Eleven seminars were conducted during the period from February 25, 1975 to April 11. Five hundred and thirty-seven (537) invitations were sent out drawing a total attendance of two hundred and thirty-four (234) for a 43.6% response.

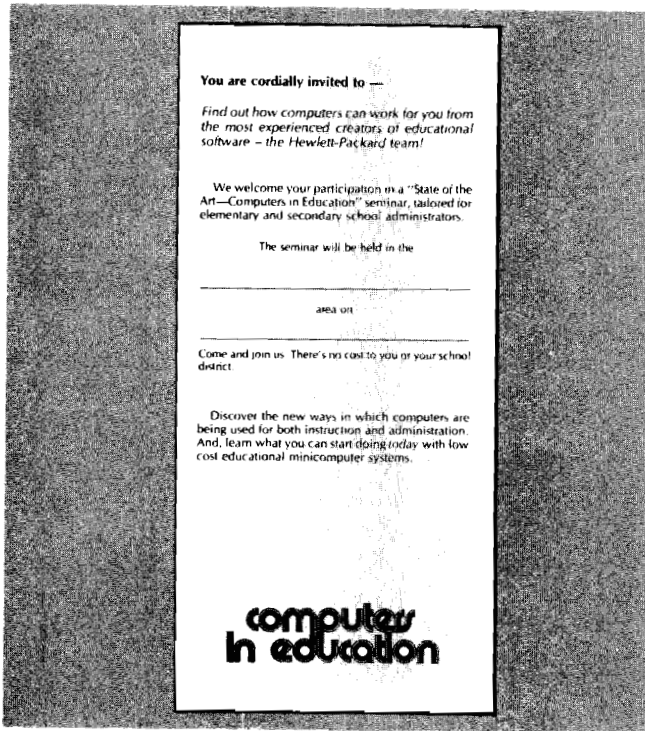
A good invitation must convey enough information about the seminar to make it easy for a busy potential customer to decide whether or not he can spare a half day or more of his valuable time. The physical layout of this first invitation was a four section brochure which opened as a book opens and then opened up again into a four section piece. It did not require an envelope. Address labels can be printed from a data base. It will help the reader to examine the education brochure as each feature is described.

This invitation design can be discussed by sections, there being eight, counting both sides.

The first thing the potential customer sees is the cover which should be attractive and contain the seminar title, which hopefully hits his "hot" button. If the customer opens the brochure the cover has done its job. (Continued on page 13)

**THE DESIGN OF SEMINAR INVITATIONS - (Continued from page 12)**

As he opens it, he next sees the more-or-less formal invitation hitting another hot button or two and stating when and where the seminar is going to be held.



Now he opens it all the way to the four section layout. The leftmost part stresses "come as our guest" and gives him some idea of the types of staff members he may want to send. This first section also gives reasons why he and his company should participate. In other words — how are they going to profit by attending.

The second section lists specific seminar objectives which we are going to accomplish. This will enable him, at another level, to judge whether he should participate or not. These objectives may also be used in seminar evaluations.

The third section shows the exact schedule for the presentation displaying in further detail what the topics are. If a prospect can only make it for part of the seminar, he can decide which part is the most important to him.

The last section is the registration form which he fills out and returns. This tear-off portion is addressed to the Seminar Coordinator for each region and costs \$.12 for each card returned since a Business Reply Mail permit is used.

We had very positive reactions from the field to the first use of this invitation design. Most were pleased, and in some cases surprised, by the turnout. The registration card seemed to eliminate some of the hassle with the RSVP by phone used with other invitations. The details included in the invitation eliminated the calls questioning seminar content, etc.

**Eliminate Cold Calls With Seminars!**

<p><b>BE OUR GUEST FOR A DAY</b></p> <p>Hewlett-Packard, today's number one supplier of timesharing computer systems in elementary and secondary schools, is conducting a day-long seminar in your region. We would like two members of your school district staff to attend as our guests... and, of course, would like you there personally, if possible.</p> <p>Other school districts have been represented by superintendents, assistant superintendents, principals, curriculum directors, department chairmen, data processing directors, and business managers.</p> <p><b>WHY SHOULD YOU PARTICIPATE?</b></p> <p>Learn more about:</p> <ul style="list-style-type: none"> <li>State of the art in CAI and CMI.</li> <li>Computers in problem solving.</li> <li>Computer simulations to make classroom learning more relevant.</li> <li>Terminal oriented administrative computer systems to ensure the availability of timely information for decision making.</li> <li>How your elementary or junior high staff can teach a computer literacy unit to all students.</li> <li>What leading school districts across the country are doing in these areas.</li> </ul> <p>Find the answers to these questions and more in this one-day seminar!</p>	<p><b>SEMINAR OBJECTIVES</b></p> <p>By attending this "COMPUTERS IN EDUCATION" seminar you will be prepared to:</p> <ul style="list-style-type: none"> <li>assess the merits of specific instructional uses of computers</li> <li>assess the merits of terminal-oriented administrative systems</li> <li>identify what information should be readily available to aid in administrative decision-making</li> <li>define and give examples of computer uses in student problem solving, simulation, computer literacy, computer assisted instruction, and computer managed instruction</li> <li>identify educators in elementary and secondary schools that have considerable experience in the above applications</li> <li>evaluate the cost-effectiveness of computers in education</li> </ul> <p>(HP representatives from your region will be available throughout the day to answer specific questions.)</p> <p><b>REGISTER NOW</b></p> <p>Send in the registration form now. You will be contacted about two weeks prior to the seminar date concerning its exact location. Hope to see you there.</p>	<p><b>SEMINAR SCHEDULE</b></p> <p>8:30 — 9:00 Registration and Coffee  9:00 — 9:30 HP and Instructional Uses of Computers — An Overview  9:30 — 10:15 Problem Solving — Teaching and Using a Computer Language Simulation — On-Line Demonstrations (Via Terminals)  10:15 — 10:30 Coffee Break  10:30 — 11:00 Teaching Computer Literacy in Elementary School — A Demonstration  11:00 — 12:00 Computer Assisted Instruction — On-Line Demonstrations, Computer Managed Instruction  12:00 — 1:00 Lunch</p> <p><b>ADMINISTRATIVE SESSION — DISCUSSION AND ON-LINE DEMONSTRATIONS</b></p> <p>1:00 — 1:30 Terminal Oriented Administrative Systems and Information Management  1:30 — 2:30 Mark Reporting, Attendance Accounting, Scheduling, and Student Data Bases  2:30 — 2:45 Coffee Break  2:45 — 3:30 Payroll and Accounting Systems  3:45 — 4:30 Summary</p> <p><b>INSTRUCTIONAL SESSION</b></p> <p>1:00 — 3:30 Open discussion of Other Instructional Uses, Examples of Call-Author Languages and the Monitoring of Student Achievement.</p>	<p><b>REGISTRATION FORM</b></p> <p>The following people</p> <p><input type="checkbox"/> Will definitely attend.  <input type="checkbox"/> Will probably attend.  <input type="checkbox"/> Are interested but will not be able to attend.</p> <p><b>The "Computers in Education Seminar"</b></p> <p>SCHOOL DISTRICT _____</p> <p>TELEPHONE _____</p> <p>NAME _____ TITLE _____</p> <p>ADDRESS _____</p> <p>CITY _____ STATE _____ ZIP _____</p> <p>NAME _____ TITLE _____</p> <p>ADDRESS _____</p> <p>CITY _____ STATE _____ ZIP _____</p> <p>For additional information contact Don Lund  Telephone (608) 237-7000</p> <p><b>computers in education</b></p>
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## GSA 9600MX CONTRACT EXPANDED

by Ed Smith

The RTE-III, 7905A, 2112A and Video Monitor Card options have been added to our Data Acquisition System contract (Schedule K) effective July 1, 1975. There are also several option deletions. In addition, there are a number price increases effective August 1, 1975. These price increases are small, and are largely a result of maintenance price increases which became effective July 1, 1975. Thus, the new, higher GSA system and option prices should be effective August 1 — with no further "grace period".

A supplement covering these changes is being rushed into print and should be in your hands at about the same time you read this. If you have any questions, contact George Fernandez at Data Systems.

HEWLETT-PACKARD

## NEW GSA ADP CONTRACT AWARDED

by Ed Smith

3000 and 2000 systems, as well as individual CPU's and peripherals, are now on a long-term GSA ADP schedule. Contract number is GS-00C-00623 for the period July 3, 1975 through September 30, 1976.

This new contract is virtually identical to the May 30, 1975 — June 30, 1975 one, except that the 2100A and 2155A have been repriced to match the July Corporate Price List. 24380A and 24386A RTE and On Top software have been deleted, and the 12987A Line Printer Subsystem has a price increase to \$8325 and a classification change to type 10B.

We should have the printed catalog in distribution by the end of July.

HEWLETT-PACKARD

## 9600/9700 CUSTOMER SEMINARS A SUCCESS

by Dave Borton

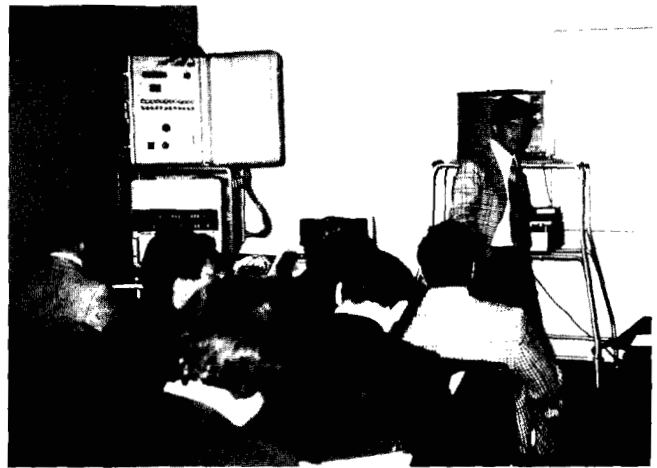


The 9600/9700 Customer Seminars are still being conducted with continuing success. The seminars ("How to Improve Manufacturing Efficiency and Quality with Computerized Systems") use a portable 21MX/6940/RTE-B System connected to a Distributed Systems Central provided by the field sales offices where possible.

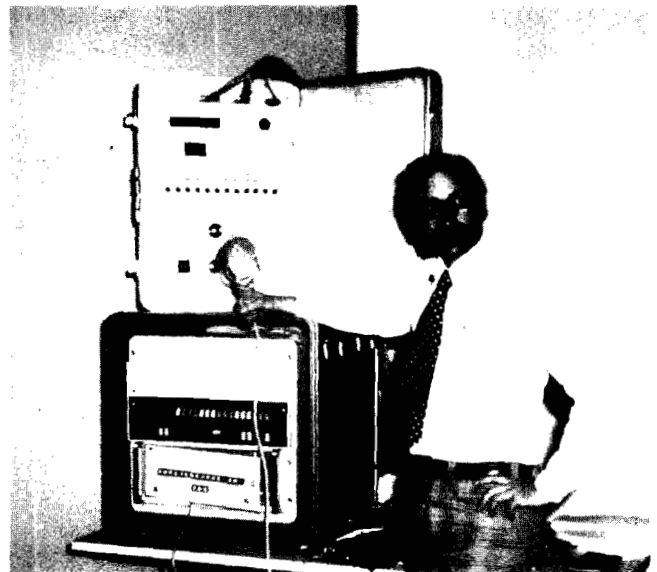
Seminar audiences ranged up to 63 (Pittsburgh, Pa.) with an average near 30 attendees per seminar. These pictures show most of the factory team responsible for putting the RTE-B satellite system together plus the May 12 seminar in Toronto, Ontario. That seminar had 48 attendees.



Kudos to the factory team; left to right: John Flores, Sammy Sugiyama, Harold Harris, Ed Cavender, PAT Rybak, Art Hughes, and Jim Eckford. Missing is John Trudeau.



"The rest rooms are down the hall to the left. Just follow me ... " as Mike Naggiar finishes his summary.



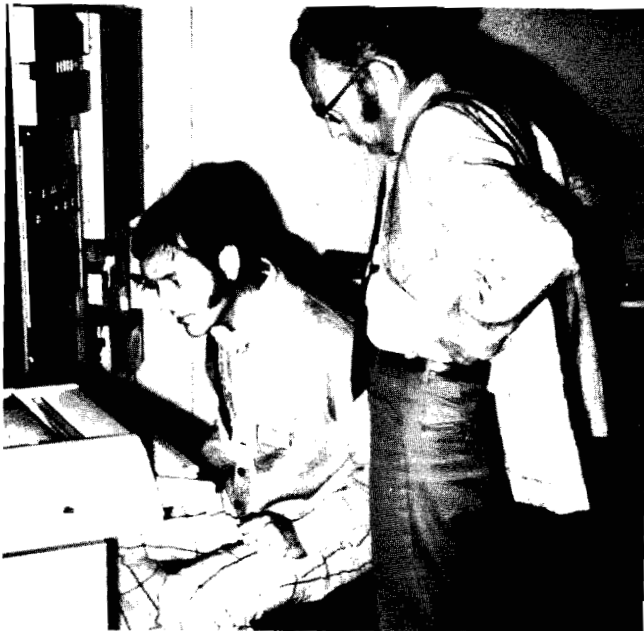
"Would this computer-operated light work better if it was plugged in?" asks Dave Borton.

**HP Computer Museum**  
**[www.hpmuseum.net](http://www.hpmuseum.net)**

**For research and education purposes only.**



Bob Kresek takes another order.



Two customers ponder the messages from the Central Computer's system console. "What does 'WHZAT' mean?"



"To start a computer, all you have to do is turn this ignition switch" explains Grant Hallman hopefully.



"Have computer, will travel" grunts Bob Kresek.



HEWLETT  PACKARD

## QUESTIONS CONCERNING THE 2640 SERIES TERMINALS. PART I OF A SERIES

by Jim Elliott

### 1. How Do I Use Printer With the 2640A Terminal?

Manually using the PRINT key (ESC 0). If the optional printer is present, the contents of the terminals' memory is printed when the print key is depressed or the correct control code is generated by the CPU.

NOTE: Some printers cannot print many of the optional character sets that are available on the terminal. In these cases, please consult the Operation and Service manual of the printer considered.

Remote triggering of your printer from a CPU. If it is desired to have the contents of the terminals' memory dumped to the printer under computer control simply program your CPU to do three things:

- Transmit an ESC 0. — This triggers the dump command at the terminal.
- Transmit an ENQ (control F). — This asks the terminal if it is done dumping the memory.
- Wait for an ACKnowledge (control F). — This is sent from the terminal to let the computer know that it is finished.

### 2. What Interfaces and Cables are Available for the 2640A?

We know that this question comes up often and Tables A & B have been generated to help alleviate the problem.

(Continued on page 16)



QUESTIONS CONCERNING THE 2640 SERIES  
TERMINALS - (Continued from page 15)

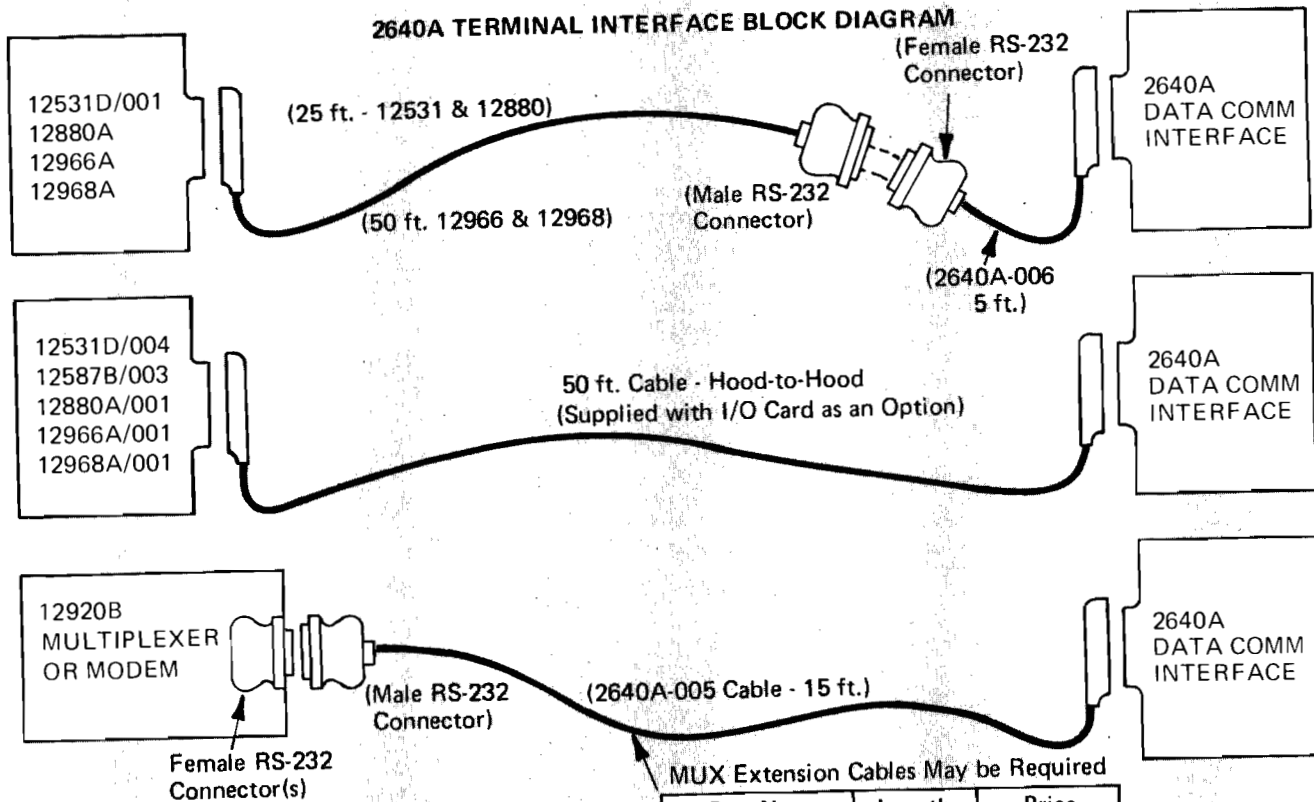
STANDARD 2640A SERIES TERMINAL INTERFACES

TABLE A

NOTE: The 2640A Currently Operates to a Maximum of 2400 Baud.

THE INTERFACE CARD AND DESCRIPTION							THE INTERFACE CABLES			ADDITIONAL REQUIREMENTS	
PRODUCT	COMM. TYPE	MAX BAUD RATE	MODE(S) OF OPERATION	BUFFER SIZE	DESCRIPTIVE COMMENTS	PRICE	PRODUCT	DESCRIPTION	PRICE	REQUIRED 2640 CABLE	PRICE
12531D	ASYNCR	2400	Character	None	Single Terminal Interface Must use own clock	\$350.00	12531D-001	RS232, 25 ft. Cable Hood-to-Male RS232 Conn.	\$55.00	2640-006 5 ft. Cable	\$50.00
							12531D-004	RS232, 50 ft. Hood-to-Hood Cable	55.00	None Req.	
12587B	ASYNCR	3110	Char/Block	2 Char	Single Terminal Interface Needs Additional Documentation	550.00	12587B-001	Does not work with the 2640A	50.00	None	
							12587B-003	Not yet released - 50 ft. Hood-to-Hood Cable	50.00	None Req.	
12880	ASYNCR	9600	Character	None	Single Terminal Interface Uses terminal's clock	350.00	Cable Included	RS232, 25 ft. Cable Hood-to-Male RS232 Conn.	N.C.	2640-006 5 ft. Cable	50.00
							12880-001	RS232, 50 ft. Hood-to-Hood Cable	N.C.	None Req.	
12920B	ASYNCR	2400	Char/Block	None	Multiple Terminal Interface Has Female RS232 Connector	2200.00	None Needed			2640-005 15 ft. Cable	50.00
12966	ASYNCR	9600	Char/Block	128 Char.	Buffered Comm. Interface	950.00	Cable Included	RS232, 50 ft. Cable Hood-to-Male RS232 Conn.	N.C.	2640-006 5 ft. Cable	50.00
							12966-001	RS232, 50 ft. Cable Hood-to-Hood Connectors	N.C.	None Req.	
12968	ASYNCR	9600	Char/Block	2 Char	Asynchronous Comm Interface Card	600.00	Cable Included	RS232, 50 ft. Cable Hood-to-Male RS232 Conn.	N.C.	2640-006	50.00
							12968-001	RS232, 50 ft. Cable Hood-to-Hood Connectors	N.C.	None Req.	

2640A TERMINAL INTERFACE BLOCK DIAGRAM



Part No.	Length	Price
30062-60006	25 ft.	\$50.00
30062-60009	50 ft.	65.00
30062-60012	100 ft.	75.00

TABLE B

(Continued on page 17)

QUESTIONS CONCERNING THE 2640 SERIES  
TERMINALS - (Continued from page 16)

3. **What is a RS-232 Connection and Why Is It That We Don't Have Current Loop Instead?**

The RS-232 connection is an HP adopted method for data communication equipment employing serial binary data transmission and reception. It is an industry standard recommended by Electronic Industries Assoc.

The specification gives thirteen specific interface considerations for fifteen defined system applications. It is applicable for data signaling rates from 0-to-20K bits per second. It is applicable for interchange of data, timing and control signals for electronic equipment having a single common return ground at the interface point. It covers such detail as the required characteristics for:

- a. Open circuit driver voltage
- b. Effective capacitance of the driver at the interface point. (Includes any cable to the interface point. Distance indicated is 50 ft.)
- c. Internal driver DC resistance.
- d. Capacitance of the terminator (plus Cable)
- e. Load resistance at the terminator.
- f. Open-circuit terminator voltage.
- g. The voltage at the interface point.
- h. Communications over dedicated, private and switched two or four wire lines.
- i. Application for synchronous and non-synchronous serial binary data communications.

Also included are the functional descriptions of the interchange circuits.

So, using this standard, compatibility is ensured for manufacturers of electronic data-comm equipment specifying this type of interface.

On the other hand, there is no uniquely specified standard for current-loop interfaces. Though there seems to be a *de facto* industry standard for current levels of 60 ma or 20 ma, certain pin connections, etc. manufacturers have been known to deviate from the norm.

Hope this brief explanation helps.



## EDUCATIONAL NEWS

### HOT OFF THE PRESS — NEW COLLEGE/ UNIVERSITY BROCHURES!!!

by *Babs Brownyard*

**Computer Solutions for Colleges/Universities**, a new capability brochure, is now available for your use with prospects and customers. The booklet describes Hewlett-Packard's instructional and administrative software packages, as well as user services and computer systems. It is aimed at decision makers in community colleges, colleges and universities. The literature number is 5952-5536(22).

The first two pages are an "executive summary" of HP's philosophy and capabilities as they relate to the higher education market place. On the back cover is a product summary. We have condensed these sections into a mini-brochure suitable for introductory literature, show handouts or a general easy-to-talk-from piece. It is entitled ON-LINE DATA PROCESSING AND HIGHER EDUCATION MEANS . . . ; literature number is 5952-5537.

Watch for the brochures in the packets which were sent to you from Educational marketing last week — they may be the door openers for that next big educational sale!

HEWLETT  PACKARD

## COMPETITIVE CORNER

### DEC PDP-11/03 COMPETITIVE ANALYSIS

by *David Carver*

The PDP-11/03 is a packaged version of the LSI-11 microcomputer. On the surface the 11/03 looks very much like a minicomputer, but there are some key differences.

Like all microcomputers, the 11/03 is considerably slower than a minicomputer. We estimate that the 11/03 is two to five times *slower* than the 21MX.

The PDP-11/03 Central Bus is not compatible with the "Unibus" of other PDP-11 models, although overall I/O programming is the same. This means that the number of peripherals supported is more limited than is the case with the minicomputer. Only two I/O interfaces are available with the 11/03: a serial line interface (max speed 9600 bits per second) and a parallel interface (max speed 90K words per second). A DMA port capable of operating to 833K words per second is available, but the user must design his own interface.

DEC promotes the fact that the 11/03 has the same base instruction set as the PDP-11/35, which gives the user ac-

(Continued on page 18)

## DEC-11/03 COMPETITIVE ANALYSIS - (Continued from page 17)

cess to a large amount of previously developed software. This makes the 11/03 more powerful than some other microprocessors, but because of the differences in I/O device support, does not let its software performance measure up to minicomputers. For example, a simple core-based real-time operating system (RSX-11S) may reside on the 11/03, but program development will generally be done on a PDP-11/35 system costing \$30,000. (Assembly language programs may be developed directly on the 11/03.) This means that the 11/03 is best suited for dedicated applications, and should not be considered a general-purpose minicomputer.

In summary, the 11/03 is a very powerful product when measured against microprocessors, but has inferior performance to minicomputers in terms of speed, peripheral support, software support, and expandability. It is best suited for low-end, dedicated applications where expansion capability and general purpose operating software are not needed.

Following are the 11/03, LSI-11, and accessory prices:

PRODUCT	DESCRIPTION	LIST PRICE
PDP-11/03	KD11F Microcomputer with 3 1/2" Enclosure, Power Supply, minimum front panel, and 4K semiconductor memory	2495
PDP-11/03	With 4K core memory	2925
KD11F	CPU Board only, 4K semiconductor	990
KD11J	CPU Board only, 4K core	1536
DLV11	Serial line interface	235
DRV11	parallel line interface	195
MSV11-A	1K X 16 RAM module	475
MSV11-B	4K X 16 RAM module	625
MMV11-A	4K X 16 CORE module	895
H9270	Backplane	175
KEV11	Extended Arithmetic Chip	125

HEWLETT-PACKARD

## MICRO OR MINI? — HOW TO DECIDE

by David Carver

Several of you have called regarding how to compete against the emerging microcomputer vendors that are becoming more aggressive in your established industrial accounts. Although comparing micros and minis is a little like comparing apples and oranges, this article summarizes some important differences and suggests some ways to combat the micro-vendors in the areas of overlap. The topics discussed here are based on the following definitions:

**Microprocessor** One or more LSI chips which provide the functions of a CPU (INTEL 8008, 8080; MOTOROLA 6800, etc.). Priced between \$50-300/unit from most semiconductor houses. Useless without memory (ROM/PROM/RAM) chips and some form of I/O capability.

**Microcomputer** a. Normally a microprocessor, memory chips, and rudimentary I/O capability packaged on one or more PC board(s). Priced between \$400-1200.

b. Same as above with power supply, packaging and I/O (or some combination of the above). Priced \$1500-5000.

### Microcomputer Development (Prototyping) System

Since most microcomputers are too incomplete to develop software on directly, most vendors offer microcomputer based development systems (\$3000-10,000) for program development/debugging for the target machine. INTEL's "INTELLEC®" system is an example. In most cases, the software is very special purpose (oriented toward developing software, not task execution in a production environment).

### Mini Compatible Microcomputers

Some mini manufacturers (DEC, INTERDATA, MICRODATA, G.A., and COMPUTER AUTOMATION) offer microcomputers which are "compatible" with their larger minicomputer lines. Since they typically purchase their technology (chips) from the microprocessor vendors, prices are somewhat higher than the semiconductor house or independent microcomputer vendors.

In looking at the limitations overlaps of micros and minis, there are two overriding considerations:

1. In most applications, micros and minis don't compete. Today only 18% of micro sales are encroaching on traditional minicomputer applications (and this number is dropping). Most micros are sold today to replace hardwired or relay logic (in new lower cost applications) where minis will not even be considered. If this is what your customer wants micros for, we can't help him.
2. In those areas where the customer is wavering between a micro and a mini, recent experience has shown that first time micro users will *almost always underestimate* the development and check out time associated with using micros (they are *not friendly!*). The plain fact is that the support in terms of peripherals, I/O design, software and documentation is next to nothing in most cases. It's difficult to get the customer to properly weigh the costs here because of the faddish nature of microprocessors — they are today's "in" product!

The following excerpt from an article by Eric R. Garen (MODERN DATA, February 1975) does a good job of summarizing the trade offs.

### "SHOULD A MICROPROCESSOR BE USED AT ALL?"

The key to this decision lies in first determining if a microprocessor can do the job. The designer must develop a rough conceptual design of the system and determine the requirements on the processor itself. With regard to I/O requirements, how much data must be transferred? At what peak rates? What data width? Can the microprocessor keep pace with the I/O rates using software only, or must additional interface hardware be added for buffering

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## MICRO OR MINI? - HOW TO DECIDE - (Continued from page 18)

or for DMA data transfer at high speeds? How much additional hardware is required? With regard to data processing, is there a realtime requirement on the processing to be performed? If so, is a microprocessor fast enough?

Unfortunately, to answer these questions with certainty in many cases requires a detailed analysis and design of both the microcomputer hardware and software — which in turn implies a detailed knowledge of available microprocessors. We quickly come to an unpleasant conclusion; to even consider using a microprocessor will require a significant amount of time and money for education. Why then should the designer, who already knows how to implement the system using other techniques, consider a microprocessor?

For minicomputer replacement applications there is really only one strong motivation — the use of a microcomputer may result in a savings of several thousand dollars per unit in typical production quantity systems. Using far fewer parts, they are often easily implemented on a single PC board, reducing interconnections as well: since the reliability of the microprocessors themselves is quite good the reduced parts count and complexity increases the system reliability.

Despite the advantages, the designer should be wary of several disadvantages of micros relative to minis. The development time for a microcomputer-based system will almost certainly be longer (and therefore more expensive) because of the current absence of available peripheral in-

terfaces, systems and applications software, documentation and customer support. While peripherals are becoming more available, progress is slow. Furthermore, the future development of complete systems software by the microprocessor manufacturers themselves is doubtful, and it appears that future development of both microcomputer peripherals and systems software may be left to the systems houses. Thus, the designer is today faced with developing his applications software on crude systems with clumsy I/O devices and with little software to support him. Furthermore, he must today proceed on the basis of poor documentation, which forces him to make assumptions of how the system operates, assumptions which will sometimes necessarily be wrong, leading to programming and interfacing errors and time-consuming debugging. To make the situation still worse, vendor support for micros is far less than that available for most popular minis. The designer has no one to turn to for help and, thus, consumes additional time discovering for himself the answers to his questions.

The designer must also consider that he will actually be saving money only on the CPU. Memory and peripherals, which for many systems are the major cost items, are equivalently expensive for either micros or minis. Thus, the savings realized by utilizing a micro, even in production quantities, may only be a small percentage of the overall system cost.

These observations lead directly to the conclusion that microcomputers are only cost effective in replacing minicomputers in systems produced in large enough volume for the savings on the production units to more than offset the increased development costs."

### Let's look at these key points again one at a time:

1. First, it takes a significant amount of time for the customer to even determine whether or not a microcomputer can do the job. As yet, there are not even a good set of benchmarking techniques for microprocessors. A couple of things to watch out for — although the *architecture* (stacks, number of registers, etc.) of a micro can be as sophisticated as that of a mini, speed is typically 5-10 times slower than a good mini, and I/O in particular can become a bottleneck because of the pin limitations (for data/address paths) on a chip.
2. As Garen points out, costs savings accrue only in the CPU area — peripherals, memory, etc. (which for most systems are the major cost items) are equivalently expensive for either micros or minis. Also, watch out for companies that don't include power and packaging.
3. Increased development costs will tend to be underestimated by your customer. The following graph gives an idea of the volume required to justify a microcomputer. For example, a \$1000/unit savings in production cost combined with an increased development cost of \$40K (one man year) means at least 40 units must be purchased to justify a micro.

Note also that development time increases as you move from a "boxed" micro down to a microprocessor chip set. It took HP over two man years to develop the 8K byte executive for the 2640 on the INTEL 8008 chip, for example.

But, what about those microcomputers made by mini manufacturers that claim upwards compatibility in terms of software, peripherals, support, etc? Certainly the LSI-11, for example, doesn't suffer the same disadvantages as the microcomputers we have been talking about.

In general, microcomputers made by minicomputer manufacturers are superior to other microprocessors in terms of software development support, but are not up to the capabilities of minicomputers. The accompanying article on the LSI-11 looks at a typical example in detail.

In summary, most true microprocessor/microcomputer applications are not in competition with minicomputers. In cases of overlap, don't let the customer underestimate the additional development effort involved. Don't waste too much time on the guy that needs compatibility all the way from a \$1000 micro to a \$30,000 mini system — we don't have an answer today. And, finally, remember that when HP enters the micro arena with a product of its own, it will be based on a technological contribution which we hope will enable us to leapfrog the competition in terms of power, cost, performance, and (most importantly) useability.

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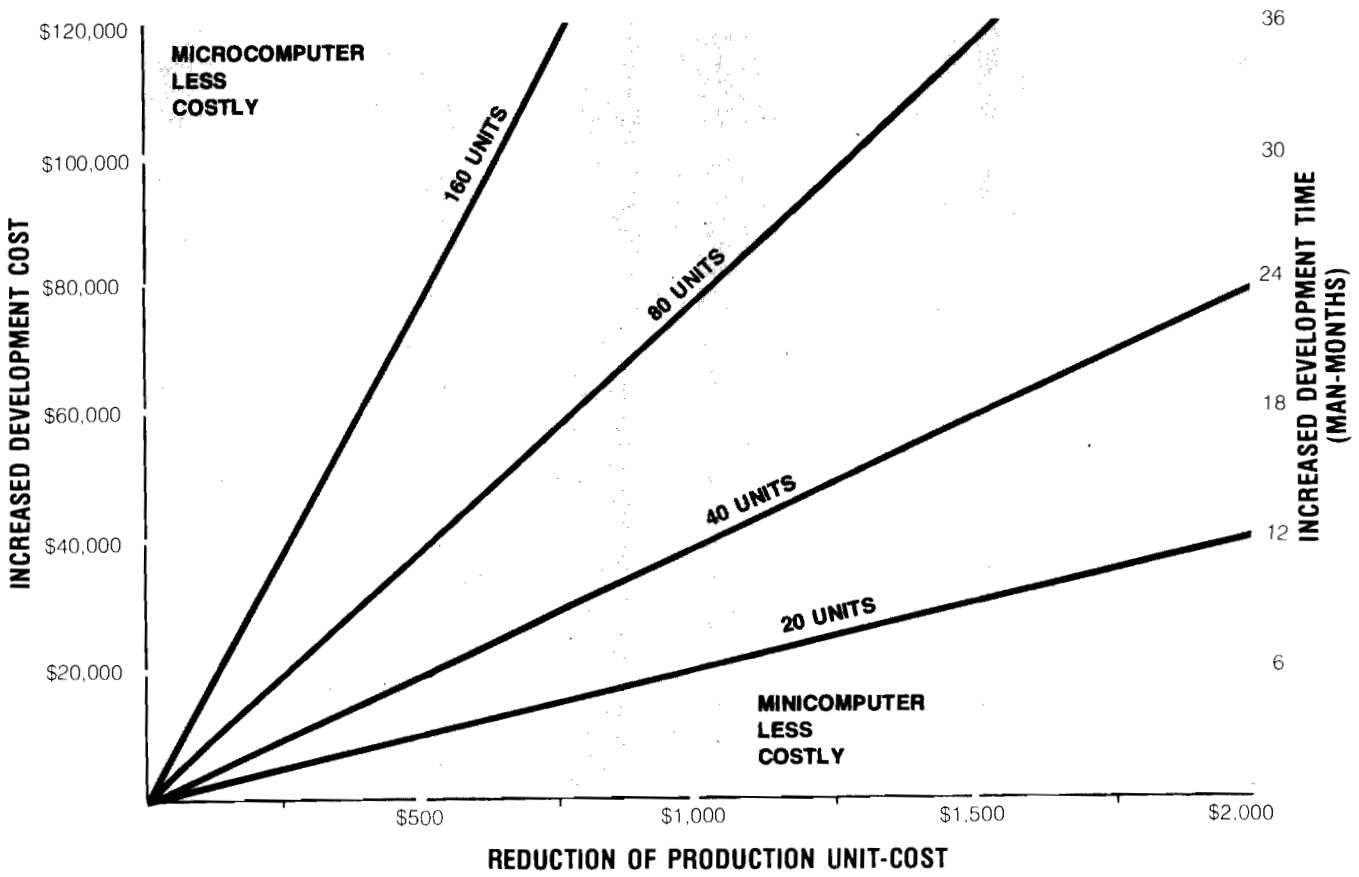


Fig. 1. Production Quantity Required to Justify Replacement of a Minicomputer with a Microcomputer



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