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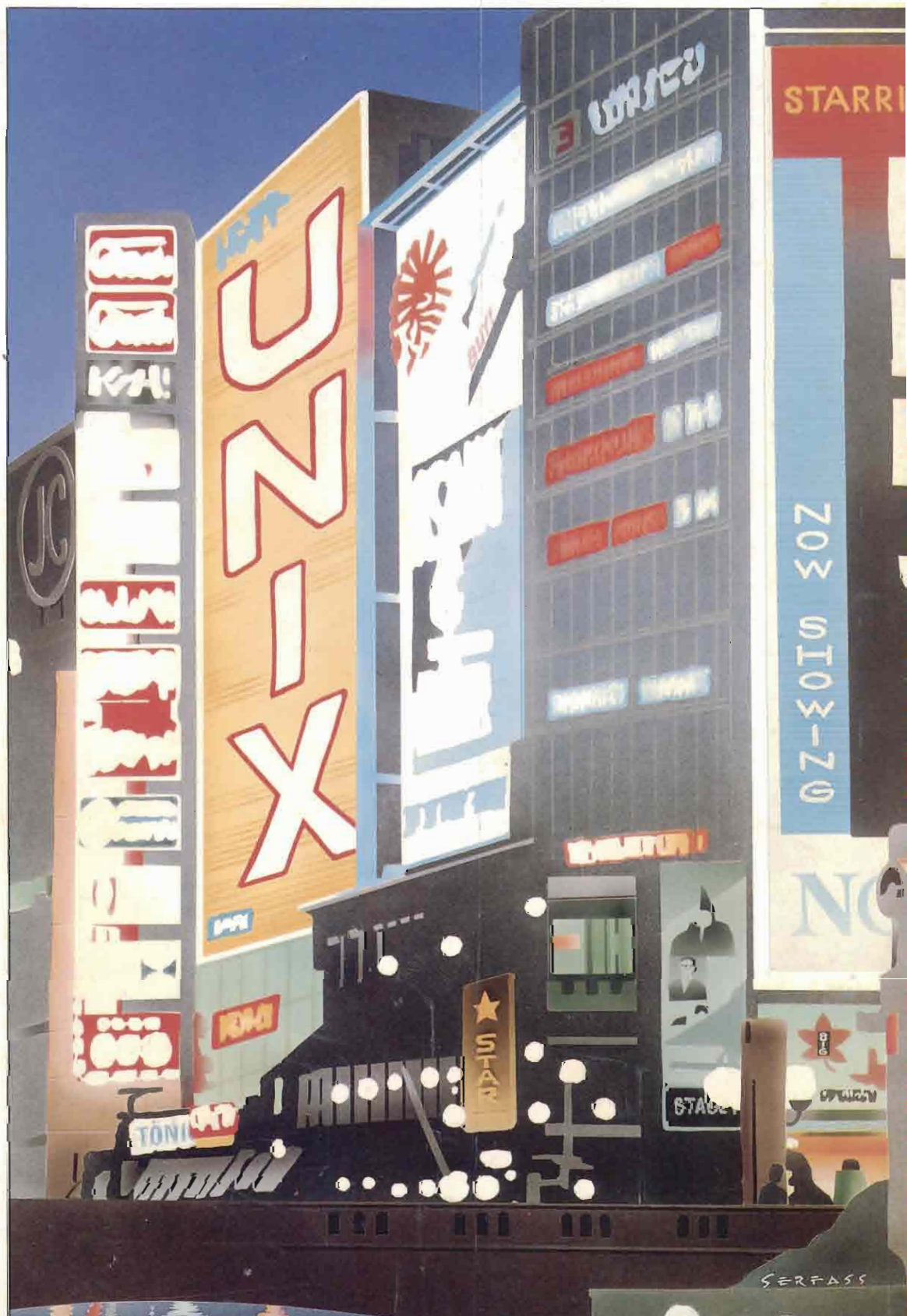
FEBRUARY 1989

INDUSTRY WATCH

OSF Could Usher In Changes For HP



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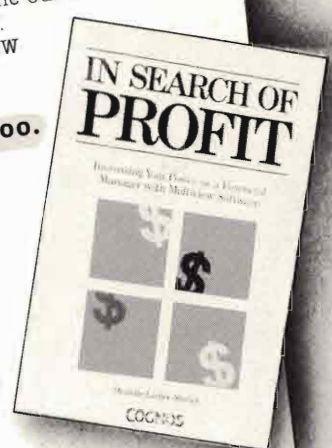

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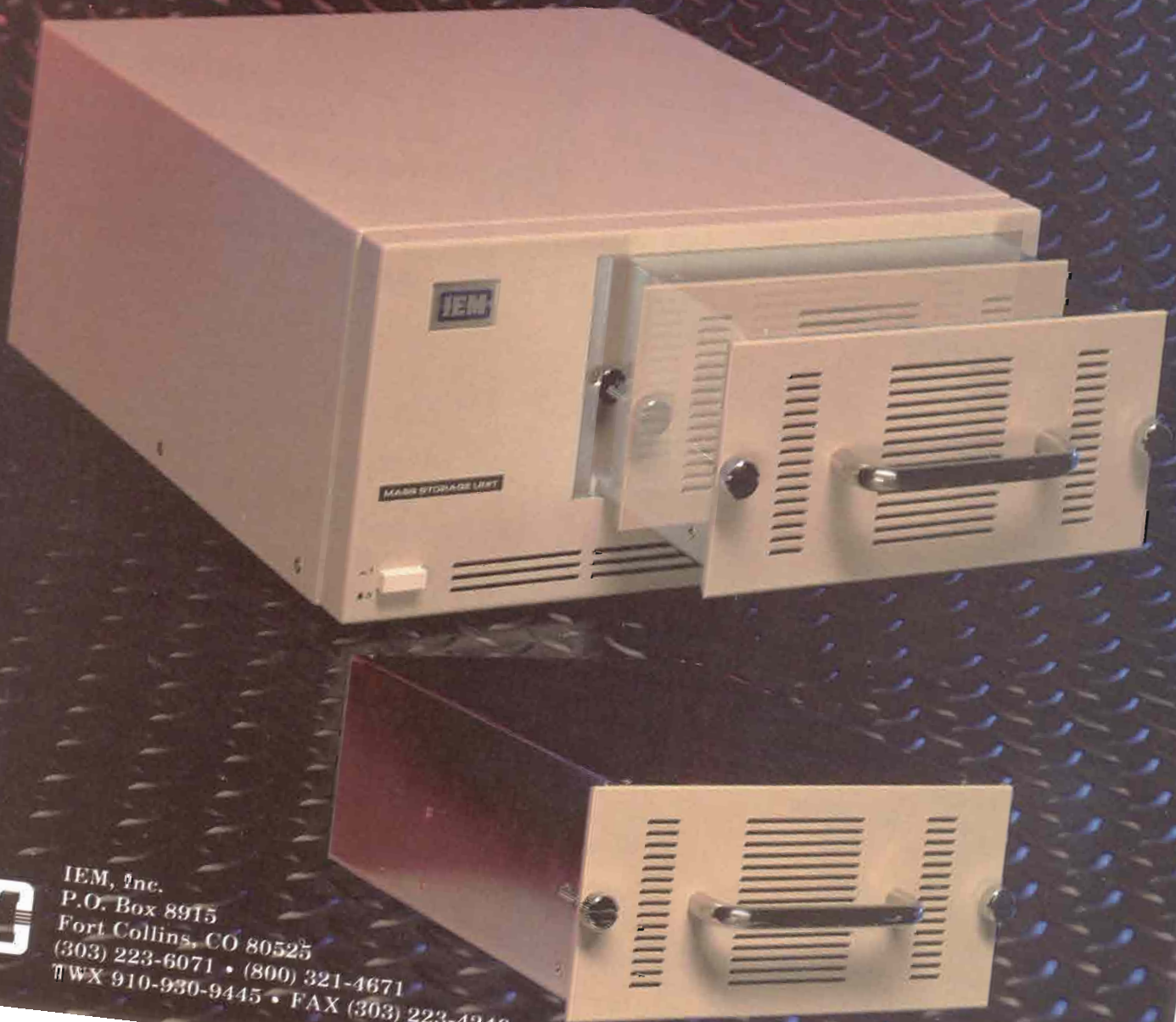

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Expand Your Horiz

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This month's cover illustration is the work of Pennsylvania-based airbrush artist Jim Serfass.

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COLUMNS

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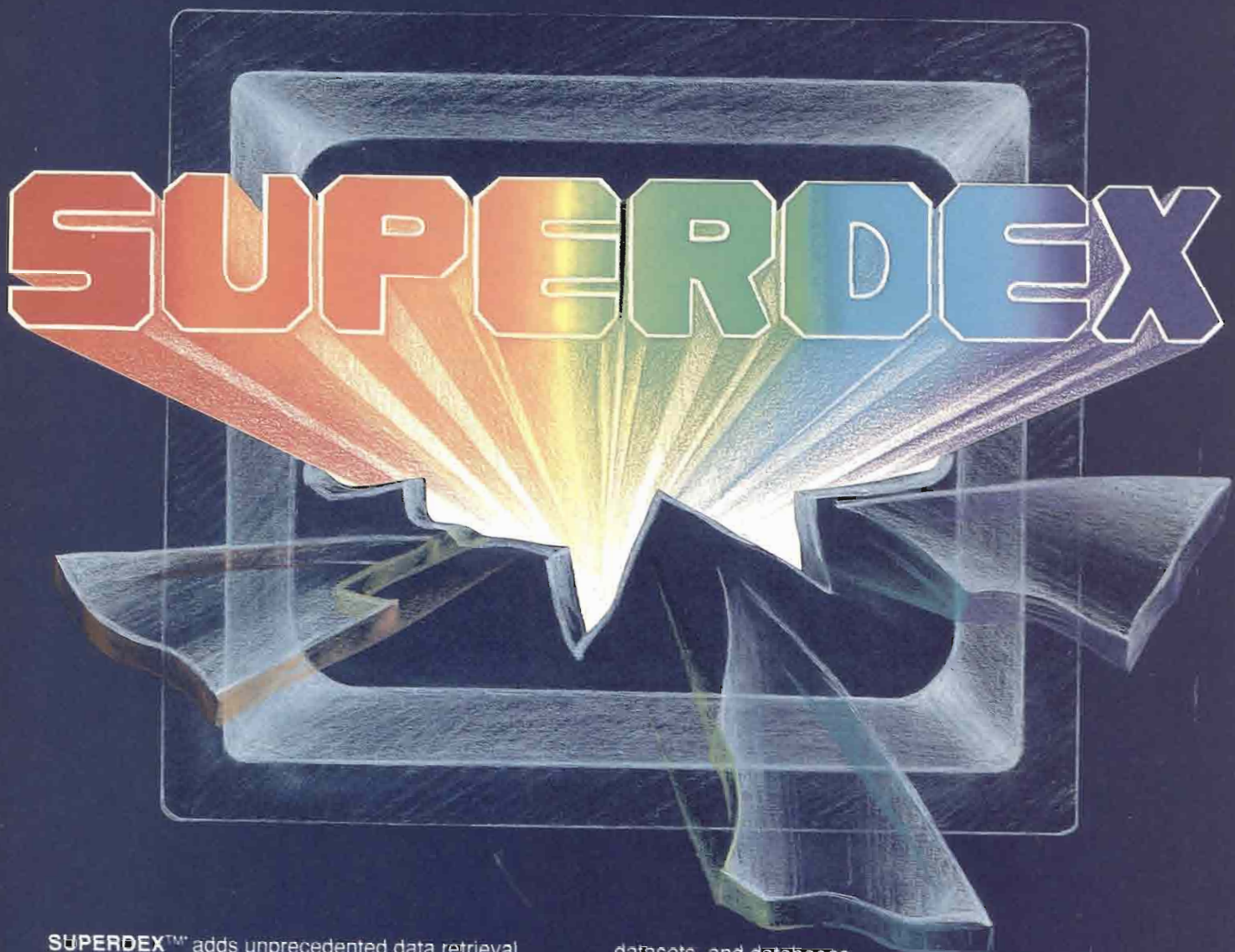

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Session for Windows. The next generation in HP to PC connectivity.

The Microsoft® Windows environment has opened a new era in software for PCs and compatibles. With a speedy mouse and a powerful keyboard. Intuitive, well-organized menus and dialog boxes. Cut and Paste facilities for moving data between documents. The ability to run multiple applications at one time, each in a separate window on your screen. A standard interface for all applications, so manuals are almost obsolete. And with all the new Windows-based software from Hewlett-Packard—NewWave, OpenView, LaserROM, and LaserRX—it's clear that this is a trend no HP site can ignore.

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SPEC Will Benefit Both Customers And Vendors

Nowadays, buying engineering workstations is an act of faith. Unless prospective customers have the resources to set up an internal testing lab or hire consultants to perform benchmarking, they must rely solely on the vendor for information regarding a machine's performance.

If a vendor's workstation has a high MIPS rating in relation to its price, the rating is promoted. However, if a workstation has a lower MIPS rating, the customer is told that MIPS is not comparable across architectures and that system throughput is the better way to measure a machine's performance.

In fairness to the four vendors — HP, Sun, MIPS and Apollo — whose RISC-based architectures use CPU chips based on their own design, each has devoted considerable time and resources to constructing benchmark tests that help customers gauge the performance of workstations running applications they will use most often. If these four vendors were to pool their resources and share the test results, customers would have a better set of benchmarks and could make their own decisions at minimal expense.

Enter SPEC, the Systems Performance Evaluation Cooperative formed last fall. According to Joe Uniejewski, Apollo Computer's representative at SPEC, performance testing RISC-based systems is especially difficult because RISC architecture is more sensitive to the way that benchmark tests are performed. By making a type of change that would not affect the performance of a complex instruction (CISC) workstation, it is possible to get very different benchmarks on a RISC machine.

SPEC's benchmarks are designed to be a universally adopted means to help users understand how high-performance workstations will function running specific applications. By using the SPEC benchmarks, users will be able to make decisions about which workstations to purchase for specific applications. And, vendors also benefit because different workstations are optimal for different applications.

The first suite of tests is expected to include benchmarks from electronic publishing, LISP, CASE and Computer Aided Design. It is unlikely that any one workstation will receive the highest marks for each application. The widespread availability of benchmarking results for different applications will hasten the move toward application-specific workstations. Customers and vendors will have the same chance to see which system best serves individual requirements.

Moreover, vendors will be able to position their machines to sell to specific market segments, direct marketing efforts to customers whose applications are best suited to their products and form alliances with vendors whose software products work best on their workstations.

SPEC is yet another promising sign that cooperation and competition can coexist in our industry. SPEC is a great idea that is long overdue. We intend to join this cooperative effort and utilize their suite of benchmarks in our laboratory.

Across The Spectrum EMC Is Your Total Performance Solution

With high performing HXP-95X memory & Falcon Series disk subsystems for your HPPA computer.

It takes constant innovation to be a top performer. HP's new Spectrum Series systems add a whole new dimension to HP 3000 computing by enabling faster processing than ever before seen on classic HP 3000's.

EMC has been helping you maximize the performance of your HP system for years by providing reliable, high performing memory and disk products. Our success stems from innovative engineering and manufacturing excellence backed by worldwide support. EMC gives you all this at prices up to 20% less than HP's.

Spectrum users have found that greater amounts of memory and disk storage are required to reach peak performance with HPPA than was necessary with classic HP 3000's. In response to this need, EMC has developed a full line of products for the Spectrum Series. Now you can take advantage of EMC HXP-95X memory for your HP 3000 Series 950/955 and HP 9000 Series 850/855. And you can add Falcons, the fastest disk subsystems on the market, to your HP 3000 Series 925LX/925, 935, and 950/955, all at a cost that fits your budget.

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CIRCLE 113 ON READER CARD

LETTERS

MAGNETIC TAPE CAN BE SAVED

I recently read with great interest an article concerning magnetic tape conversion to optical disc. (Dec. 1988, *From Magnetic Tape To Optical Disc*, by Jack Edwards, pg.38) I agree with Mr. Jack Edwards that technologically it is, under certain conditions, advantageous to migrate from magnetic computer tape to optical discs for long-term storage. However, some of the reasons for converting media have to be clearly defined as it requires a lot of money for hardware, and conversion time to make the transition.

More important, Mr. Edwards suggests that magnetic computer tape may not be safe to use for long- or short-term storage because archival life may be cut short as the media used to store information is subject to corruption from stretching, breaking, external magnetic fields and print through.

For the majority of my 25-year computer career, I have been involved with magnetic media, computer tape and removable discs. I also market products that relate to magnetic media maintenance, care and handling of magnetic media, etc.

Magnetic computer tape will last for years if maintained properly. Computer tape must be prepared for storage for long periods of time. Think about it, everything in the computer room is maintained except the one item that is the most valuable and holds the most important item, your data — weeks, months, and years of sometimes unrecoverable data. Yet, it is the least cared for item in the computer room.

Address letters to the editor to the *HP PROFESSIONAL* magazine, P.O. Box 445, Spring House, PA 19477-0445. Letters should include the writer's full name, address and daytime telephone number. Letters may be edited for purposes of clarity or space.

Firms spend millions yearly to protect valuable data off-site. Disaster recovery sites are flourishing to protect against fire, terrorism and earthquakes. But, how much money is spent to insure the integrity of the media? Many users of media may not be budgeted for conversion just yet, and I want them to know that computer tape is an adequate storage medium, but care has to be given to the media and the environment in which it must survive.

Maintenance of magnetic media is an industry and information on proper care and handling for everyday use and storage is available. All manufacturers of new computer tape spend millions of dollars to insure the durability and longevity of this product. But, computer tape must be maintained like any other piece of equipment in the computer room. Disaster recovery sites cannot recreate what is already bad, but rather provide, expertly, an alternate site to run existing data.

Sincerely,

Ronald H. Carboy, President
PERIPHERALS
Costa Mesa, CA. ■

Corrections

Three companies selling used HP equipment listed on page 35 of the December issue contained inaccurate information. Here are the correct listings:

CompuTech Systems
2721 152nd Ave.,
N.E. Redmond, WA 98052
Specialty: HP 3000
CIRCLE 304 ON READER CARD

Norco Computer Systems
925D Bassett Rd.
Cleveland OH 44145-1108
Specialty: HP 3000
CIRCLE 303 ON READER CARD

Ted Dasher & Associates
4117 Second Ave. S.
Birmingham, AL 35222
Specialty: HP 9000 Series 80
CIRCLE 302 ON READER CARD

• • •

In the December issue under New Products on page 88, the telephone number of Perwill Business Management Consultants Limited was incorrect. Perwill's announcement concerned a new Electronic Data Interchange (EDI) package.

Perwill Business Management Systems
Underwood, Swaines Hill, Odiham Road,
Alton Hampshire, GU34 4DP, U.K.,(0256) 862003
or in U.S. (714) 683-7920.
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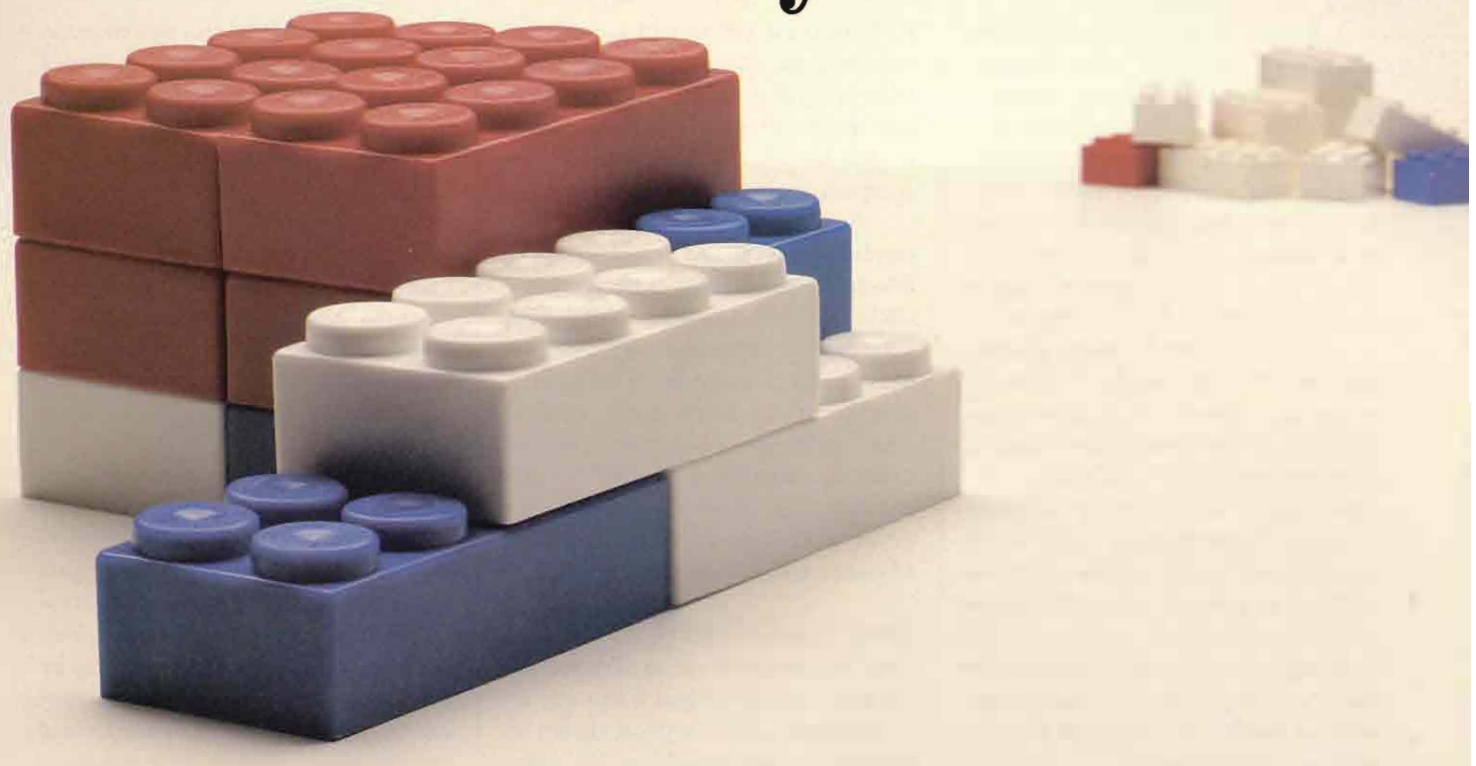

with the DataExpressSeries modular approach.

FOUNDATION: The core module of the DataExpressSeries links end users to their data on the HP3000. It accesses IMAGE™, KSAM, MPE and SD files to select, compute, sort, reformat and download data to PC applications.

STRUCTURE: The DataExpressSeries has a common menu and catalog structure. Full function key support provides even easier end user access to data. With Reflection™, downloads are automatic.

BUILDING: PowerHouse, Dictionary, RELATE and Omnidex Interfaces are available for enhanced access to your data. The DataCatalog option allows "views" of complex data structures to be defined for end users and security to be defined at the field value. The PrintLocal option gives end users access to their spooled output on their local printers.

In short, the DataExpressSeries is a simple, powerful information center solution to meet your needs and budget today. Since you can add options and interfaces at any time, it provides a clear growth path to solving all your HP3000 data interchange needs in the future.

So, if you want to expand the power of your information center, call IMACS and ask how the DataExpressSeries can help you and your end users.

IMACS, helping HP3000 users since 1976.

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CIRCLE 118 ON READER CARD

INDUSTRY WATCH

Peggy King

'Widget' And 'Application Programming Interface' May Become Familiar Terms

OSF Could Usher In Changes For HP

The Open Software Foundation (OSF) was formed in May 1988 when major vendors including HP, IBM and DEC banded together in an attempt to take decisions about the future of UNIX out of the hands of AT&T and Sun. The OSF aims to present a single standard for UNIX-based software.

AT&T's proprietary System V is currently the core for "standard" UNIX. HP had to pay a license fee to AT&T to use Version V as the core of HP-UX. AIX-3, IBM's version of UNIX, will be the core technology for the open standard operating environment currently under development. OSF's version of UNIX will be a completely rewritten version of AIX-3. This new version of the operating system should be available late this year or early 1990. The development effort is funded through fees paid by members and sponsors.

Vendors who sponsor OSF, such as HP, pay $4.5 million annually for three years. Major OSF sponsors control a significant portion of worldwide computer market sales. There are nine sponsors with seats on OSF's board of directors. Companies such as Pacific Bell and Royal Dutch Shell, who are users of UNIX, pay $25,000 a year for general member status. Non-profit organizations, including universities and research foundations, pay $5,000 annually for general member status.

Members who license OSF's standard technology will have the benefits of transportable applications and increased interoperability, as well as access to a porting room at the foundation's headquarters in the Boston area.

Last July, 40 companies responded to OSF's request for technology (RTF) for a graphical user interface (GUI) standard. Early this year OSF should announce its decision and rationale for selecting a technology(ies) for a UNIX user interface that is compatible with Version 11 of the MIT X Windows System and complies with POSIX standards.

At Comdex last November, HP and Microsoft announced an agreement to develop Presentation Manager/X, a UNIX version of Microsoft's OS/2 Presentation Manager. Presentation Manager/X extends the Common X Interface (CXI), which gives workstations and multiuser systems running UNIX the same look and feel as PCs running MS-DOS with Microsoft windows and the OS/2 Presentation Manager when it becomes available.

Open UNIX System

Both DECwindows and the Common X Interface, which bridges UNIX and PC environments, have a good chance to become integral parts of the GUI. Since a significant percentage of computer users are familiar with either Microsoft's or DEC's version of a window environment, it is a good possibility that OSF will incorporate both of these technologies in the standard interface for open UNIX systems.

In September, the 26 companies and organizations, whose 23 technologies qualified as candidates in OSF's selection process, were invited to present their technologies in half hour demonstrations and brief hands-on demonstrations.

As of late December, the final selection process was still ongoing. A core team of six members of the OSF's technical staff is responsible for the final decisions, but at least 24 outside experts (including members of the X consortium) have been consulted during the process. The selection committee consists of two representatives from each OSF member.

In a second joint announcement at Comdex, Microsoft and HP revealed plans to port the presentation manager to the UNIX operating system. If Common X Interface is selected by OSF, independent software developers will follow with new products based on HP's NewWave environment. If it becomes possible to port OS/2 applications to UNIX, developers have an assurance that their applications will be scalable and can exist in multivendor environments without significant porting efforts.

Further, HP stands to benefit from the CXI becoming part of the standard user interface for UNIX because two-dimensional widgets will become part of the standard. HP's proprietary three-dimensional widgets may become a very attractive enhancement, and HP will be in a good position to profit from licensing this three-dimensional appearance for applications that need the enhancement of buttons and knobs that actually can look recessed when they're selected.

The OSF user interface announcement could make the terms "widget" and "application programming interface" as familiar in the software lexicon as scroll bar and kernel are today. There even may be a sudden upturn in sales of NewWave developer's kits.

***Editor's Note**: At deadline, the OSF announced that its user environment component will be based on HP's 3D appearance and Window Manager technology, HP and Microsoft's Presentation Manager-compatible behavior and DEC's toolkit technology. HP also said it plans to use the new OSF interface as the base for HP NewWave on UNIX.*

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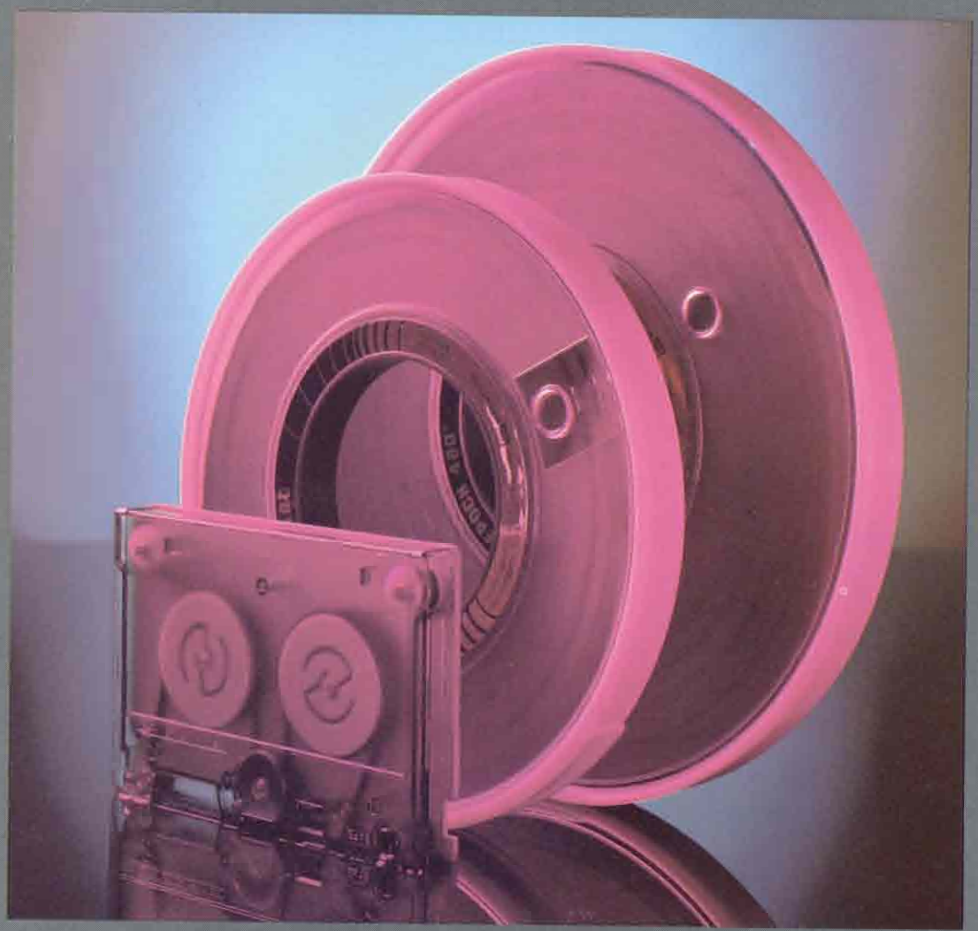

Whatever your HP 3000 configuration, there's a BackPack™ solution for you! For cartridge tape backup, there's low-cost **Micro BackPack.** Micro BackPack cuts backup time in half and doubles cartridge capacity—useful on any cartridge-based HP 3000, and a real lifesaver on a Micro LX or GX.

For MPE/V systems with reel-to-reel tape drives, the solution is **BackPack/V.** BackPack/V dramatically reduces backup time and tape usage, stores multiple databases on a single tapeset, offers integrated SYSDUMP and VALIDATE, and supports unattended backup.

For new MPE/XL sites, **BackPack/XL** is here! Because it uses the same tape format as BackPack/V, BackPack/XL can play a key role in migration and disaster recovery. BackPack/XL is over twice as fast as HP's TRANSPORT mode, about 20% faster than native mode, and also supports operatorless backup.

BackPack can solve *your* backup problem. Call to order a free demo today!

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NEWS & TRENDS

N&T

Operations Control Systems Expands Reseller Program For HP 3000 Line

Expansion Includes A Broader Range Of Distribution And Worldwide Marketing

In response to record results, Operations Control Systems (OCS) is expanding its recently launched reseller program for its entire line of HP 3000 Data Center Management Software.

OCS announces it has doubled the volume of its channel marketing since establishing a reseller program in the second quarter of 1988 and is expanding the program to include a broader range of distribution.

The company has expanded the program to allow qualified Value Added Resellers operating in selected vertical markets to offer OCS products for resale to their customer base. OCS is currently seeking qualified distributors.

The company also has expanded the program to include distribution through qualified consultants who recommend and install OCS software at HP 3000 sites. OCS will continue its original program making its products available for distribution through application suppliers as part of a fully integrated package. OCS systems engineers are available to assist suppliers with unique interfacing procedures.

OCS also will continue expanding its worldwide marketing and is seeking qualified international distributors. The company's current distributors include Perwill (England), Performing Systems (The Netherlands) and Facer Information Designs (Australia).

OCS and its distributors provide full training and support for all of its products including OCS/EXPRESS, a batch job scheduler, OCS/LIBRARIAN, a library management and version control system, and OCS/PRIVATE, a security system.

A discount program also is available for government and educational institutions.

For more information on the OCS reseller program contact OCS, 560 San Antonio Road, Palo Alto, CA 94306; (415) 493-4122.

Circle 363 on reader card

Mighty Keys Opens New U.S. Office

Will Provide Servicing For SESAME

Mighty Keys Inc. of France has recently announced the opening of an office in the United States to provide better service and marketing for SESAME, a comprehensive security system for the HP 3000 and DIAG, and new performance analyzer. Successful in Europe, these products now are ready to assume a string position in the American marketplace.

The move is coupled with an agreement with Speier Associates, a Cincinnati based HP 3000 software supplier, to provide assistance in the area of training, English documentation and technical support.

Contact Mighty Keys at its new address: Mighty Keys International, 1720 Section Rd, Suite 111, Cincinnati, OH 45237; (513) 731-4966.

Circle 365 on reader card

CASE Users Group Formed

First Aimed At Managerial Issues Associated With CASE-based Tools

The first CASE Users Group aimed at fostering a dialogue on managerial issues associated with CASE-based tools and methodologies has been formed. The group is sponsored by the CASE Research Corporation.

The objectives of the CASE Users Group include: promoting understanding of the role CASE plays in support of Information Systems among senior IS and line management, providing education and research materials on an on-going basis for CASE-related subjects, and fostering a relationship with CASE vendors and systems software community members in order to influence future technological developments.

Contact Arthur Young, 277 Park Avenue, New York, NY 10172; (212) 407-1723.

Circle 372 on reader card

Cumulus Will Provide Terminals For INTEREX

Also Shipping VDTs To Training Sites

Video Display Terminal manufacturer Cumulus Technology has announced that it has been chosen as the official supplier of terminals for the INTEREX Computing Management Symposium to be held March 8 through 10, 1989 in Nashville, TN. Over 60 exhibitors will have the opportunity to sign up and receive a Cumulus terminal for use during the show.

Cumulus Technology also has shipped a large order of VDTs to various training sites for ASK Computer Systems. ASK Computer recently installed HCT terminals at its training centers throughout the United States. These centers include the Los Altos Training Center located at their headquarters in Northern California and regional training centers located in Orange, CA; Oakbrook, IL; Houston, TX; Burlington, MA and Syosset, NY.

Since ASK software uses a series of screens that provide data and information to the user, these screens must be easy to read. Therefore it is important to train new users on VDTs that are legible and eyestrain-relieving.

Members of ASK's technical group tested the Cumulus unit and found that it met their requirements for clarity of display, cost and reliability. The first units were installed in May, 1988.

Contact Cumulus Technology, 1007 Elwell Court, Palo Alto, CA 94303; (415) 960-1200.

Circle 362 on reader card

Microtec Research Grows

Moves Into New Facilities

Microtec Research Inc., has announced that it has expanded its operations and moved its headquarters into new facilities to accommodate that expansion.

Microtec Research is a producer of microprocessor development products for the embedded systems environment.

Formerly located at 3930 Freedom Circle in Santa Clara, CA, Microtec Research now can be contacted at 2350 Mission College, Blvd., Santa Clara, CA 95054; (408) 980-1300.

Circle 371 on reader card

Gateway Systems Moves To Atlanta

New Office To Market SYNERGIST

Gateway Systems Corporation has announced the opening of its newest office in Atlanta, GA. The office will handle the marketing of SYNERGIST to the southeast portion of the U.S.

SYNERGIST is the latest in application development architecture and blends the power of PC and host computers. It operates with a DEC VAX or HP 3000 host and allows the programmer/analyst to design applications using the PC as the development workstation as well as an end-user workstation. It also is currently in alpha testing with the IBM 9370.

Contact Gateway Systems Corporation, 2400 Science Pkwy., Okemos, MI 48864; (517) 349-7740.

Circle 368 on reader card

New Danville Facility To Accommodate ORBiT Growth

Will House Growing Staff And HP 925

A new 3,000-square-foot facility in Danville, CA will house the staff and HP 925 computer of ORBiT Software (USA) Inc.

The firm, which is part of a multinational group, expanded into the U.S. earlier in 1988. Its products, BACKUP/3000 and ONLINE-BACKUP/3000 are licensed to more than 150 U.S. firms, including Proctor & Gamble, Dupont, Hughes, Boeing, Union Camp and Northern Telecom Ltd.

ORBiT also has offices in the United Kingdom, Germany, France, Scandinavia and Benelux.

Contact ORBiT Software, 319 Diablo Rd., Suite 218, Danville, CA 94526; (415) 837-4143.

Circle 360 on reader card

HP Creates Three Entities Within Computer Systems Group

New Structure Will Enhance Customer Support

Hewlett-Packard has recently announced the creation of two divisions and one operation within the recently established Computer Systems Group.

The group's structure will speed decision-making and enhance HP's ability to meet customers' needs.

The three new entities in CSG, which is headed by HP Vice President Willem P. Roelandts, are the General Systems Division, which is responsible for the HP 9000 multiuser-systems business and for development of HP-UX operating systems; the Data and Languages Division, which includes laboratories devoted to databases, languages and tools; and Data Systems Operation, which is responsible for the HP 1000 computer line for factory-floor markets.

Contact Hewlett-Packard, 3000 Hanover St., Palo Alto, CA 94303; (415) 857-6805.

Circle 374 on reader card

Folsom Research And HP's Technical Computer Group

Develop Aurora/300 Single-Slot Boardset

Folsom Research Inc., (Folsom, CA) has introduced a new board-level video scan converter for the HP 9000 Series 300 family of workstations.

The Aurora/300 board represents a solution for getting real-time RS-170A, RGB and genlockable NTSC standard video output from the Series 300 workstations.

PAL versions will be available in the first quarter of 1989. The Aurora/300 board set was developed by Folsom Research in cooperation with HP's Technical Computer Group (Ft. Collins, CO). The boardset is a follow-on product to the Monarch CGC color-graphics converter. While the Monarch product is a standalone unit, the Aurora/300 is an integral part of the Series 300 workstation.

The single-slot boardset slides into the Series 300 backplane and offers two modes of conversion: full-frame, real-time compression of the analog RGB signals for the HP graphics processor and a windowing mode that allows the user to write digitally to the Aurora/300 frame buffer through the HP DIO-II bus.

Contact Folsom Research Inc., 526 E. Bidwell St., Folsom, CA 95630; (916) 985-2481.

Circle 361 on reader card

HP Announces Solution For Security-Conscious Customer

Working Closely With NCSC To Ensure C Level Of Security

Hewlett-Packard has announced the availability of additional protection for the security-conscious customer.

HP's solution is the result of working closely with the Department Of Defense National Computer Security Center (NCSC) to ensure that the HP MPE operating system meets its C2 level of security. After a formal evaluation, the NCSC certified HP MPE and HP Security Monitor at a C2 security level. HP Security Monitor is a system-security product running under MPE V on the HP 3000 minicomputer.

Additionally, HP has developed new functionality to meet the C2 criteria, including increased access protection, improved batch security and enhanced auditing capabilities.

For more information contact Hewlett-Packard, 19091 Pruneridge Avenue, Cupertino, CA 95014; (408) 725-8900.

Circle 373 on reader card

Sybase And Hewlett-Packard Sign Software-supplier Agreement

Sybase Will Port RDBMS To HP 9000s

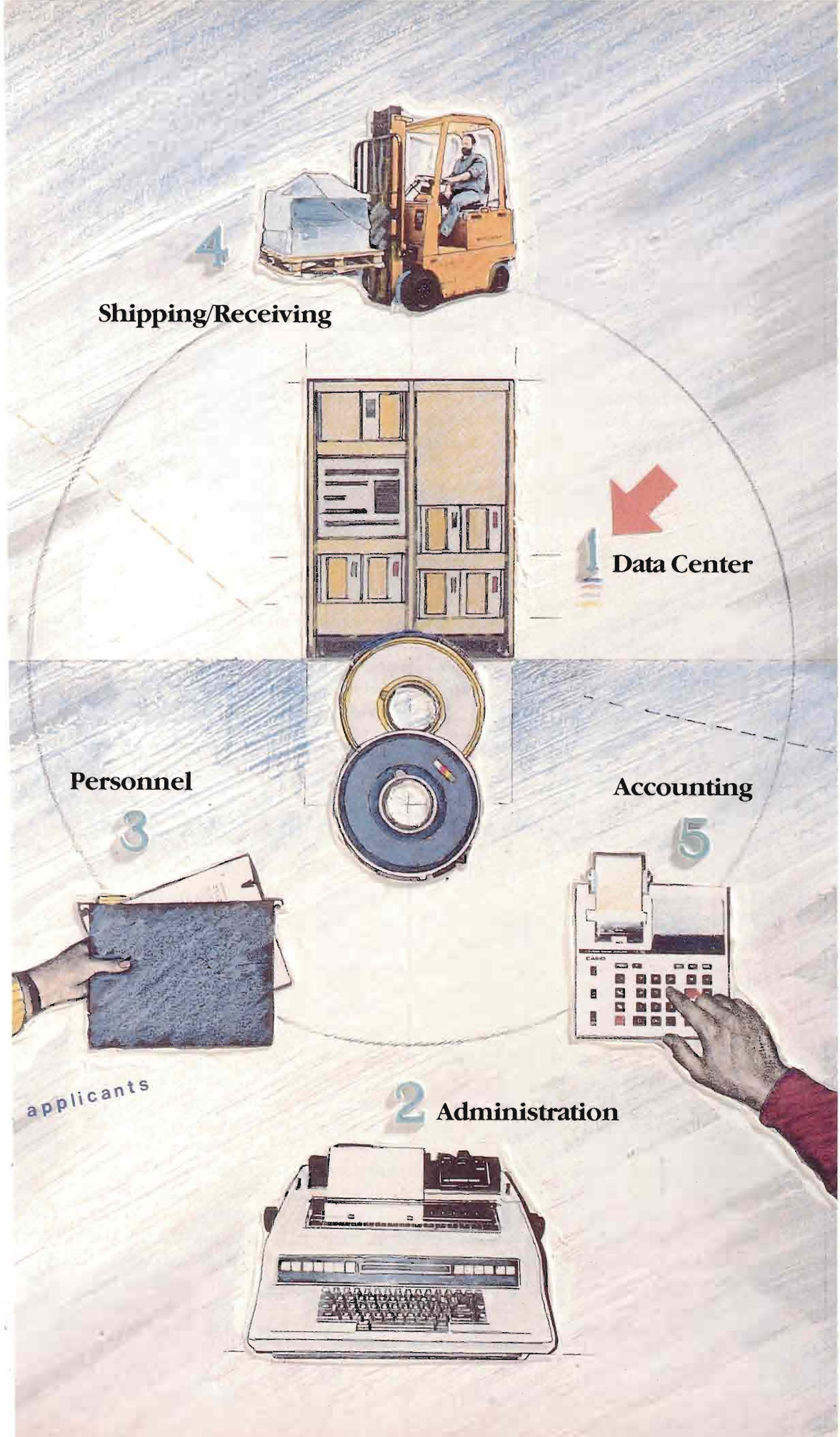
Sybase Inc. and Hewlett-Packard have announced a software-supplier agreement under which Sybase will port its SQL-based relational database management system (RDBMS) to HP 9000 computers.

Designed for on-line application processing, Sybase will run under the HP-UX operating system on both HP 9000 Series 300 individual workstations and HP 9000 Series 800 multiuser HP Precision Architecture (HP-PA) minicomputers.

Software from Sybase and computers from HP are priced separately. The HP Series 300 starts at $4,995 and Series 800 starts at $35,000. Sybase software prices vary according to the computer model selected.

Contact the Hewlett-Packard sales office listed in the white pages of your telephone directory.

Circle 374 on reader card



We're #1

At Unison, the focus—the only focus—is on providing innovative software solutions for automating data center management. This single-minded commitment has helped make us the market leader.

Today, our customer base includes many of the world's largest and most successful corporations. Companies such as Kodak, DuPont, Northern Telecom, Monsanto, Compaq, Rockwell, and Hewlett-Packard have incorporated Unison's software into their data center operations.

They've selected Unison because our products are as reliable and easy to use as they are powerful.

Only one company provides such high-level HP data center software and support: "For a permanent solution, it's Unison." 415 Clyde Ave., Mountain View, CA 94043, 415-968-7511

CIRCLE 141 ON READER CARD

Unison SOFTWARE
The data center management company

Lotus Development Announces Agreement With GTSI

Will Sell Lotus One Source Products To The Federal Government

Lotus Development Corp., has announced an agreement with Government Technology Services Inc. (GTSI) to sell Lotus One Source products to the federal government market.

GTSI is one of the remarketers of microcomputer products and support services to all levels of the government.

Lotus One Source is a family of personal computer-based business and financial database products delivered on CD ROM. One Source products combine industry standard financial information with Lotus software for screening and analysis.

The product line offers a wide range of both numerical and textual information and consists of five products: CD/Investment, CD/Corporate, CD/Banking, CD/Private + and CD/International.

Contact Lotus Development Corp., 55 Cambridge, Pkwy., Cambridge, MA 02142; (617) 225-7087.

Circle 366 on reader card

HP And Libra Health Technology Sign Marketing Agreement

Involves Software Running On HP 9000

Hewlett-Packard and Libra Health Technology, a subsidiary of Libra Systems Inc. (Dallas, TX) have signed a marketing agreement for Libra's LIFENET software system used for the integration of hospital computer systems.

This agreement means both companies will sell Libra's LIFENET software running on HP 9000 Series 300 and 800 computers.

LIFENET's open architecture can integrate different applications systems into a single, hospital-wide network system. All system resources can create clinical and financial information previously contained on different computers. LIFENET supports a wide range a communication protocols including asynchronous, bi-synchronous, TCP/IP and X.25.

Contact the Hewlett-Packard sales office listed in the white pages of you telephone directory.

Circle 374 reader card

Major Developers Endorse HP's OpenView

Provides Further Evidence Of Industry Support

Hewlett Packard has provided further evidence of industry support for its HP OpenView network-management offering by announcing that several major vendors are developing network management applications using the HP OpenView user interface.

The Microsoft Windows-based HP OpenView graphical user interface provides network managers with a standard integrated way to manage networks of systems and devices from multiple vendors. Using a common set of symbols, colors and windows displayed on a central PC console, HP OpenView integrates network management information from multivendor equipment connected throughout a company to help managers optimize networking resource and minimize costs.

The new HP OverView developers include: FiberCom Corporation, Jutland Telephone Company, Microtronix Systems Ltd., Telindus and Ungermann-Bass Inc.

Contact the Hewlett-Packard sales office listed in the white pages of your telephone directory.

Circle 374 on reader card

New HP Program To Aid DEC Users

Applications To Run On 9000/800

Hewlett-Packard has recently launched a program to help Digital Equipment Corp. (DEC) computer users and independent software vendors convert their applications to run on the HP 9000 Series 800 family of HP Precision Architecture (HP-PA) computers.

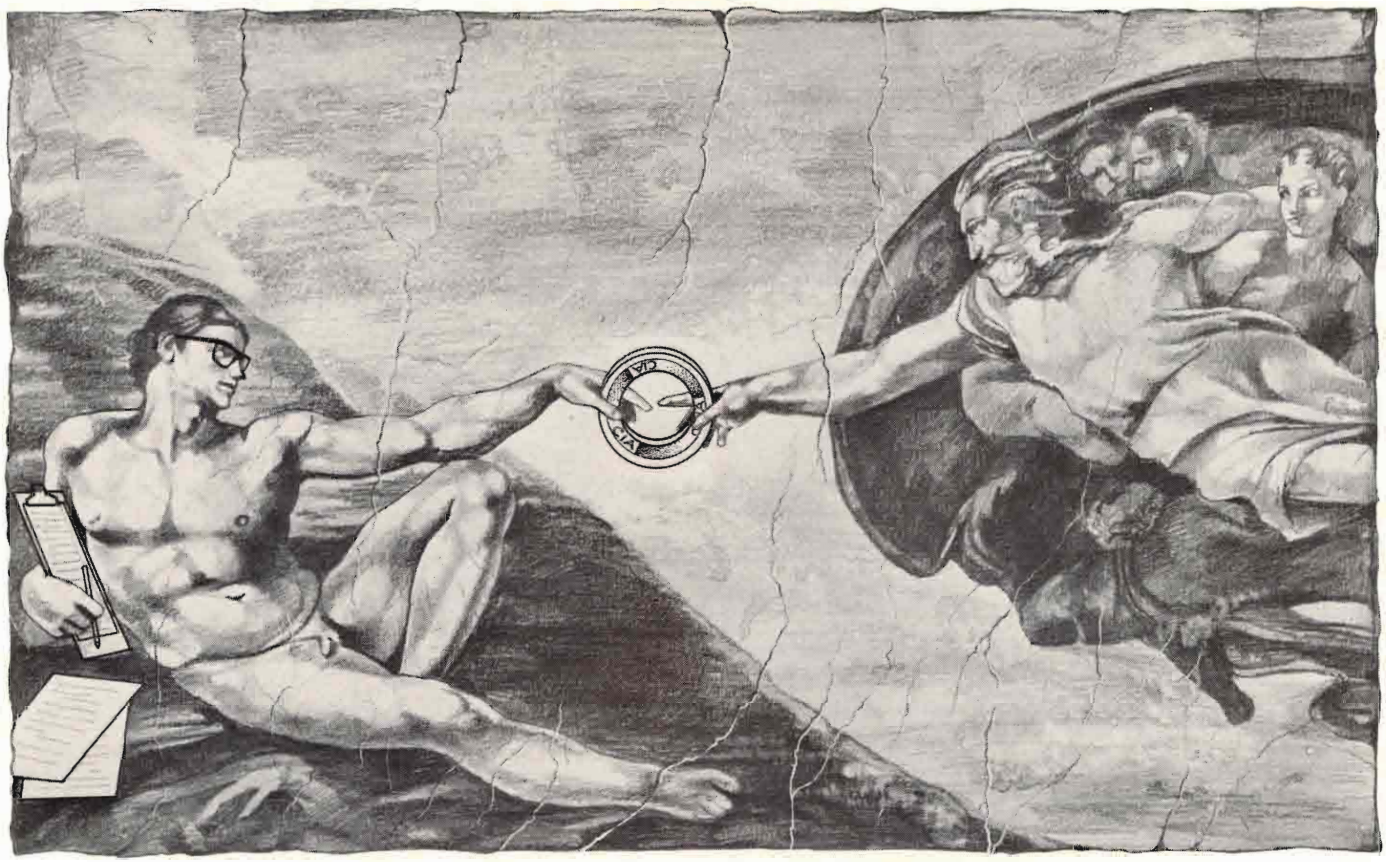
The program, which offers up to three months' free use of any of the four RISC-based HP 9000 Series 800 computer models, includes software-conversion tools, consulting and training services and financing at industry leading rates.

It gives DEC VAX users a low-cost, low risk conversion path from DEC's proprietary VMS systems to an HP system running a UNIX operating system.

The elements of the new program include a free trial program; PORT/VX, a FORTRAN migration product; use of one of HP's field-migration centers and financial programs.

Contact the Hewlett-Packard sales office listed in the white pages of your telephone directory.

Circle 374 on reader card



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Telephone +61 2 484 3979. Facsimile +61 2 484 5709.

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Tres Associates

Post Office Box 9802-231, Austin, Texas 78766.

Telephone 512 346 0904. Facsimile 512 459 9588.

FM&A/LF5

CIRCLE 154 ON READER CARD

Pathfinder Offers Information Management Capabilities

Now Part Of Health And Safety Module

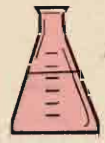
Industrial relations managers and company health officers can take advantage of the information management capabilities that are now part of the Health and Safety Module in Pathfinder's Personnel Management System.

Along with detailed employee health profiles, the system will track complete medical and accident information including any kind of medical exams, tests, accidents and injuries. Information is tracked for historical events and future scheduling events. Reporting profiles are available by employee, employee group or other organizational grouping and include every aspect of medical, accident and testing information contained in the system.

For more information contact Pathfinder Software Inc., 1577 West Georgia Street, Vancouver, BC V6G 2V3; (604) 682-6633.

Circle 364 on reader card

HP, Molecular Design Ltd. To Develop Workstation



System To Process Chemical Information

Molecular Design Limited has formed a development and marketing relationship with Hewlett-Packard to develop a complete chemical workstation.

To be developed over the next 18 months, the workstation will consist of Molecular Design Limited software running on HP 9000 high-performance graphics workstations.

The software will feature a graphical user interface with seamless integration between workstation and mainframe applications. Appropriate processes will be distributed transparently between local and host hardware environments. Interactive portions of the program will run on a workstation and computer intensive portions, such as searching of corporate databases, will run on a mini- or mainframe computer.

For more information contact Moleculer Design Limited, 2132 Farallon Dr., San Leandro, CA 94577; (415) 895-1313.

Circle 369 on reader card

Execucom And DB/ACCESS Announce License Agreement

Execucom To Integrate Access/Star

Execucom Systems Corp. and DB/ACCESS Inc. have announced a product licensing agreement that calls for Execucom to integrate Access/Star, a product of DB/ACCESS in Execucom's line of Decision Support System (DSS), and Executive Support Systems (ESS) products.

Included in the agreement are IFPS/Plus, a mainframe-based modeling and forecasting software package and Executive Edge, a software program designed to meet the information needs of senior executives.

Access/Star is a family of software tools that provides users and programmers with a simple, standard SQL-based mechanism to access remote data in both SQL and non-SQL databases and file systems.

Contact Execucom Systems Corp., 9442 Capital of Texas Hwy. N., Arboretum Plaza One, Austin, TX 78759; (512) 346-4980.

Circle 367 on reader card

UniMarket Is Direct Source For UNIX Applications

Provides Users With One-Stop Shopping

UniPress Software Inc. has announced UniMarket, the first direct single-vendor source for a wide range of UNIX/XENIX applications, tools and languages. Through UniMarket, a variety of UNIX-based office automation, desktop publishing, database management and communications packages from numerous suppliers may be ordered by mail or toll-free telephone call. UniPress will provide installation and technical support for the applications.

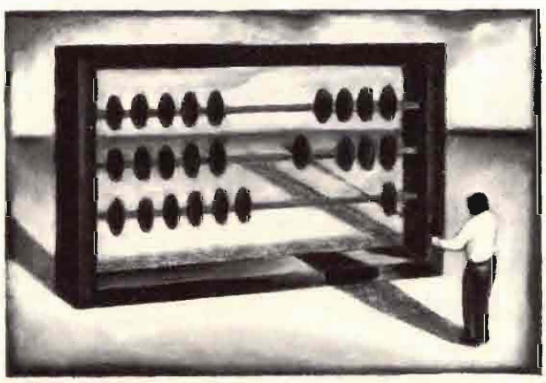
Applications currently offered by UniMarket include office automation, database and communications products and development tools.

For more information contact Marilyn R. Kilinski, UniPress Software, 2025 Lincoln Hwy., Edison NJ 08817; (201) 985-8000.

Circle 370 on reader card

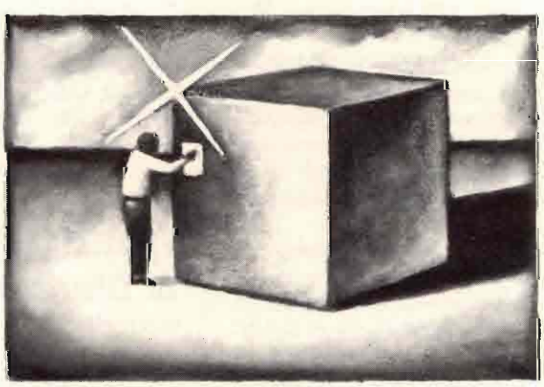
While they're

Looking it up,



Adding it up,

Writing it up,



Finishing it up...

You could be backing it up!

Now with ONLINE-BACKUP/3000 all you need is 10 minutes of system downtime to secure backup integrity. **Backup runs during productive online UPTIME** — with no loss in system responsiveness.

Tired of seeing online and batch time "squeezed out" by your current backup procedures? Then you owe it to yourself and your users to **discover amazing new system availability with ONLINE-BACKUP/3000.**

Join companies like Hughes Aircraft, Procter & Gamble, Union Camp, and General Motors who traded "time out" for more "time up" with ORBiT Software.

Retain all the tape-reducing and process-timesaving features of traditional unattended backup utilities while adding the powerful ONLINE capability to your toolkit.

online BACKUP 3000

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CIRCLE 130 ON READER CARD

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(800) 6-ONLINE, in California (415) 837-4143, FAX (415) 837-5752

ORBiT Software GmbH (Berlin) | **ORBiT Software (UK) Ltd** | **ORBiT Logistics (France) Sarl** | **ORBiT Utilities (Benelux) N.V.** | **ORBiT Software (Scandinavia) AB**

HP Introduces Software Emulator

Hewlett-Packard has introduced SoftPC Synthetic Hardware that allows HP 9000 computer users to run IBM PC-XT software.

HP also improved the HP 9000 Series 300 DOS coprocessor with support of EGA display emulation, X Window System, Version 11 and MS-DOS 3.3.

SoftPC allows HP 9000 Series 300 and 800 systems to emulate a PC-XT and use more than 40,000 software packs, including office automation and PC-CAD (computer-aided design) applications. This high-speed, software-only product requires no additional hardware.

Earlier this year, Insignia Solution Inc. announced the porting of SoftPC to the HP 9000. The agreement with Insignia calls for HP to license, label, sell and support SoftPC as an HP product.

SoftPC is available for a wide range of systems from the HP Model 318M to the high-performance HP 9000 Precision Architecture Model 855, which is based on RISC (reduced-instructions computing). Connectibility to other vendors' computers is provided through the extensive networking capabilities of the HP 9000 and support of the latest version of X Window System, Version 11.

The HP 9000 Series 300 DOS coprocessor system, which includes both hardware and software, is $1,335.

Contact the Hewlett-Packard sales office listed in the white pages of your telephone directory.

Circle 400 on reader card

Oracle Offers Accounting Software Applications

Oracle Corporation, developer and marketer of the ORACLE RDBMS has announced Oracle Financials, a suite of accounting application software packages.

Oracle Financials is designed for centralized and decentralized accounting departments. Initially it consists of four products: Oracle Ledger, Oracle Payables, Oracle Purchasing and Oracles Assets. The products currently are being shipped to customers using Sequent and DEC VAX computers and will be ported to the same mainframe, minicomputer, workstation and microcomputer systems on which the ORACLE RDBMS is available.

Available immediately, each Oracle Financials product ranges in price according to the computer on which it is installed.

Contact Oracle Corporate Headquarters, 20 Davis Dr., Belmont, CA 94002; (800) 345-DBMS.

Circle 399 on reader card

VERILOG USA To Distribute GEODE

VERILOG USA, a distributor of VERILOG products in the United States, has announced that it is adding another CASE tool to its set of software development tools. GEODE, a real-time systems design tool, now is available in the U.S. along with its companion products, LOGISCOPE and A.S.A.

GEODE is a graphic oriented design tool that includes a Graphic Editor, Semantics Checker, Simulator/Debugger, Documentor and a Code Generator for C. GEODE supports the Specification and Description Language (SDL) a graphic and textual language defined by CCITT.

For more information, contact VERILOG, USA., Beauregard Square, #340, 6303 Little River Turnpike, Alexandria, VA 22312; (703) 354-0371.

Circle 397 on reader card

Oracle Financials consists of four accounting packages.

DISCORP Announces Imaging System

Distributed Image Systems Corporation (DISCORP) has announced the release of a second-generation imaging workstation.

DISCORP's imaging workstation configuration is a new PC/AT-based system capable of compressing storing, scaling and displaying 60 documents per minute. When employed as a viewing workstation, the system can decompress, scale and display a full-page, 300-DPI image in about 300 milliseconds.

The new system consists of the PC/AT, DISCORP's display controller and a 19-inch CRT monitor. The system displays a 2048 × 1650 pixel image. A complete set of library routines, DOS-based image commands and full documentation are furnished as part of the system.

The windowing environment allows the user to display document images, host record and DOS image management commands, all at the same time. The DISCORP system supports a broad range of scanners, including the highest speed scanners operating at 40 pages per minute. DISCORP systems will handle paper documents of any size up to E-size engineering drawings as well as 16-mm and 35-mm aperture cards and microfiche.

Contact DISCORP, 290 Easy Street, #5, Simi Valley, CA 93065; (805) 584-0688.

Circle 398 on reader card

Sola Introduces New Small UPS

A new electronic uninterrupted power system that features an output power factor and increased crest factor has been introduced

by Sola, a Unit of General Signal. The portable, plug-in unit also offers an overload bypass, that previously was available only on larger UPS systems. With these enhancements, the new Mini-UPS/2 eliminates the need to oversize the power protection unit to meet the high-inrush and peak current demands of modern computers and other equipment using switch mode power supplies.

The Mini-UPS/2, like other Sola UPS systems, is a "true" on-line UPS that operates continuously during normal line-power condition to provide voltage regulation plus isolation from noise and transients. Battery reserve is always on-line and automatically supplies the critical load with no-break uninterrupted power in the event of any line-power failure.

For more information on the Mini-UPS/2 models and other power protection equipment, contact Sola, A Unit of General Signal, 1717 Busse Road, Elk Grove Village, IL 60007-5666; (312) 439-2800.

Circle 394 on reader card

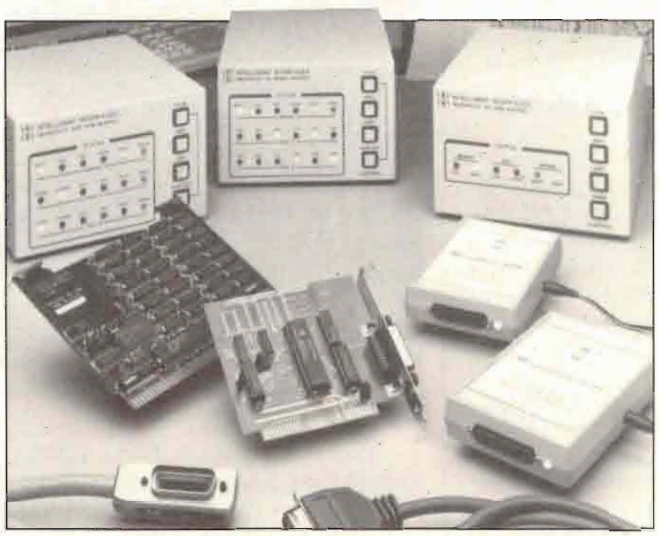
Peripherals Boost Workstation Productivity

A new family of computer peripherals, has been designed to increase the productivity of Hewlett-Packard 9000 Series and IBM PC workstations for CAD/CAM/CAE applications. The new peripherals, manufactured by Intelligent Interfaces Inc., (Stone Mountain, GA) provide increased efficiency and up to a 20:1 improvement in computer utilization for users of expensive HP and IBM workstations.

The new peripherals include MicroPlot 80 Series plotter/printer buffers for HPIB and other IEEE-488 computers; MicroPlot 55 Series plotters/printer buffers for IBM-PC, compatible and other RS-232 computers; MicroRAM 1 MB memory expansion board for HP 200/300 Series computers; MicroPrint 45 Series converters for HPIB/Centronics printer interfacing and GPIB-1000 card for IBM/HP printer interfacing.

The buffers enable workstation users to begin new projects while completed projects are being printed or plotted, so costly workstation down-time is eliminated. The interface units allow HP and IBM computer users to access non-compatible peripherals.

All Intelligent Interfaces peripherals feature a minimum one-year warranty and a 30-day money-back guarantee.



Intelligent Interfaces Inc., introduces new family of computer peripherals.

For more information contact Robert Jarvis, Intelligent Interfaces, Inc., P.O. Box 1486, Stone Mountain, GA 30086-1486; (404) 381-9891.

Circle 396 on reader card

Xsight Windowing Software Announced By Locus

Locus Computing Corporation now is shipping its Xsight windowing software that lets system developers customize windowing environments to their specific applications.

Using the MIT X Window System standard, the Xsight windowing software is designed for Intel 80386-based machines running UNIX System V, Release 3, operating system software.

Xsight was designed to work with Locus Computing Corporation's Merge 386 product that allows users to concurrently operate DOS and UNIX applications on 386-based systems.

When 386-based personal computers running Xsight, DOS and UNIX are networked to UNIX hosts, Xsight users can invoke, monitor and control multiple DOS and UNIX process on any number of network controlled systems.

Xsight sells for $695 and is available immediately. Xsight is compatible with PC Xsight, Locus Computing Corporation's DOS implementation of the X Window System as well as other host implementations of the MIT standard. Xsight can be used with most 386 DOS/UNIX operating systems and local area networks.

Contact Locus Computing Corporation, 9800 La Cienega Blvd., Inglewood, CA 90301-4440; (213) 670-6500.

Circle 395 on reader card

VESOFT Offers Security Auditing Tool

VESOFT has announced VEAUDIT/3000 designed to find the loopholes in your system security configuration.

VEAUDIT/3000 generates reports on: passwordless users; users with powerful capabilities (like SM, OP, PM and AM); job streams with embedded passwords; improperly secured files; privileged programs; possible "Trojan Horses"; recent changes to your security system; ways by which users can DISABLE your UDC-based security system and more.

Contact Vesoft Inc., 1135 S. Beverly Drive, Los Angeles, CA 90035; (213) 282-0420.

Circle 393 on reader card

QMS Introduces UltraScript PC

QMS Inc., has announced UltraScript PC a software program that uses UltraScript, the PostScript language compatible interpreter developed by IMAGEN Corporation, a wholly-owned subsidiary of QMS. UltraScript PC consists of a language interpreter, fonts and print drivers that support dot-matrix, ink-jet and laser printers including Epson LQ Series, IBM Proprinter X24 and XL24 series and other 24-pin dot-matrix printers that emulate them; Hewlett-

Packard DeskJet and LaserJet Series I and Series II printers.
Contact QMS Inc, One Magnum Pass, Mobile, AL 36618; (205) 633-4300.

Circle 392 on reader card

New Version Of FIGARO Released By TGS

Template Graphics Software Inc. has announced the release of an advanced version of FIGARO software for hardware from Silicon Graphics, Sun Microsystems, Prime, HP, Apollo and DEC. FIGARO is an enhanced implementation of the ANSI/ISO Programer's Hierarchical Interactive Graphics Systems (PHIGS) standard. In addition to the PHIGS standard, FIGARO incorporates functionality required by commercial and government application developers and by Fortune 100 companies for internal application.

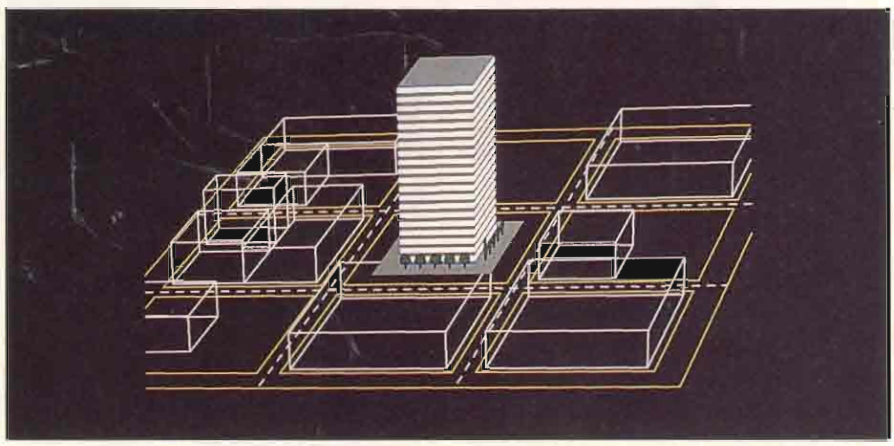
FIGARO now supports full asynchronous event input for hardware input devices and allows multiple simultaneously active input devices. Programmable device triggers allow a single keystroke or mouse click to generate multiple input events. With this general functionality, applications can retrieve the position values, the key pressed and the graphical object being identified by a single operator click of the mouse. On-screen buttons and slider widgets now are provided with FIGARO and are available in addition to optional hardware buttons and dial boxes.
Contact Robert Bruns, TGS, 9685 Scranton Rd., Suite 150, San Diego, CA 92121; (619)457-5359.

Circle 376 on reader card

Protection Switch From CaSaT Technology

CaSaT Technology Inc. (Amherst, NH) has announced an intelligent LAN protection switch that provides automatic redundancy for IEEE 802.3, 802.4 and proprietary broad band networks. The APS-2220 family consists of three standards-conformant products that automatically connect alternate backbones in the event of primary backbone failure.

The APS-2220 family uses microprocessor-based circuitry to provide a range of features including automatic self-diagnostic alarm indication. A front panel key switch enables a user to override the automatic function of the APS for diagnostic and signal and distortion labels on incoming signals and, in the event of difficulties, switches backbone connections in less than 10 msec.



TGS has announced an advanced version of FIGARO.

Prices range from $1,950 to $3,975.
Contact CaSaT Technology Inc., 10 Northern Blvd., Amherst, NH 03031; (603) 880-1833.

Circle 391 on reader card

Baytech Introduces Print Master II, Model 804C

Bay Technical Associates Inc. Data Communications Products Division has introduced the Print Master II, Model 804C.

Designed for small office connectivity, the Print Master II, Model 804C offers flexible, buffered printer sharing between computers, printers, plotters and modems, and allows computer-to-computer communications with many communications software packages.

The Model 804C features four RS-232C serial ports. The flexibility of Print Master II enables any port to be set as a computer port or a printer port through BayTech's menu-driven configuration mode. All configuration changes are saved in non-volatile memory and can be altered later if applications change.

Print Master II is compatible with virtually any computer, printer, plotter, modem or other peripheral and is covered by a full one year warranty on parts and labor. The price is $395. Unlimited toll-free tech support is provided Monday through Friday from 7:00 a.m. to 6:00 p.m. (CT).
For more information contact BayTech, 200 N. Second St., Bay S. Louis, MS 39520; (800) 523-2702 or (601) 467-8231.

Circle 390 on reader card

WFSB Introduces MLPTS/3000

Washington Federal Savings Bank has introduced an automated mortgage software package, Mortgage Loan Pipeline and Tracking System MLPTS/3000, designed in PowerHouse which currently runs on the HP 3000.

MLPTS/3000 provides control over the loan inventory from application through delivery and sale. Special features include the use of laser printers to print all Conventional, FHA and VA processing and closing documents. Forms such as Loan Applications, Truth-In Lending Disclosures, Deeds and Notes all are maintained on the HP 3000. Changes to forms would be automatic with less time involved in training processors and closers in document preparation procedures.

Costs vary for MLPTS/3000 depending on the size of your HP 3000 and the volume of loans each mortgage company produces.
Contact Alex Wish, Washington Federal Saving Bank, 516 Herndon Pkwy., Herndon, VA 22070; (703) 478-0870.

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Laser Control 3.3 Supports HP Printers

Insight Development Corporation (Moraga, CA) has announced Laser Control 3.3 a software package that allows any IBM or compatible PC to work with the HP LaserJet, DeskJet and compatible series of printers.

LaserControl 3.3 allows existing application software packages to use all the features of inkjet and laser printer technology regardless of compatibility between the application program and inkjet or laser printer.

LaserControl 3.3 also reduces memory requirements for setup and envelope handling capabilities. With the introduction of Hewlett-Packard eight-page-per-minute LaserJet IID printer, support for duplex printing, binding control, paper tray selec-

Continued on page 86.

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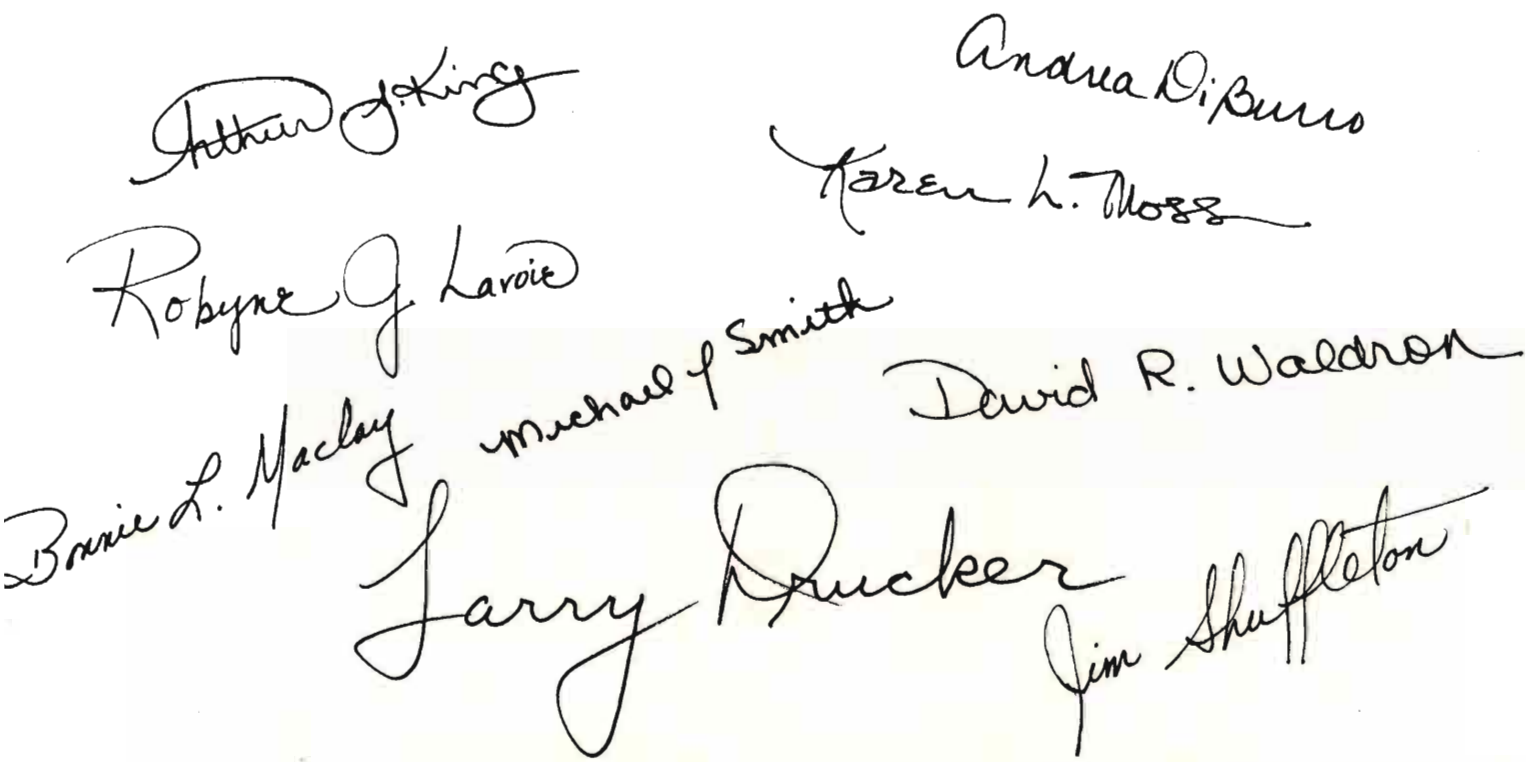

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Welcome Back, Mr. Smith

A Major Hotel Chain Looks To UNIX To Improve Efficiency And Service

Who would have thought that database technology and a fourth generation language would be the means to provide the personal attention that distinguishes good hotels from excellent ones?

At first glance, it seems improbable that the hospitality industry is pioneering commercial uses of UNIX. Hotels, motels and resorts are latecomers to automation, and hospitality employees are less likely to be computer literate than say, employees of banks or professional offices.

Vendors of commercial UNIX packages for hotels need to hide the rough edges of the operating system from unfamiliar users. According to Geoffrey McDowell, Toronto-based manager of Information Systems for the Four Seasons Hotels, hotels require congenial user interfaces and extremely responsive training and support. He notes that most hotel properties have no systems person on hand, so the software vendor must be prepared to offer 24-hour support.

In many hotels the middle of the night is the most crucial time in the operation of the system because the accounting department is processing bills that will be slipped under the doors of guests departing in the morning.

[BY PEGGY KING]

Ironically, the fact that hotels were late to automate helped the hospitality industry move to the forefront of the trend toward using UNIX systems for commercial applications. Some large hotel chains are just now replacing twenty-year-old centralized mainframe systems, and many of the smaller chains and single properties are automating for the first time. Many chains are ready to evaluate new systems, and software vendors for the lodging industry have seized the market opportunity by writing UNIX applications that can be used on machines from many vendors. Today, software packages for the hospitality industry are becoming more readily available than in other vertical markets where proprietary operating systems are firmly entrenched.

Hotel users are extremely demanding customers for software vendors who serve the hospitality industry. MIS directors and systems managers of hotels and lodging chains have an exacting set of

hardware and networking requirements. Hewlett-Packard is prepared to meet their requirements because it views the lodging industry as a very important niche in its vertical market strategy.

HP Targets Lodging Industry

HP'S STRENGTHS IN THE hospitality market for commercial UNIX systems are the same ones that it hopes will attract other vertical market customers when these markets get better established. HP is relying on its adherence to industry standards and its leadership role on standards committees, as well as publicizing its alliances with leading software vendors in the industry to gain market share. (HP refers to these vendors as value added businesses or VABs).

The sales force and marketing specialists are positioning the HP 9000 Series as the best platform for the lodging industry by emphasizing reliability, scalability and price/performance.

Reliability:A hotel's reputation depends on customer service. If a person calls an 800 number to reserve a room at a hotel and is told that the system is down, that prospective guest is not likely to call back. Instead, he or she will call one of the other chains with an 800 number.

The guest who waits in line to check out while his bill is being processed manually because the accounting system is down may leave the hotel with a bad impression and decide to stay elsewhere next time. HP's reputation for reliable hardware coupled with its stringent selection process for VABs helps assure that the systems and software will have minimal downtime.

Scalability: Most of the properties in the Four Seasons chain average 300 rooms, so scalability was not an issue in their decision to use HP 9000 systems. On the other hand, most of the large nationwide chains have small to massive properties. HP can provide UNIX solutions that range from Vectra PCs for smaller properties, to Series 855 superminis to handle accounting at a chain's headquarters.

For example, LaQuinta Motor Inns, Inc. (Santa Cruz, CA) recently selected HP Vectra RS/20 workstations running XENIX — a PC-based version of UNIX — as its on-site computer for each of its 200 inns located in 29 states.

Price/performance: Systems managers, MIS directors and systems analysts for hotels, motels and resorts often are employed by management that views systems as overhead. Typically a hotel chain will have a very small MIS department in relation to the size of its workforce, and managers are looking for the most cost-effective way to run their applications.

For example, the Four Seasons Hotels chose HP over six other vendors whose systems they evaluated because of a benchmark they ran on a code sample similar to their marketing application written in the 4GL ZIM from Zanthe Information Systems. The HP 9000 Model 825 minicomputer ran three to four times as fast as the nearest competitor. As hotels automate an increasing number of functions, they need a

The Four Seasons Hotels' UNIX-based Guest History database is used by hotel personnel to service repeat clientele. The database is used to record information concerning a person's special requirements and preferences. Then, when the person makes a reservation, hotel staff can use the database to prepare for his arrival.

system that delivers maximum processing power for the price.

Industry Standards: No lodging chain can rely on a turnkey solution to its computing and communication requirements. With UNIX as a standard operating system, hotels and lodging chains can use one platform for all of their software. Computing professionals in the hospitality industry look to a standard operating system as an investment in longevity and a chance to build expandable systems to provide for the future when even more functions of the industry become automated.

Perhaps HP's biggest advantage in working with the lodging industry is its reputation as an excellent partner in VAB relationships. In a recent industry report of twelve major vendors, HP was ranked No.1 in the category of working in cooperation with VABS to solve problems. UNIX software vendors have a choice of major vendors with whom to form alliances; HP's good relations with VABs should help the corporation form the alliances needed to offer the hospitality industry a choice of software for their HP 9000 systems.

To date, HP has announced alliances with Computerized Lodging Systems (Long Beach, CA), the largest hotel industry VAB to offer UNIX software, TLI (Albuquerque, NM) and Jonas & Erickson (Ontario, CD).

Software requirements for the hospitality industry vary from chain to chain. Individual resorts or hotels have different needs from those of properties that are part of a chain. Typically, a chain needs to select, purchase and maintain at least four different systems: a back office package, front office software (used by desk clerks, phone reservationists and sometimes even housekeepers), external interfaces to automated systems and network management. In general, the bigger the hotel, the more software will be required to run the subsystems.

UNIX Comes To Four Seasons

FOUR SEASONS HOTELS AND RESORTS is the first major chain to announce its intention to use HP Series 9000 computers both at headquarters and in all of its properties. In 1985, Four Seasons decided to do future software development using UNIX because the company could use 4GLs with UNIX databases. Another advantage of UNIX is that the chain could choose appropriate software from a variety of vendors. The first system, an HP 9000 Series 825 that was installed at the Toronto headquarters last June recently was replaced with an 835 system. Over the next four years, HP 9000 computers running HP-UX will be installed and networked to Vectra PCs at all of the chain's 22 properties in the U.S., Canada and England. When each property's system is installed and running, UNIX software will be used for most subsystems that run the individual properties and the headquarters.

In hotels, back office functions consist of tasks such as accounting, inventory management and payroll processing where the user has no contact with hotel guests. For back office functions, the central minicomputer functions like the departmental computers found in many other businesses.

Front office functions have a direct effect on the quality of service hotels can offer their guests. Software for front office functions must be highly customizable to meet the needs of different types of lodgings. In general, the more luxurious hotels have more automation in front office functions than the budget class lodgings. Almost all mid-sized and large hotels have computerized reservation systems and can provide guests with a confirmation number. Some hotels use software that can provide express checkout, a feature appreciated by business travelers. The Four Seasons has a system that allows housekeepers to telephone a code to indicate whether a room has been cleaned and to report any problems.

Many chains also need software that provides external interfaces (usually RS-232) to various subsystems like pay television, energy systems and telephone charge accounting. Some hotels even have computerized locking systems that need to be integrated with front office functions.

Lodging chains need networking to connect systems in

Over the next four years, HP 9000 computers running HP-UX will be installed and networked to Vectra PCs at all of the Four Seasons' 22 properties in the U.S., Canada and England.

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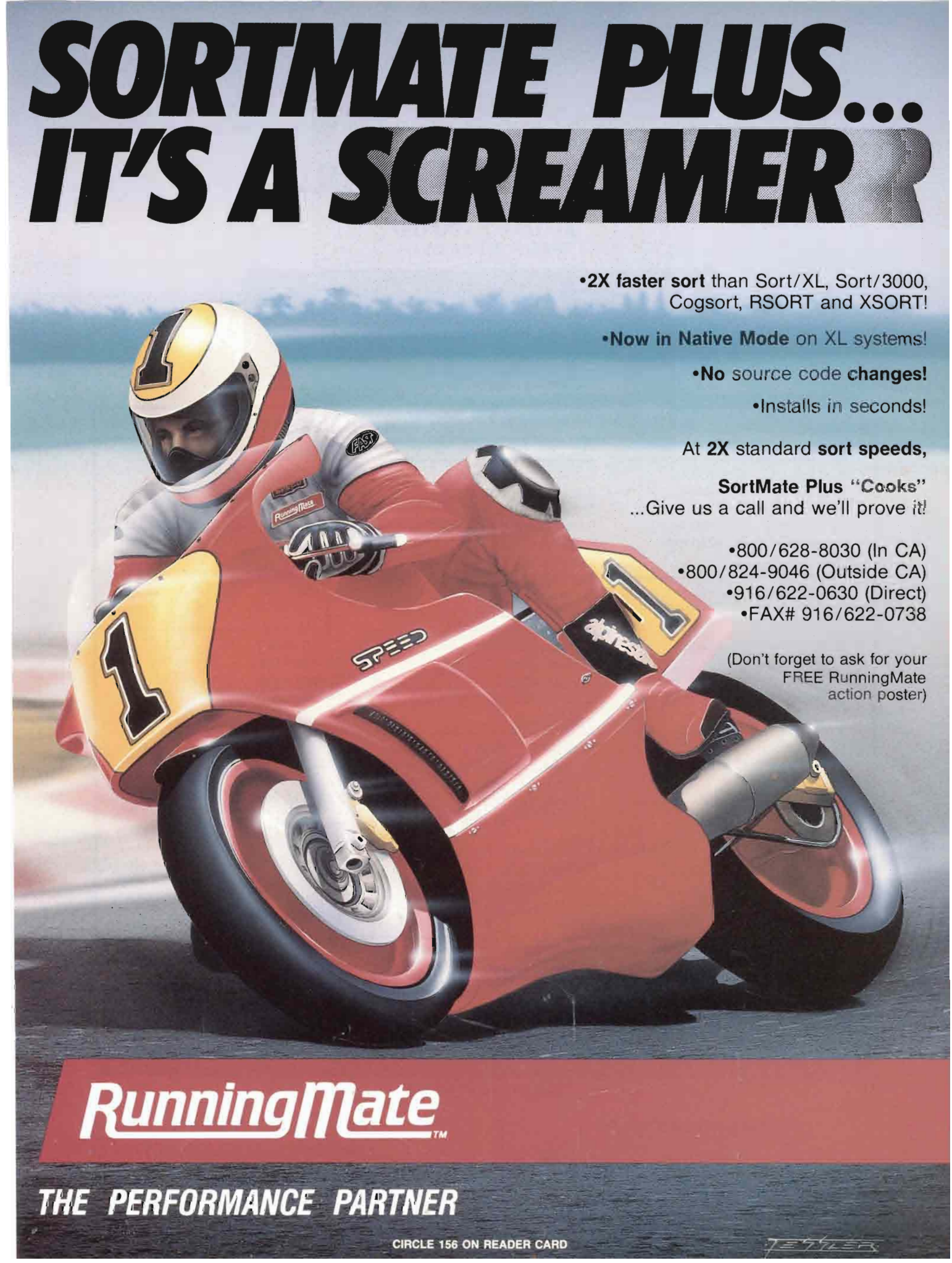

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headquarters to property management systems at individual hotels. For example, at the Four Seasons hotels, personal computers in sales offices need to upload records concerning group rates and catering department services. The Four Seasons' networking solution uses Starlan 10 and PC Interface from Locus. PC Interface provides PC-to-PC transfer UNIX-to-PC file transfer, and resource sharing so that more than one computer can access the same printers and disc space.

The Four Seasons' corporate Guest History Database application helps the hotel chain to offer personal attention to its guests. For the class of travelers whose decision about where to stay is not based entirely on cost, individualized attention is an important benefit. Following the lead of the airlines, most of the larger American chains have instituted frequent guest or corporate traveler programs. The hotel or lodging chain issues cards that provide returning guests with the opportunity to distinguish themselves as guests entitled to receive special treatment.

In keeping with its reputation as a luxury hotel chain, Four Seasons wanted a more subtle way to reward its repeat clientele. Front office employees use the Guest History Database to record information about a guest's special requirements and preferences. When a person makes a reservation, the reservationist can query the Guest History Database to find out if the person is a repeat guest. When a returning guest reserves a room, a screen lists information that helps the hotel prepare for his arrival.

So, by the time the guests arrive, hotel personnel already know about the special mattress provided last visit or the fact that the person used the golf course, and the staff can prepare accordingly.

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A More Sophisticated Programming Environment Than What's Offered By Other UNIX Vendors

HP-UX AS A *Software Development Environment*

[BY DAVE TAYLOR]

There are a number of operating systems, such as MPE/XL, HP's Rocky Mountain Basic workstations, and HP 1000 RTE, that are designed for transaction processing. But there are few systems that are built around the needs of the software developer. UNIX is such a system — an entire operating system designed to support programmers.

This isn't without cost, however. A common complaint of UNIX is its unfriendliness. Moreover, compared to MS-DOS or MPE/XL, UNIX — specifically HP-UX — is limited in sophisticated vendor and third-party software packages.

Rather than tackle these problems here, let's focus on UNIX and HP-UX as software development environments.

Before we can examine the HP-UX support strategy for the vast number of programming languages available, let's talk about the elements of the software environment.

The most fundamental ingredient is a compiler or an interpreter that understands and accepts the complete language that you're using. In sophisticated systems, compilers offer much more than just a black box that you feed source into and have executable modules emitted. Various levels of code optimization should be available, as well as the ability to customize both the compile-time and run-time program environments. Compiler support should also give you the ability to allow programs to be compiled as separate modules and

then linked together to make a single run-time image.

Languages aren't of much use unless they can interface successfully with the rest of the operating system and give programmers the power to exploit the features of their execution environment. For example, one of the reasons for the success of the Apple Macintosh is the user interface and operating system toolbox that is an intrinsic part of every Mac.

Similarly, UNIX offers the software developer a number of toolkits and system interface functions to extend the power of the languages being used. They include toolkits to support the creation of powerful user interfaces and window-smart programs to communicate via various networking protocols with other computers; to use and present graphics to the user; to utilize simple or sophisticated database management systems, and to aid in the internationalization of software. Other features include real-time control libraries, device input and output libraries, and access to specialized hardware that the execution environment might contain (e.g., floating point accelerators).

In the future, it will become more common for programs to be written in multiple languages . . .

Complex software packages have been around for a while and are constantly being ported or migrated onto new platforms. This recognition of "software migratory evolution" has two resultant features for a software development environment: support for cross compilation and support for importing software packages, and programs from other operating systems or computing environments.

RECENTLY, NEW PROGRAMMING methodologies have led to increasing value placed on tools that allow revision control and monitoring. This allows companies quick access to specific older versions of the software package while not taking up hundreds of megabytes of disc space with snapshots of the source.

More important, revision control allows not only multiple engineers to work on a multipart system without concern that contention could cause corrupted files or lost work, but it also allows experimentation with different implementation techniques. This is because it is simple to back up to the most recent running version of a software package.

A related concept to revision control is environmental support for large sets of files through facilities that allow minimal recompilation upon modification of individual files. Generally, tools of this nature are more useful if they support the definition of arbitrary create rules and then allow users to define a dependency list of what files depend on what other files.

The next element of a software development environment, run-time execution profiling, is essential to all code development. Without this feature, it is difficult, if not impossible, to understand how the final running software works, and to fine tune the performance of the package. In addition to generating this information, a sophisticated and user comprehensible method of presenting the data should be included, so that users are able to utilize the information easily to improve their products.

While reading this article, you may be sitting at your desk, relaxing in an easy chair, or laying on a hammock in your back yard. In a similar way, programmers adapt different styles and techniques for the format and layout of their programs. While it is common to impose so-called coding guidelines upon programmers, the more tenable solution is to make available some tools that can translate from one coding style to another.

Symbolic Debuggers

PERHAPS THE SECOND most important element of a software development environment is the presence of a symbolic debugging package. Symbolic debuggers differ from their non-symbolic cousins because they work at the source level of whatever language the program originally was written in, and can accept the syntax of that language as typed input for queries.

Without the support of a powerful symbolic debugging package, problems often are considerably harder to find, resulting in a loss in productivity and a visible increase in frustration. The first time a programmer tries to find what the value of a variable that is contained in a complex multilevel data structure, it becomes immediately obvious what value these tools have.

Often, even a well-supported single programming language environment isn't enough for sufficiently complex packages. Today, it is common to find packages written in multiple languages with each section programmed in the language most appropriate. Sophisticated software development environments are designed to aid in this interlanguage linkage, and include packages that aid in sharing complex data structures across dissimilar languages. In the future, it will become more common for programs to be written in multiple languages, as this linkage area will become increasingly important.

Another aspect of the software development environment is editing support appropriate and specific to the language that

you're working with. This is known as syntax-based editing. And, if you've ever tried to match parenthesis in LISP or BEGIN/END pairs in PASCAL, you'll understand that an editor offering these features built in would be a boon to individual programmer productivity.

The last aspect of the environment is the inclusion and support of project management tools. A software development project is more than simply designing, implementing and testing the program. To aid in the tracking of different phases of the software product lifecycle, packages that offer specific management capabilities are very useful. In addition, future project estimation and quality often is improved by an analysis of the metrics associated with the project (e.g., number of

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engineers, time taken, number of lines of code and documentation generated, number of defects reported by customers after ship date, etc).

However, what's more important than the specific elements is how it all fits together. In typesetting, the word *glue* is used to describe the intercharacter and interword spacing. In a similar way, perhaps the most crucial and important part of any software development environment is the glue that connects all of the various tools. In this aspect, HP-UX, and to be fair, UNIX itself, is very poor. The programmer is the glue.

Programming In HP-UX

UNLIKE MOST OPERATING systems that are written in the assembly language of their hardware architecture, the UNIX operating system was written in a language developed simultaneously for just that purpose — the C Programming Language.

Though originally written to allow the OS implementors the freedom to write device drivers in a higher-level language than assembler, it gradually grew in size and power until it had enough scope to support programming user interfaces and utilities as well.

With this evolution, it isn't surprising that C has a wide range of utilities and tools available in the HP-UX environment to aid the programmer. In addition to the tools, however, C also has a set of libraries and toolboxes that allow the creation of a wide range of software.

There are three libraries for windowing systems (The X Windows System from MIT [see box], HP's Windows/9000 for bit mapped display terminals, and Curses for CRTs), two networking packages (The Berkeley Sockets and System V Streams interfaces to the TCP/IP network), an interprocess communications package that works across network connections, and two sophisticated graphics packages (HP's Starbase graphics package and the GKS Graphical Kernel Standard). In addition, the DBM simple database management facility is

[X Window System And The Future Of Development Environments]

One of the more interesting and promising software packages available as part of HP-UX is the X Window System, originally developed at the Massachussetts Institute of Technology (a part of Project Athena).

X is a distributed graphical interface or windowing system that allows windows on each individual screen to be broken into a client and server portion. It further allows either of those two processes to exist anywhere in the network. In addition, X comes with a number of different toolkits to aid programmers in creating display portable software.

What's most promising about X is that it has been adopted as the bit-mapped display windowing system of choice by companies such as HP, DEC, Apple (within A/UX, its System V variant for the Macintosh II product line), Ardent, Apollo, IBM (on the RT workstations) and Sun. The X server has been demonstrated on VMS, MPE/XL, and MS-DOS, as well as numerous UNIX machines.

How does this affect the future of software development environments? Hopefully it can allow for the creation of standard, well thought-out, vendor independent software environments that can be customized for the language or the user community, rather than for the vendor hardware.

With the addition of the OSF's interest in windowing technologies and the resultant impetus that its endorsement can bring, it only is a matter of time before X and specific toolboxes are commonly available across a diverse set of hardware.

In addition, other developments such as HP's NewWave/X (offering a highly customized, linked application environment) and Presentation Manager/X (an X Window System-based version of the IBM Presentation Manager) promise that the future of X-based environments will be bright indeed.

However, there is one glitch in this picture. Sun Microsystems, previous to the acceptance of X as a standard, released its own, very powerful NeWS Networked Windowing System, based on a variant of the Postscript page description language called Display Postscript.

Although the X Window System continues to gain momentum, the announcement of Steve Jobs' Next computer demonstrated a new windowing system based on display Postscript, with its own user interface toolkit, Next Step, which was immediately licensed by IBM.

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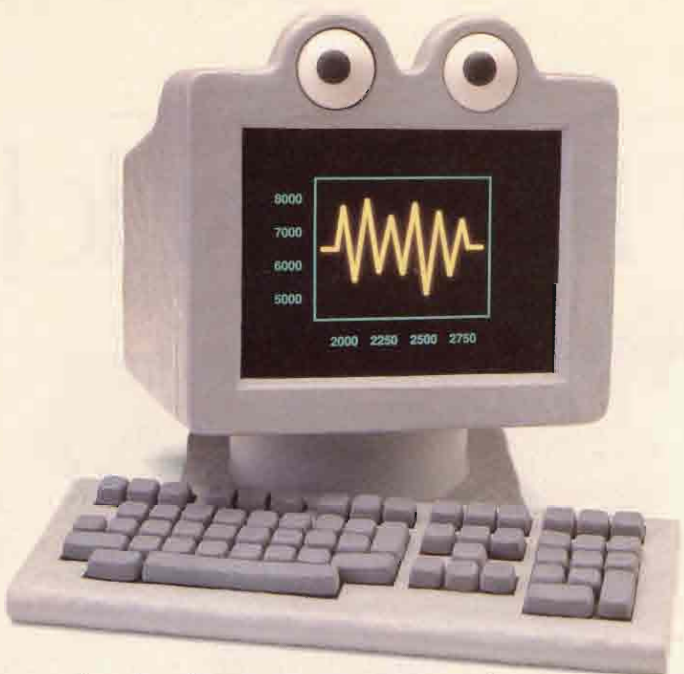

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> A second distinguishing library package with HP-UX is the support for real-time computing.

available on HP-UX, as well as the much more sophisticated and powerful HP ALLBASE database system.

The toolkits that set HP-UX apart from the rest of the UNIX crowd are the Native Language System support library (currently supporting more than 20 different languages) which has also been tentatively adopted by the X/Open Committee as the standard way of internationalizing UNIX utilities. The NLS package also has been offered to the Open Software Foundation (OSF) by Hewlett-Packard to be part of the OSF reference implementation.

A second distinguishing library package with HP-UX is the support for real-time computing. UNIX and real-time often are considered quite incompatible. Indeed, for many versions of UNIX it is rather peculiar to think of the two together, but HP-UX gives the programmer considerable power over how the kernel prioritizes the specific tasks, including having support for non-preemptable sections of code.

Finally, interaction with devices and peripherals is a complex and difficult task on the most powerful of systems. HP-UX helps solve this problem through its DIO device I/O library.

However, the rest of the HP-UX C environment is a bit more spotty, with no support for migration of software from other operating systems, minimal support for cross-compilation, no company supplied C language knowledgeable editors and no project management software.

On the other hand, HP-UX has two revision control systems (SCCS, the Source Code Control System from AT&T, and RCS, the Revision Control System from Purdue University), the popular *make* utility to support multiple file compilation, the *cb* C source formatter, *prof*, a post run-time execution profile package, *lint*, a program verification and portability validator, *cxref* for building C cross references, and a symbolic debugger (*cdb* for the 300 series, and *xdb* for the 800

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[A Brief History Of UNIX And HP-UX]

There are two different breeds of UNIX that reflect the interests and biases of their origins. Originally, UNIX was written by engineers at AT&T Bell Laboratories. Then, students at the University of California at Berkeley rewrote significant portions of the system (including the "kernel" or lowest layer of the operating system). After years of development on each side, the two versions now are know as System V from AT&T, and BSD (Berkeley Software Distribution) from U.C.B.

The picture is complex because not only are there two divergent versions of UNIX, but there is also much effort being expended on standardization. Among the groups working on creating or quantifying standards are: The POSIX Committee, under the aegis of the Institute for Electrical and Electronic Engineers (the IEEE); the X/OPEN Consortium, devoted to the internationalization of the UNIX system; the Open Software Foundation (OSF), developing a "reference implementation" of what they hope will become the future standard UNIX environment; the Archer Group, now known as UNIX International, co-sponsored by AT&T (not currently a member of OSF), and AT&T which also is involved in attempts to make System V the standard through the System V Interface Definition (SVID) documents and compliance suite.

What is HP's position in these standards wars? Actually, HP is demonstrating attentiveness to the needs of its customers and understanding of the justification behind standardization. HP is improving the ability of users to transparently move between different versions of UNIX and, more important, for software developers to be able to write software that is portable across many different computers.

HP is an active member of the POSIX Committee helping to shape the standards documents. It is also a member of the X/OPEN consortium though HP with its Native Language System already demonstrates an understanding of the needs and additional complexity of internationalization and localization. And, HP is one of the five founding OSF companies.

series). In addition, C programs are able to link with utilities written in PASCAL, FORTRAN, and COMMON LISP, as well as in assembler.

Available Languages Include PASCAL, HP FORTRAN, And COMMON LISP

ANOTHER POPULAR LANGUAGE on HP-UX machines is PASCAL. Originally designed to be a compact and modular language for small programming projects, HP implemented the various standard extensions and then further extended the language into what is considered one of the most powerful variants of PASCAL available.

The HP-UX version of PASCAL bears almost no similarity to the popular version that is part of the PASCAL Workstation. Not only is HP-UX PASCAL missing the library calls available in C, it has what can be best described as a minimalist software development environment, with a compiler, symbolic debugger and the ability to interface with the HP ALLBASE database package as the entire toolbox.

HP FORTRAN, as specified in the 1977 ANSI standard (with extensions), has somewhat better support, including the ability to call many of the built in UNIX intrinsics. It also has a symbolic debugger (*fdb*) and the ability to interface with ALLBASE, but FORTRAN also has *flint*, a program that checks sub-routine interfaces between modules in a program, and a powerful set of VMS library functions to allow the easy migration of FORTRAN programs from the DEC VMS environment to HP's Precision Architecture HP-UX machines. HP also includes the RATFOR (RATional FORtran) preprocessor, which makes the language look similar to C.

Low on the totempole, assembler is minimally supported on either the 300 or the 800 series machines. There is an assembler and a very minimal debugger, *adb*, but really no other support at all.

LISP is another language that has gone through many different variations on the way to becoming a standard dialect (COMMON LISP). Before COMMON LISP, Hewlett-Packard offered its NMODE Portable Standard LISP (PSL) development environment, which offered support for LISP programming, interfacing PSL with the HP-UX system, interfacing with the Windows/9000 package and with other programming languages on the machine.

The replacement COMMON LISP interpreter and programming environment from Lucid offers a more powerful language but at the price of less development environment support (for example, the CLX Common LISP/X Windows interface package is still being developed).

In conjunction with the transition from PSL LISP to COMMON LISP, HP also stopped supporting the PROLOG interpreter written in PSL). There are no announced plans for a version of PROLOG from HP on any future HP-UX machine.

Fortunately, ADA and BASIC are much better stories. Though the HP supplied ADA compiler only runs on the Series 200 (obsolete) and 300 machines, there are third-party ADA compilers available that offer more power.

BASIC, on the other hand, always has been a language that HP has been very interested in, and for many years the company has continued to develop the BASIC Workstation. With the inclusion of the Technical BASIC package from HP,

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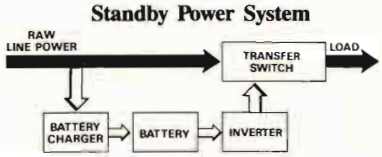

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- Poor isolation
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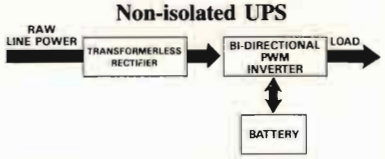
- Poor high line protection
- Poor lightning protection

Non-isolated UPS



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- Moderate cost
- Brownout protection
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- No break system

Disadvantages:
- No derived neutral
- Poor isolation
- Inverter on continuously
- Poor lightning protection
- Non-linear load

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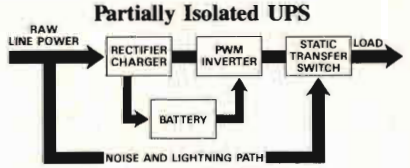

Advantages:
- Brownout protection
- High line protection
- Partial no-break system
- Separately derived neutral

Disadvantages:
- Break in transfer to line
- Poor isolation
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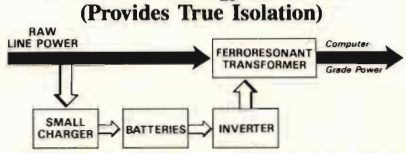

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> . . . concentrate on the problem being solved, not the tools and environment in which the work is taking place.

users who are familiar with the HP Series 80 BASIC (including the Series 80 ROM calls) will find themselves quite at home. This BASIC variant includes built in support for HP plotters, additional matrix operations and advanced input and output functions compatible with the HP-UX system.

There are also a number of packages available from third party works, including: ACSL (Advanced Continuous Simulation Language), ANSI 74 COBOL, APL, the ADA Software Development Environment, FORTH, ANSI BASIC, Objective-C and even a FORTRAN to C program translation package.

What is unique about the UNIX community is its sense of public spirit, coupled with the vast presence of UNIX machines at universities worldwide. As a result there are many programming languages and environments available. Some are completely unsupported, some are supported by graduate students, and some are supported by a department of the university. These languages include: SNOBOL IV, ICON (a SNOBOL-like language with C syntax and notation), FRANZ LISP LOGO, PILOT, FP, CLU and many more.

Complete software development environments are very difficult to find, and while HP-UX appears to be a considerably more sophisticated programming environment than what's offered by other UNIX vendors, there is still a way to go before software engineers truly can concentrate on the problem being solved, not the tools and environment in which the work is taking place. — *Dave Taylor is an independent consultant with Intuitive Systems, Los Altos, CA.*

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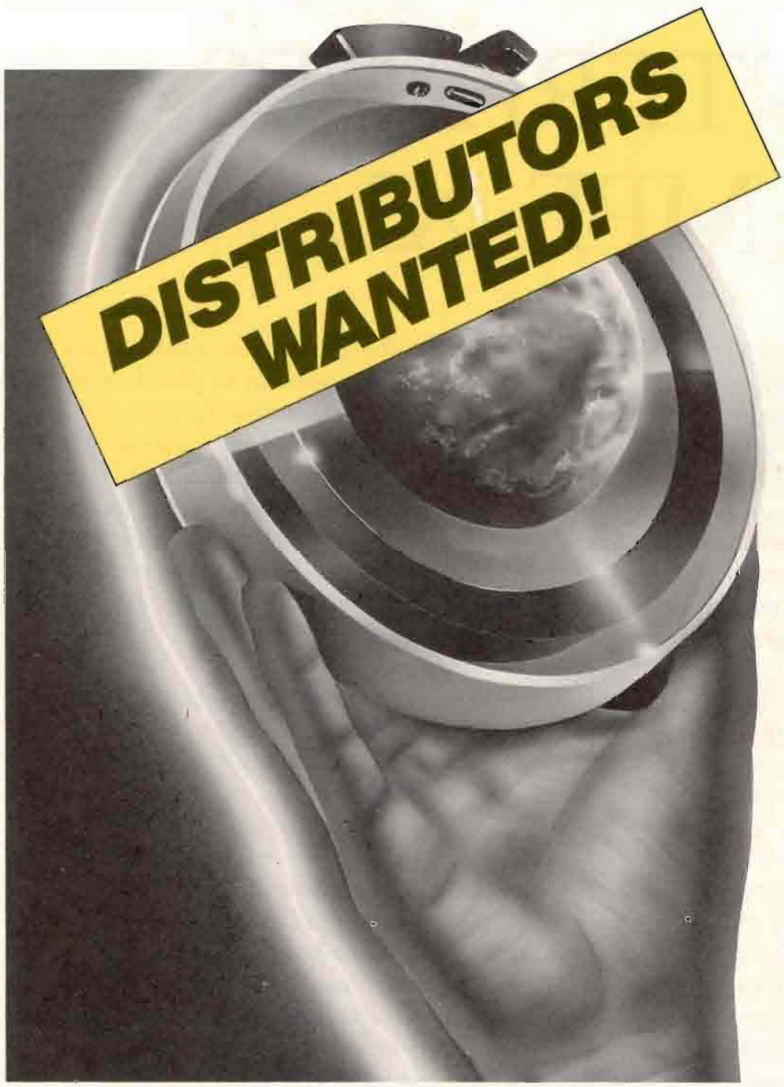

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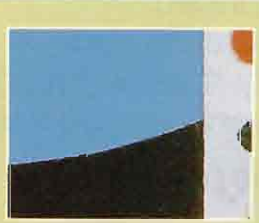

STORAGE

Gary Vogelsberg

With the introduction of HP-FL, Hewlett-Packard's new fiber-optic link, now there are two disc interface alternatives for HP 3000 MPE-XL systems (they also are supported on Series 800 HP-UX systems).

A disc drive is a device used to store data so it can be accessed by the CPU. Internal to the CPU, data is stored in memory. There are various hierarchies of memory within the CPU, allowing it to be designed for optimum price/performance.

Because CPU memory is expensive and volatile, disc drives are used to complement CPU memory. They provide a place where large amounts of data can be stored in a non-volatile form and be easily accessible to the system.

The disc interface is the connection between the disc drive and the CPU. The interface provides a means of moving data between disc mechanisms and memory within the CPU. Examples of disc interfaces on HP systems include the older parallel differential interface on the 7906/20/25 disc drives; HP-IB, which is used on many current products; and HP-FL, which was introduced last year.

The components of a typical disc interface are shown in *Figure 1*.

Both hardware and software work together within the CPU to manage disc I/Os. The disc driver is the software portion. The interface card is the hardware portion. The interface card plugs into the internal CPU bus. It receives I/O requests issued across the CPU bus by the driver and communicates those requests to the disc controllers.

The interface card then manages the communications necessary to complete the I/O request. This includes managing the transmission or reception of the data as packets across the cable.

The intelligence of the interface card varies. Microprocessors can be placed on the interface, effectively downloading some of the functions from the main CPU, reducing CPU overhead and improving performance.

The cable is the physical connection between the interface card and the disc controller. The cable traditionally consists of multiple wires and is used to send commands and data between the interface card and the disc controller.

Commands are sent across the cable using a protocol, the language used by the interface card and the controller as they communicate across the cable.

The disc controller provides the intelligence required to execute commands issued across the interface. The main functions of the disc controller are to decode commands, execute the commands, manage error recovery when necessary, manage the transmission of data across the cable and report the execution status of commands back to the host.

The controller also can be designed to provide diagnostics to aid in troubleshooting a disc drive.

How The Components Work Together

Now that we have defined the pieces of a disc interface, let's take a look at the execution of a typical disc I/O request.

The I/O request is initiated by the CPU when it discovers that it needs data that doesn't reside in memory, or that some data needs to be posted to disc. The CPU decides what data it needs to transmit/receive and then issues a command across the CPU bus. This portion of the I/O is referred to as *CPU overhead*.

Upon receipt of the I/O request, the interface card looks for idle time on the bus and

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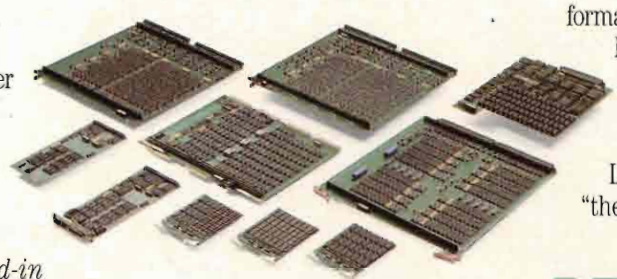

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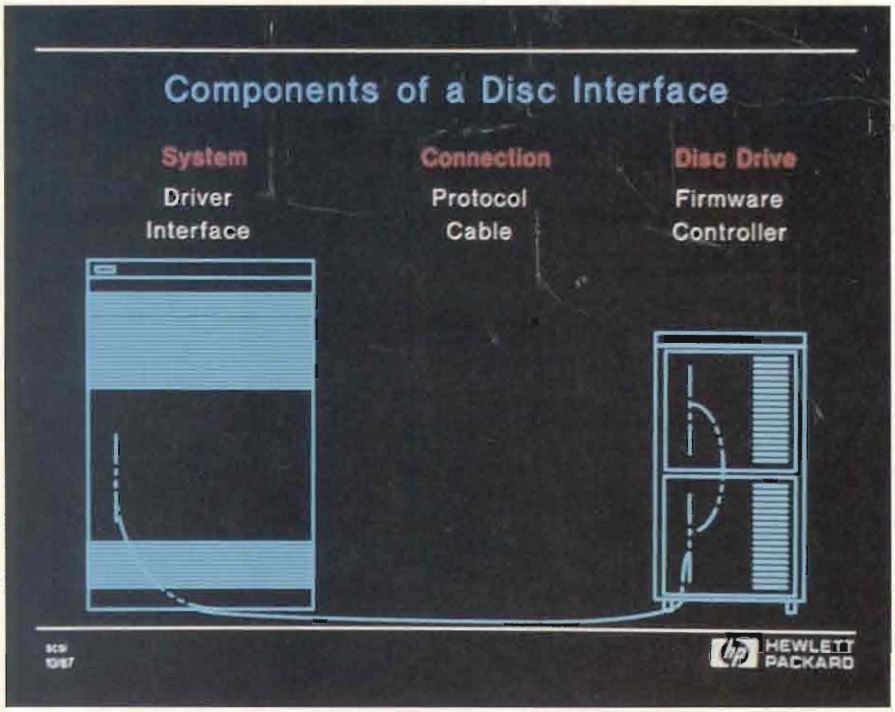


The components of a typical disc interface.

sends the command down to the disc controller. The disc controller then acknowledges receipt of the I/O request. The time it takes the interface to receive and then issue these commands is referred to as *interface overhead*.

After the controller receives the command, it decodes it and issues a command to the disc to seek to the correct location. The time required to do this is referred to as *controller overhead*.

The disc mechanism then must execute the requested command. It does this by means of a mechanical movement of the actuator, placing the heads in the disc drive over the correct track. Once the heads are over the correct track, additional time is required for the disc surface to rotate so that the correct data is under the head. The time required to move the heads to the correct position is called *seek time*; the time spent waiting for the correct data to rotate under the head is called *latency*.

Data is sent to or from the disc mechanism through the interface, cable and controller. Once the data transmission is complete, the controller sends a message that the transaction has completed properly. The time spent transmitting data to or from the disc is known as *transfer time*.

In a normal disc transaction on current HP systems, the majority of the time is spent in seek and latency. CPU overhead, interface overhead and controller overhead generally are small components of the I/O execution time. Transfer time is variable and is dependent on the amount of data being transferred.

HP-IB Components

HP-IB disc drives have been available on HP systems for over eight years. This interface, offering one of the first intelligent controllers, is based on the IEEE-488 electrical specification and the CS-80 protocol.

There are three basic hardware components of an HP-IB connection: the HP-IB interface card, the HP-IB cable, and the HP-IB disc controller. The HP-IB interface card plugs into the CPU bus and provides a means of attaching multiple types of devices to the CPU. Supported peripherals include disc drives, tape drives, printers and plotters.

The HP-IB cable is a multiwire copper cable that plugs into an HP-IB connector on the interface card. HP-IB provides eight device addresses, so you can daisy chain up to eight peripherals off one HP-IB interface card. The open back of the HP-IB connector lets you do this easily.

The HP-IB disc controller resides in the disc drive. The HP-IB cable plugs into the controller. As I/O requests are received by the addressed controller across the HP-IB cable, the controller accepts and decodes the requests and gives commands to the disc mechanism to execute the requests.

The CS-80 command set is the protocol used to communicate with discs across the interface. All hardware components of the disc interface are designed to communicate using this protocol.

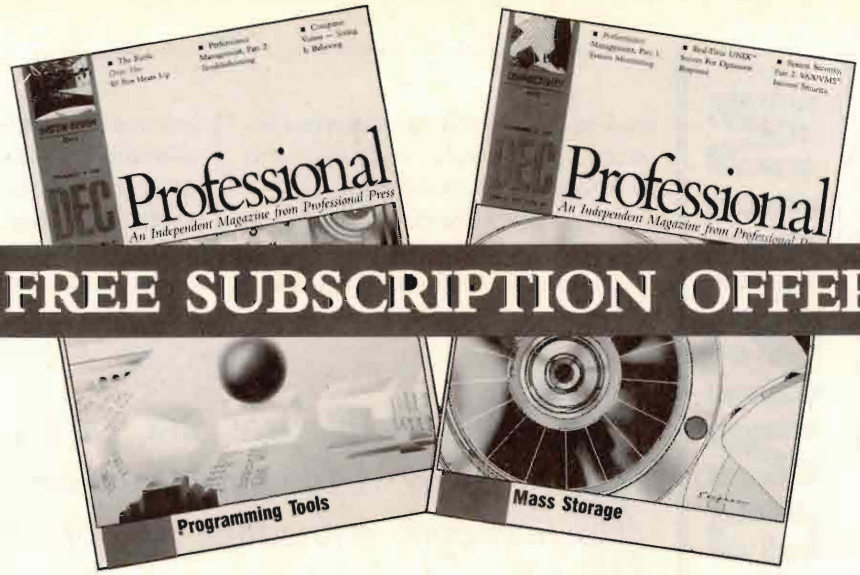
HP-FL Components

There are two methods of cabling incorporated into the new HP-FL architecture. A fiber-optic cable is used to connect the CPU to a group of disc drives, while a multiwire PBus cable is used to daisy-chain a group of disc drives.

The fiber-optic cable is a duplex cable of glass fiber. There actually are two fiber-optic strands in the cable. One strand is used to transmit data in the direction of the disc drives, while the other is used to send data back to the CPU. The fiber-optic cable has a burst transfer rate of 5 MB per second and is supported in lengths of up to 500 meters.

The PBus cable is a 64-pin copper cable. It is used to daisy-chain up to eight drives to the fiber-optic cable. The PBus cable is designed to operate at a burst transfer rate of 5 MB per second, the same transfer rate achieved across the fiber-optic cable.

The HP-FL interface card is a CPU



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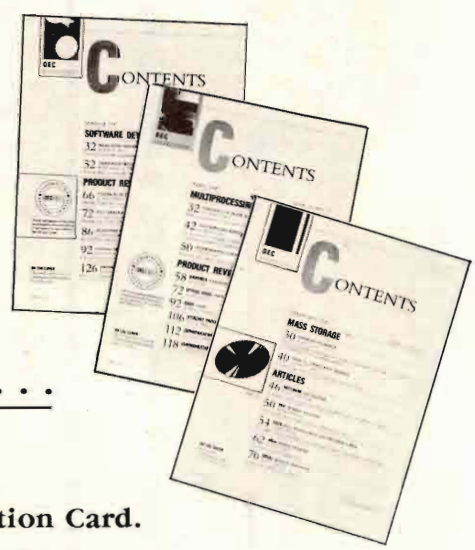

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resident card, providing an interface between peripherals and the CIO backplane on HP-PA systems.

Each HP-FL interface card has an improved CIO backplane interface circuit, protocol controller, high-speed parallel/serial/parallel converter and encoder/decoder and high-performance microprocessor. A pair of fiber-optic connectors also is included with each HP-FL interface card.

The fiber-optic connectors provide a means of attaching the fiber-optic cable to the interface card. As previously noted, the fiber-optic cable consists of two fiber-optic strands. One of the connectors, equipped with a fiber-optic transmitter, is used to transmit data from the interface card to the group of disc drives. The other connector, equipped with a fiber-optic receiver, is used to receive data transmitted from the group of disc drives.

The function of the electronic hardware is to convert electronic signals into a format allowing them to be communicated across the fiber-optic cable. When data is to be sent from the CPU to the disc drive, the interface card accepts the data issued in parallel across the CIO backplane and converts it into serial signals with the proper protocol. A light-emitting diode (LED) in the transmitter then sends the data in the form of light pulses across the fiber-optic cable. The reverse is done when signals are sent back to the CPU from the disc drive. The interface card accepts the light pulses transmitted across the fiber-optic cable, converts them into parallel signals and forwards them to the CPU across the CIO backplane.

A high-performance microprocessor on the board allows the downloading of I/O processing from the CPU, reducing the amount of CPU time spent executing I/Os. The microprocessor also provides the interface card with the "horsepower" required to meet the critical timing required by the interface's high transfer rate. A large amount of custom VLSI work was required to provide the performance and functionality of the new interface at a reasonable cost.

Like the interface card, each HP-FL controller is equipped with two fiber-optic connectors, one for sending data and one for receiving it.

The HP-FL controller is disc resident, replacing the HP-IB controller in 7936 and 7937 disc drives. The disc controller manages communication between the disc drives and the CPU. Like the interface card, each HP-FL controller is equipped with two fiber-optic connectors, one for sending data and one for receiving it. The fiber-optic strand connected to the transmitter on the interface card must be connected to the receiver on the controller card. And, the strand connected to the receiver on the interface card must be connected to the transmitter on the controller card. LEDs on the controller indicate if the fiber-optic cable is not properly connected.

The HP-FL controller also has two connectors for PBus cables. Using these connectors, up to eight disc drives can be daisy chained. The end drives in a chain must have PBus terminators on their unused connectors.

With two cabling methods incorporated into the HP-FL architecture, the HP-FL controller becomes the point of management of communications moving from the fiber-optic cable to the PBus cable. As serial light pulses are

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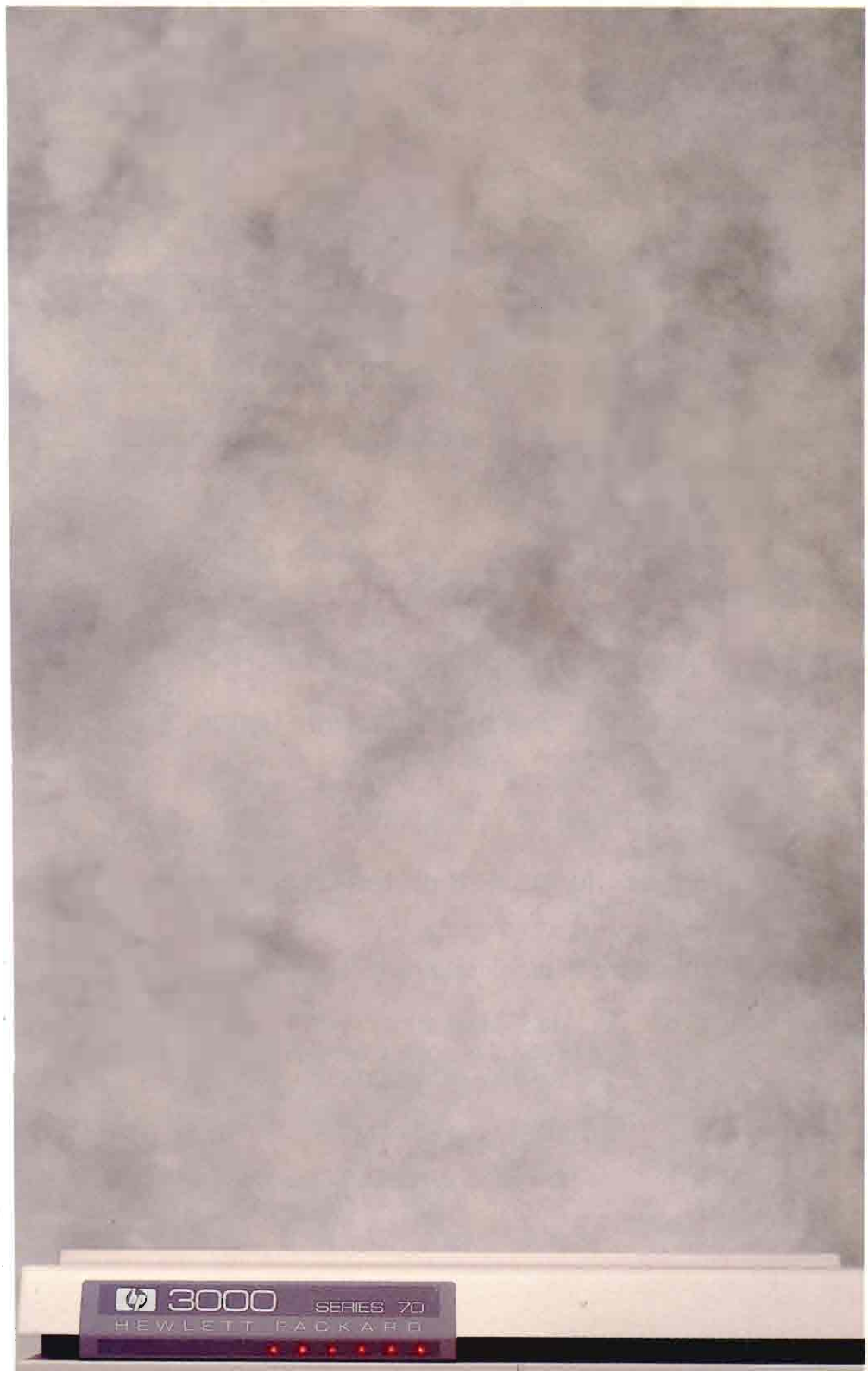

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received across the fiber-optic cable, the controller converts them into a parallel signal that can be sent across the PBus cable to the appropriate disc drive.

Signals sent across the PBus cable destined for the CPU are converted from parallel to serial so that they can be transmitted as light across the fiber-optic cable. The interface card and controller share some common electronics, because the same functions of encoding and decoding signals and converting them back and forth from parallel to serial must be executed at both ends of the fiber-optic connection.

Once the command is received at the appropriate disc drive, the controller carries out the traditional functions of decoding the commands, executing the commands, executing error correction and reporting back to the host.

The HP-FL interface, with its 5 MB per second burst transfer rate, has a much higher transfer rate than the 7937 disc drive. For efficiency, the controller has been designed to allow interleaved transfers of data from multiple disc drives. This is accomplished through buffering in the controller and active management of the PBus connection.

As data is read off disc, it is stored in the controller buffer. When a critical mass of data is stored, the controller arbitrates for ownership of the interface, sends its data at the full 5 MB per second transfer rate of the interface and disconnects. The controller will connect/disconnect several times when executing a large transfer.

This intelligent use of the interface allows it to be used efficiently by multiple drives.

Because all components have very high burst transfer rates, the components of the controller must be designed to meet critical timing requirements. The controller was designed with precision and performance in mind, using custom VLSI extensively.

Performance Impact Of HP-FL

The time to process a typical MPE-XL I/O with a 7937H and 7937FL disc drive once it gets to the disc controller is shown in *Figure 2*. The HP-FL disc controller overhead is slightly larger than that of the HP-IB controller.

Note: A feature called "command queueing" allows the pre-processing of controller overhead, effectively masking controller overhead on busy disc drives.

Because the 7937 disc mechanism is common to both products, the seek and

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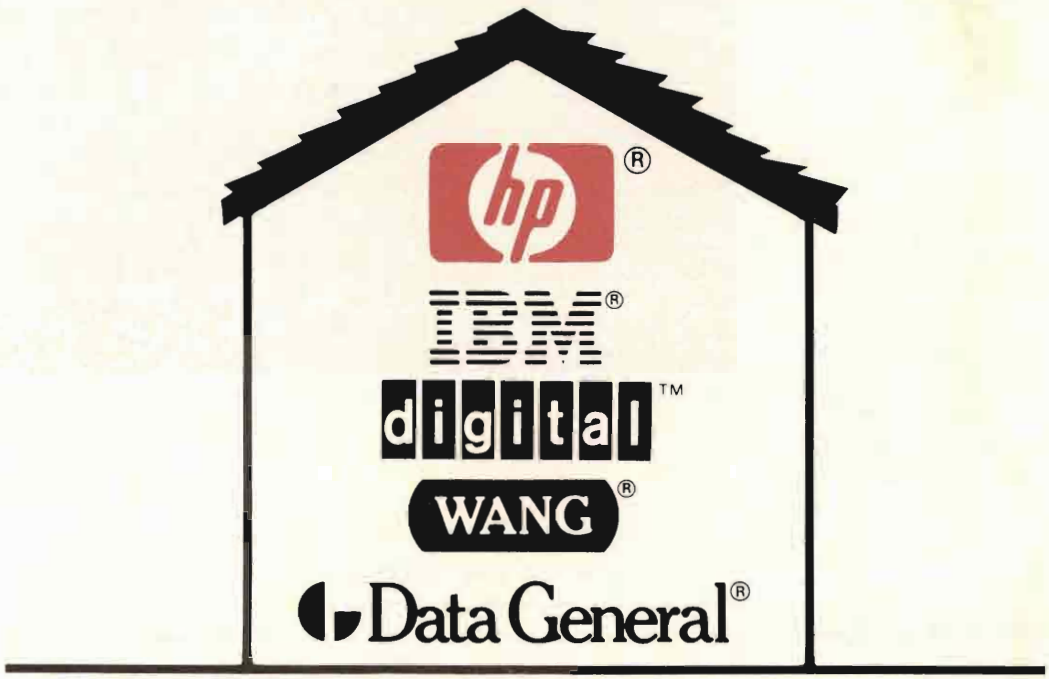

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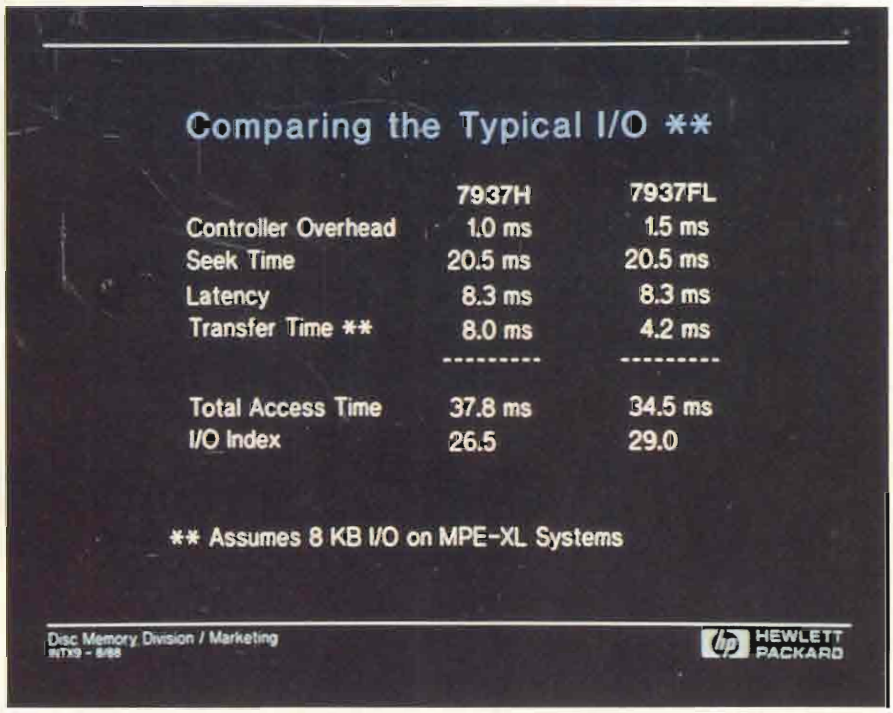
latency times are the same.

The typical transfer is assumed to be 8 KBs on an MPE-XL system, compared to 1 KB on an MPE system. Although the HP-FL interface has roughly a five times higher transfer rate, transfer time is reduced by less than half. Because the interface rate now is faster than the disc transfer rate, transfer time for an I/O is determined by the disc transfer rate (1.89 MB per second across one track).

The comparison shows that the typical 8-KB I/O will execute in nine percent less time using the HP-FL interface. At first glance, it might be expected that the HP-FL interface will have an immediate impact of at least nine percent on HP-PA system performance. However, there are some reasons that this is not the case.

Total access time is an important measure of disc performance, not because a given disc drive allows the system to get back to a given user three or four milliseconds faster, but because it provides a relative measure of how many I/Os a disc drive is capable of executing.



The time to process a typical MPE-XL I/O with a 7937H and 7937FL disc drive once it gets to the disc controller.

Impact On Today's MPE-XL System

In the early design phases of Precision Architecture systems, conscious decisions were made to improve system-level performance by reducing disc I/O requirements. The transaction look-aside buffer, memory mapped files, seek aheads and the transaction manager all were designed to reduce the number of disc I/Os. Because of these features, an MPE-XL systems requires far fewer I/Os than an MPE-V system to complete the same task.

Because of the reduced I/O requirements of MPE-XL, the HP-IB interface is able to keep up with typical MPE-XL I/O workloads. The result is that HP-FL will have little, if any, impact on system-level performance on today's typical MPE-XL systems.

Although HP-FL has little impact on the performance of today's typical MPE-XL system, there are factors that will cause the disc interface to have a performance impact in the future.

As new HP-PA systems continue to roll out, extending the family to higher performance levels, there will be corresponding increases in I/O requirements of those systems.

Along with the increases in processing power, there also will be larger mass storage configurations on those larger systems. As more gigabytes of data are stored on each interface, there will be corresponding increases in the number of I/Os executed across the interface.

With the initial release of MPE-XL, typical disc transfers are larger than they were on MPE-V systems. Since I/O loads are relatively light today, this has not yet become a factor in performance. However, as the number of I/Os increase with larger processors and disc configurations, the larger I/Os will put an added strain on the disc interface.

Growing I/O requirements coupled with larger transfers will put pressure on interface transfer rates over time.

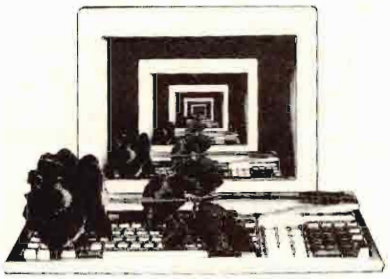
Which Interface Is For Me?

HP-IB continues to provide an easy, inexpensive method of attaching a wide variety of peripherals and instruments to HP systems. The same HP-IB interface can be used (within supported configuration guidelines) to attach discs, tapes, printers and plotters to the system.

Because it is inexpensive and can be used for multiple peripherals, the HP-IB interface continues to make a lot of sense for small systems.

The common interface on systems and peripherals also provides an easy migration path. Since HP-IB is supported on systems from the HP 150 to the HP 3000 Series 950, there is a great deal of flexibility in moving peripherals upward as computing needs grow.

The transfer rate of HP-IB is not a bottleneck to HP-PA performance systems in most situations. HP-IB will meet the performance requirements of



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systems that will not grow significantly.

Benefits of the HP-FL include the support of eight disc drives on one HP interface card. Because more disc drives are supported per HP-FL interface, HP supports larger mass storage configurations than with HP-IB. Up to 30 7937FL disc drives (17 gigabytes of mass storage) are supported on the Series 950 at first release, and supported configurations will be increased with future releases of the operating system.

A side benefit of the larger number of discs supported per interface is that CPU I/O slot use is reduced.

A side benefit of the larger number of discs supported per interface is that CPU I/O slot use is reduced. The large configurations noted above can be built using a minimal number of I/O slots.

Long fiber-optic cable lengths also provide a great deal of flexibility in laying out a data center. Some of you probably have experienced the challenges of laying out large disc configurations while staying within supported cable length constraints of HP-IB. With supported cable lengths of up to 500 meters, these problems will disappear.

HP-FL is the interface of the future for high-end mass storage for Series 900 HP 3000 systems. The improved transfer rate and flexibility provide a mass storage growth path for the future. HP-FL also provides a platform for designing future mass storage solutions. Future discs for high-end systems will be HP-FL compatible.

Because data is transmitted via light, the new fiber-optic cable also reduces environmental concerns. The fiber-optic cable is immune to electromagnetic interference. As a result, long cables can be run without worrying about emissions from equipment near the cabling route. The fiber-optic cable provides electrical isolation of discs from the system and does not emit radio frequency energy that might cause interference with other equipment. —*Gary Vogelsberg is a product marketing engineer in the Disc Memory Division at Hewlett-Packard, Boise, ID.*

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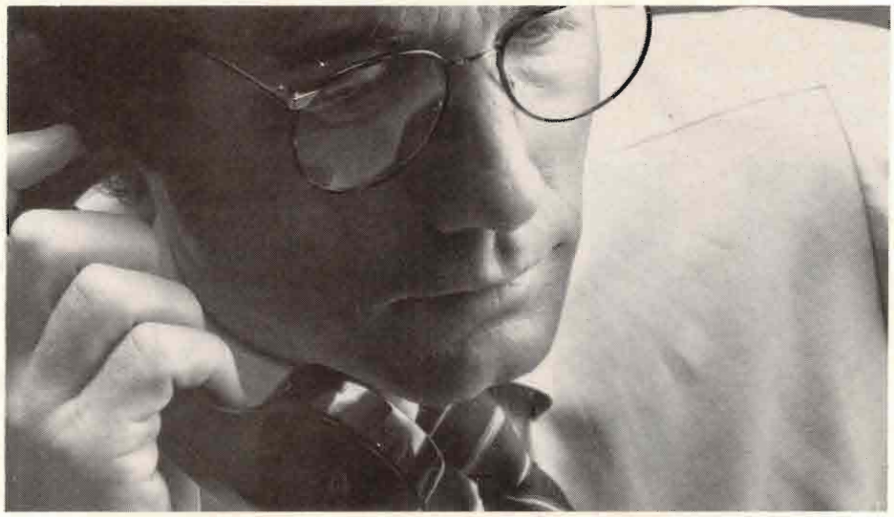

HOW TO DESIGN A LAN, PART 1

COMSAT Laboratories Explains How It Was Thrust Into The World Of Local Area Networks

NETWORKING

Ken Fullett

During the past year, the Microwave Technology Division at COMSAT Laboratories has been thrust into the world of local area networks, including TCP/IP, XNS, 802.3, Ethernet, gateways, bridges and communication servers. The move was fueled by our company's expansion of local computer capabilities coupled with relocation of parts of the division to new offices.

Like most computer users today, we use computers from different vendors including Hewlett-Packard, Apple, IBM and Digital Equipment Corporation. By making use of a local area network (LAN), users can access any one of the computers.

Our present network configuration is shown in the *Figure*. It consists of several HP computers, various communication servers and gateways. The network is located on two floors (first and second) consisting of four parts called subnetworks or simply subnets. There is one 802.3 network called MTDLAN, that connects three AppleTalk networks referred to in the *Figure* as AT1 through AT3.

MTDLAN provides the backbone of the network; i.e., it is the basis for the interconnectivity among the many devices connected to the network. It is TCP/IP based (*see box*) and is used by the HP computers for transferring files, remote log in and for remote displays with the X-Window System from MIT (HP Professional, January 1988). It provides connectivity among the AppleTalk networks via the gateways and it provides the connection among the communication servers.

There are four communication servers (CSs) manufactured by Bridge Communication (a division of 3Com) connected to the network. The use of a fifth server (CS5) will be described later. Each CS is used to convert the RS232 protocol used by terminals to the protocol required on the network. The CSs are used for two purposes: to provide virtual circuits for a printer and plotter connected to the HP 840 and to provide terminals access to the computers on the network.

Normally, when connecting an RS232 peripheral such as a printer or plotter to a computer, you connect the DB25 connectors to the computer and peripheral. After playing around with the handshake lines, twisting the datalines and setting the communication parameters (data rate, parity, etc.) you have a working printer.

However, if you want the peripheral to be farther away from the computer that is supported by the RS232 standard, you need some type of extender. A pair of CSs can be used to extend the length of the RS232 cable by converting the signals to the LAN protocol and back to the RS232 protocol. The use of the CS to extend the length of the RS232 cable is transparent to the devices on either end (computer and peripheral).

When CSs are used in this fashion, they are creating a permanent virtual circuit over the LAN. Two virtual circuits are used in our network to connect the printer and plotter on the first floor with the HP 840 located on the second floor.

The second use of the CS is to allow users at terminals access to more than one computer so that each terminal is soft-connected and not hard-wired. For example, a user on the first floor using a VT100 terminal connected to CS2 can request a connection to the HP 840 via CS1, or the user may request a connection to the IBM or VAX via CS4.

It's possible for a user, using the capabilities of the CS, to have more than one connection (also called sessions) simultaneously.

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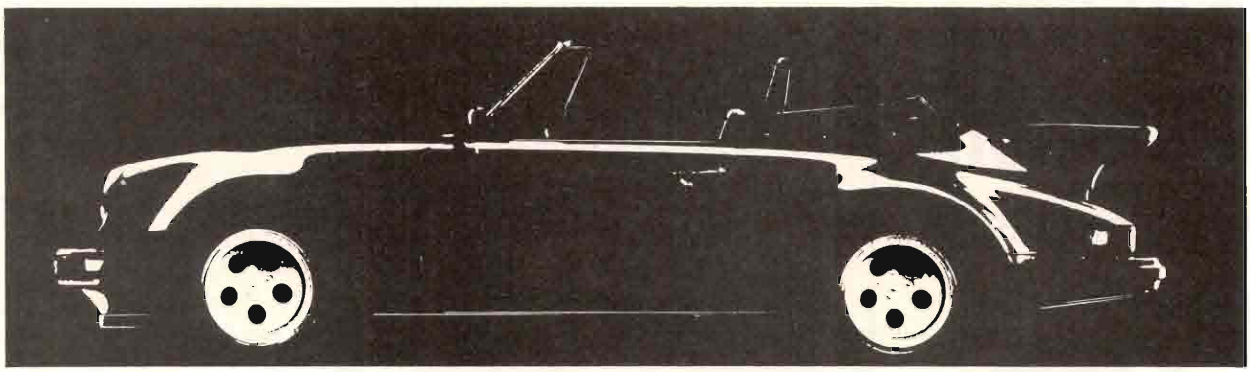

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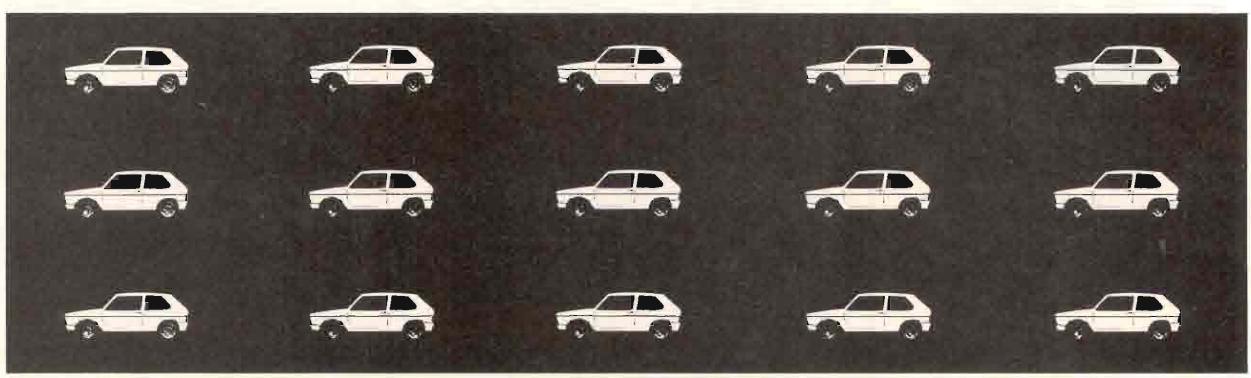

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Finally, a CS can be used to connect to any computer on the network that supports TELNET. In this case, the CS directly converts the RS232 protocol to the TCP/IP-based TELNET protocol and the connection is established via the computer's LAN interface, not via its RS232 interface.

For example, a user at CS2 may gain access to the HP 840 via an RS232 port (*point a in the Figure*) or, using the telnet capability, can log into the HP 840 via the LAN interface (*point b*). In practice, the user is unaware of the method actually used to gain access.

Thus, a user on the first floor can access any of the HP computers located on the network. By using the CSs in pairs, the distance between two RS232 devices (in our case, a terminal and the HP 840) is limited only by the length of the network cables, not the RS232 lengths.

CS4 located on the second floor provides access to a building-wide network that connects to an IBM mainframe and a VAX. Even in networking there are incompatibilities, and this is an example of a mismatch.

The building network, called Net1, uses the XNS protocol; therefore, using the TCP/IP tools, it could not be connected to directly. CS4 is used to convert from the TCP/IP to RS232 (allowing users to TELNET to Net1), and CS5

[TCP/IP vs. XNS]

When we designed our network, we had to decide between two different network protocols called TCP/IP and XNS. Let's look at the functionality each provides. (see *Figure*).

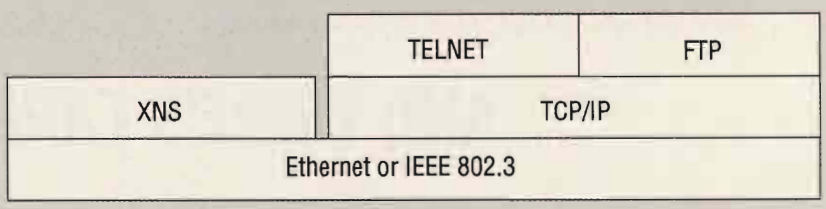
Each rectangle represents a building block. The Ethernet or IEEE 802.3 block is the foundation for our network (Note that Ethernet and IEEE 802.3 are not exactly the same, but either could be used in our network).

Each block (also called a layer) requires the block beneath it. Therefore, if either the TELNET block or FTP blocks are to be used, the TCP/IP block must be in place.

FTP stands for file transfer protocol. This is an operating system and hardware independent method for transferring files across a network. Using FTP, files can be moved among any computer that supports the protocol. In our network, FTP was available for both the Macintoshes and the HP computers.

TELNET is a protocol that provides a method for a user to connect to other computers on the network, independent of operating system and hardware. As an example, TELNET allows a user on a Macintosh to log into any of the HP computers using the network instead of an RS232 connection. In addition, communication servers that support TELNET allow users access to any device directly connected to them.

The communications servers can be purchased with either XNS or TCP/IP- based software. Because TELNET and FTP were available for the HP computers and the Macintoshes, TCP/IP was the logical choice.



The functionality of TCP/IP and XNS.

manufactured by Ungermann-Bass, is used to convert from RS232 to XNS. A user at CS2 first must request a connection to Net1 via CS4. Then, using the CS4 command language, the user requests connections to the IBM or VAX.

The AppleTalk networks are used to allow Macintosh computers to share the

In general, Mac users are aware of the existence of multiple subnets . . .

three laser printers and to allow each access to the AppleShare file server. In general, Mac users are aware of the existence of multiple subnets (called zones by AppleTalk) only when they are choosing their destination printer or a file server.

The AppleTalk (AT) networks are connected via three gateways manufactured by Excelan. Each gateway is responsible for converting the AT protocol to the TCP/IP protocol. The gateways originally were purchased to allow us to connect the AT network on the first floor (AT2) with the remaining AT network. A direct connection was not possible because the maximum AT cable length would have been exceeded. A secondary benefit has been realized — isolation.

Lesson Learned

One of the early problems with the AT network was delicate cables and poor quality connectors. In a large network, a damaged cable or loose connection is very difficult to find. Our early AT network went down once a week. The installation of the new AT networks took two days because of poor connections. Since that experience, every connection in the AT network now uses connector clips to hold it together.

In addition, by using the gateways, each network is isolated from the other

AppleTalk, AppleShare
Apple Computer Corp.
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Cupertino, CA 95014
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CS
3Com/Bridge Communication
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Mountain View, CA 94043
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San Jose, CA 95131
CIRCLE 296 ON READER CARD

Ungermann-Bass
3990 Freedom Circle
Box 58030
Santa Clara, CA 95052-8030
CIRCLE 298 ON READER CARD

electrically. So, if there is a problem it is localized to the specific network and the number of connections that must be checked is reduced greatly. The problems encountered now typically are induced by users moving a computer without reconnecting the network.

The use of gateways on the AT networks not only provides electrical isolation, but traffic isolation. The gateways are designed and installed so that traffic is not transferred to other AT networks across the MTDLAN network unless required (this uses IP addressing described in Part 2). Therefore, a print job from a Mac to a laser printer that shares the same AT network (a subnet) does not create any additional traffic on any of the other subnets.

The final network-related use of the Macs is to log in directly to the HP 840. Using a program supplied with the AT gateways, called NCSA TELNET, a user can connect to the HP 840 via the AT network and the MTDLAN to the LAN port of the HP 840 (*point b in the Figure*); an RS232 connection is not needed. Using this program, anyone with a Mac has terminal access to the HP 840. In addition, the program supports file transfer protocol (FTP), allowing users to move files between the HP 840 and their Macs.

The only drawback so far is that the Mac TELNET program emulates a VT100 terminal; therefore, graphics is not supported. At this time, the programs that emulate HP graphics terminals on the Mac don't know how to speak TELNET so they must be connected to the computers via an RS232 port using a CS or a hard-wired port.

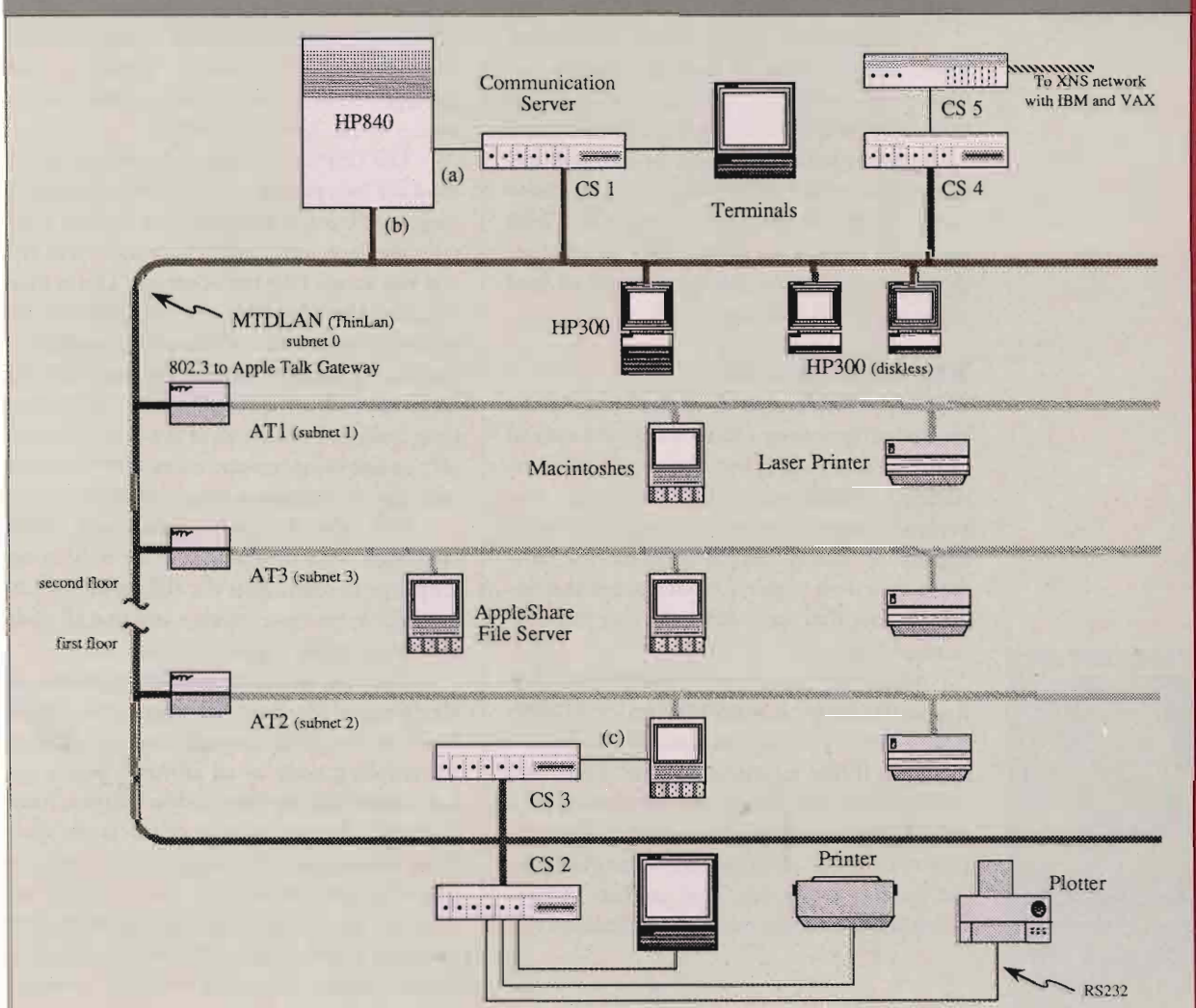
Some users prefer using other Mac emulators, which again requires an RS232 connection. This is the reason for the connection between the Mac and CS3 on the first floor (*point c in the Figure*).

The network configuration has been changing slightly since it was first assembled. AT3 was a recent addition dividing the second floor AppleTalk network into two parts. This was necessary because the addition of new Macs would have meant exceeding the allowed cable length. CS3 is a recent addition to the first floor that demonstrates a power of the network; if additional ports are needed, it's a simple matter to add additional communication servers.

In Part Two of this series, I'll explain IP addressing and how it is used to route messages on the network. —*Ken Fullett is a scientist in the Transponders Dept., Comsat Laboratories, Communications Satellite Corporation, Clarksburg, MD.*

References: *Handbook of Computer Communications Standards, Volumes 1-3, Department of Defense (DOD) Protocol Standards, William Stallings, PH.D., et. al., Macmillan Publishing Company, New York, 1988.*

FIGURE 1



The network configuration of the Microwave Technology Division at Comsat Laboratories.

LISP

A Language Whose Time Has Come

LANGUAGES

Chris Wright

With the release of HP Common LISP on the HP 9000 Series 300 workstations, and with the planned release of the same product on the Series 800 HP-PA workstations, the developer of advanced software on HP computers now has a development option well worth looking into.

LISP has come a long way in the last few years. The problem of multiple dialects has disappeared with the acceptance of Common LISP as the standard. Also, the powerful new compiler technology has made the LISP environment on the HP 9000 Series a competitive option to special-purpose LISP machines. With the many advantages LISP brings to software development, the HP developer is well advised to consider HP Common LISP.

Why Switch To LISP?

The compelling reason to switch to LISP is increased programmer productivity, not only in symbolic computing, but also in general computing. High-performance hardware has become relatively inexpensive compared to the expense of finding and paying good programmers. It is time to move to languages and environments that are suited better to this new relationship.

Many LISP programmers assert that putting a workstation with LISP on every software engineer's desk will double productivity. Even if this assertion is toned down and productivity only is 33 percent better for a $40,000-a-year programmer, a $20,000 workstation with a LISP environment more than pays for itself in two years. This increase in productivity also makes better use of trained and talented programmers — a scarce resource not easily increased by 33 percent.

Why Does LISP Provide Greater Productivity?

There are many aspects of LISP that make it a more productive environment. LISP is uniform, flexible, extensible, transparent, interactive and functional in nature. It also manages object creation and reclamation and works at the level of symbols.

The LISP environment is uniform and is used for everything. All the tools (debugger, inspector, trace, editor, window toolkit, compiler and interrupt handler) are written in LISP and run in one LISP environment. This is more efficient than having one environment for editing files, another for compiling, another for loading up images, another for executing the language and yet another for debugging running images. Because all of the tools are available in one environment, every LISP programmer also is a systems programmer.

LISP also is used as its own macro language. This means that there only is one language to learn, that the full power of LISP is available for macro design and that all of the LISP tools apply equally well to macros.

The LISP environment is transparent, interactive and dynamic. Whether at the LISP top level, in the debugger analyzing an error, or interrupting code at an arbitrary point, any command may be executed to inspect, interrogate or change the state of the work space. If, in the middle of loading 200 files, the programmer realizes that the one step that will keep the last 90 files from loading was forgotten, that step simply can be executed and the whole process continued without having to start over.

In LISP, it also is possible to redefine func-

tions or variables at will because all objects in the work space are available for examination and change. For example, a variable is not just a memory location with a value; it has a name, it belongs with a module of code, and it may have a function or other characteristics the programmer has associated with it. It is very simple to have a system all loaded in, decide that you need the latest version of some file and load that version on top of what you have already. Because any function can be executed and analyzed at any time, it is much easier to understand and isolate the behavior of pieces of your program. Also, interpreted and compiled code may be mixed freely and executed together.

LISP is extensible. Tools for designing and using macros, together with tools for doing object-oriented programming, make it very easy to extend LISP to capture abstractions that are natural to a programming project. This allows the programmer all of the usual advantages of using abstractions, such as isolating the details of the abstraction to one place (making it easy to understand and easy to modify later). This allows the rest of the project to be understood in terms of that abstraction without referring to implementation details.

Abstraction capability contributes to another of LISP's strengths — flexibility. The LISP programmer has the choice of dealing flexibly with many of the things that must be specified rigidly in other languages. For instance, the type of an object need not be specified, which makes it quite easy to change representations of objects at any point in the software life cycle. For sections of code where efficiency is a concern, there always is the choice of using type specifications to allow the compiler to produce better code. Instead of only allowing a fixed number of arguments, LISP functions also may take optional and keyword arguments, which permit more natural passing of information to functions.

Common LISP has become the standard: It is available on all major hardware platforms and it is the LISP used by all of the major symbolic computing software companies.

Why Have Programmers Not Switched Before?

The reasons programmers have for not using LISP either come from misconceptions about the language itself or are reactions to outdated hardware and LISP implementations of at least three years ago. In the last few years, however, hardware has become less expensive and faster, and the quality of LISP implementations on general-purpose computers has improved dramatically. With a few exceptions, almost all LISP implementations available five years ago were done by academic institutions and hobbyists and were inefficient, unreliable and poorly supported.

In the past, one of the liabilities of using LISP was incompatibility among the available dialects of LISP. This no longer is a problem. Common LISP has become the standard: It is available on all major hardware platforms and it is the LISP used by all of the major symbolic computing software companies. Programmers using Common LISP can count on all of the usual advantages of a language that has a standard.

LISP also has had an undeserved reputation for being grossly large and slow. LISP is somewhat larger and

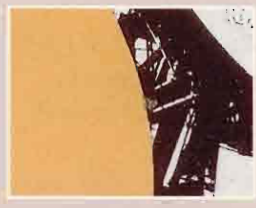
slower than some other languages, but not to the degree often thought. Here at Lucid, we have run comparisons between LISP and C, which show that for "average applications" LISP is between 2 and 10 percent slower and between 10 and 50 percent larger than C. This small gap is shrinking rapidly with new releases of LISP. One size disadvantage that LISP does have is that the environment that must be loaded to use LISP, or applications based on LISP, is large. Until LISP environments are included as part of the operating system, it will be necessary for the LISP programmer to load in MBs of environment to run any application.

An unfortunate reputation surrounding LISP is that it requires very expensive LISP machines based on special-purpose hardware in order to obtain good performance. This could not be further from the truth. Recent advances in general-purpose hardware, together with more efficient LISP implementations, have made it possible for LISP on general-purpose hardware to run as fast as, and in some cases faster than, special-purpose LISP machines.

Another misconception about LISP is that it only is useful for doing Artificial Intelligence (AI) work and that it is a world unto itself. The truth is that LISP has acquired all the features needed for numeric computation and is as useful for traditional types of applications as it is for the more forward-looking and newer applications. Also, current LISP implementations have the ability to call code written in other languages such as C, FORTRAN and Pascal, and allow the "foreign" code to call LISP procedures. These implementations also have the ability to execute operating system commands. Thus, all tools and applications available on a system — for example, on a UNIX system — can be fully integrated with the LISP environment.

Shed Old Attitudes

To make the most effective use of today's resources, we need to shed the attitudes formed from yesterday's views of computing costs and language implementations. The current release of HP Common LISP is a reliable and efficient implementation that provides the most productive software development environment for handling projects in both symbolic and non-symbolic computing. It is time to optimize the effectiveness of what now is software engineering's dearest resource — the programmer. — *Chris Wright is a senior scientist at Lucid Inc., Menlo Park, CA.*



HP-UX

The ABC's Of HP-UX

Andy Feibus

This article is the first of a series that will assist new users with learning the HP-UX operating system.

Since "important" varies from user to user, upcoming articles will show new users which HP-UX features and tricks I've found to be the most helpful.

Getting Started

All HP-UX commands *(see Table 1)* including **cd, mkdir, pwd, rm, cp, ls, more, lp, ps** and **kill**, are documented in the *HP-UX Reference Manual*. The information in this manual set may be displayed using the **man** program. The **vi** editor (pronounced vee-eye) is best documented in *HP-UX Concepts and Tutorials: Text Editors and Processors*.

Before using these commands, you must understand the HP-UX file system. HP-UX stores all files in an *inverted tree* directory structure, similar to the way in which other operating systems organize files. All files and directories are organized under the root directory, which is referenced as */*.

When referencing specific directories, a / is used to distinguish between different levels in the directory hierarchy (e.g., **/usr/bin** refers to directory bin, which is located in directory usr, which is located in the root directory).

The programs and files that comprise an HP-UX installation are stored in a standard directory structure, part of which is shown in *Figure 1*. The function of the files in these directories is described in *Table 2*.

Two special directories may be referenced from every directory in the file system: the current directory (.) and the directory containing the current directory (..). For example, the file **t1** in the current directory may be referenced as **./t1**. If **t1** were in the directory immediately "above" the current directory (this directory also is known as the *parent* directory) it could be referenced using **../t1**.

Now that you know enough to start working with your HP-UX system, let's run through a quick example of the commands listed above. In this example, text in italics indicates that you should key in, and "normal" text indicates one possible system response (other responses are possible depending on how your administrator organized your system).

```
$ls
$mkdir work
$ls
work
$cd work
$pwd
/usr/demo/work
$cp /etc/rc myfile
 $ls
myfile
$mv myfile yourfile
$ls yourfile
$cd ..
$pwd
/usr/demo
$ls
work
$
```

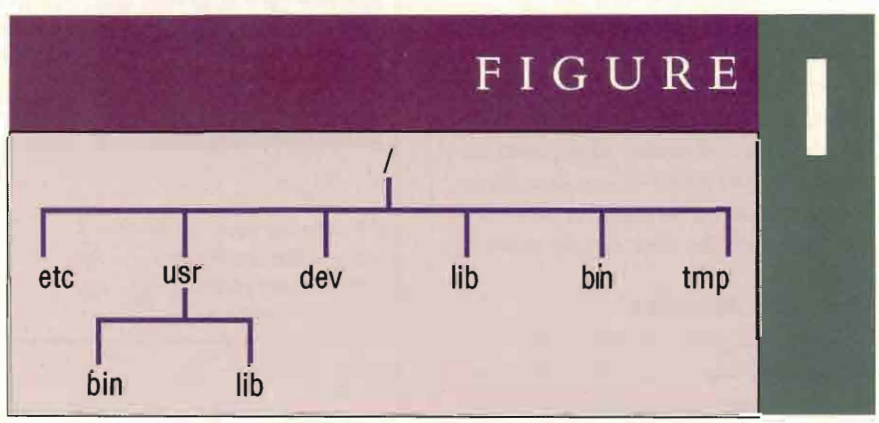
The $ indicates the shell prompt. Note: In this example, it is assumed that the system administrator created an account for you with the name **demo** and a working location of **/usr/demo**.

If any of these commands generated on error message, check Sec. 1 of the *HP-UX Reference Manual* for more information.

This example creates a new directory in your account directory location **work**, copies a file into this directory and renames it to **yourfile** and changes back to your account directory. During this procedure, the current directory and contents of the directory were listed to show the effect certain commands had on the system.

Command Options

Most HP-UX commands have optional parameters that may be used to effect the way in which a command operates.



Part of a standard directory structure.

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TABLE 1

cd	Change to the specified directory location.
mkdir	Create a directory.
pwd	Display the current location.
rm	Remove a file.
mv	Move or rename a file.
cp	Copy a file.
ls	Produce a directory listing.
more	View a file in a page-by-page manner.
lp	Print a file on the system printer.
vi	The visual file editor.
ps	Show the status of all running programs.
kill	Terminate a program.
man	Display on-line manual pages.

Important HP-UX features

TABLE 2

/etc	Contains all system administration utilities.
/dev	Contains all device files (files which are used to access system peripherals).
/lib	Contains certain programming subroutine libraries.
/bin	Contains certain basic HP-UX programs.
/tmp	A directory used for scratch space by certain programs.
/usr/bin	Contains most HP-UX user commands.
/usr/lib	Contains programming libraries and certain systemtools.

Function descriptions

TABLE 3

rm -r	"Recursive" remove. Removes the specified directories and all files in those directories.
ls -f	List the contents of a directory, placing a * after all executable files and a / after every directory. This command is the same as the **lsf** command.
ls -l	List all information about a directory (including ownership, access privileges and date of last change). This command is the same as the **ll** command.
ps -af	Show the status of all commands executed by all users on the system. The status includes who executed the program, the time the program started and how much CPU time the program has used. The command **ps-a** would list the same programs, but would not include as much information.
ps -ef	Show the status of all commands running in the system (regard less of how these commands were started).
lp -n#	Print # copies (where # is an integer) of the specified file.
cp -r	"Recursive" copy (copy all files and directories) to the specified directory location.
kill -9	Absolutely terminate the specified program. The program is specified by process number, which can be determined by using the **ps** command.

Command options

These parameters, also referred to as options, are specified as part of the command line. In most cases, these options consist of a minus sign followed by a single letter (e.g., **ls -f**). Some options may be combined with other options in a single execution of a command, and some may be mutually exclusive of other options.

Some useful options for the commands specified earlier are shown in *Table 3*.

The **more** program also has useful options that aren't specified on the command line. When **more** is used to view a file, a prompt is displayed at the end of every page. This prompt resembles: **—More—(32%)**.

At this prompt, you can use the space bar to view the next page and the letter **q** to quit viewing the file. But, what do you do if you spot an error in a long file and want to immediately edit the file? Press the letter **v** at the prompt and the **vi** editor starts, permitting you to change the file. When you exit the **vi** editor, **more** continues to page through the file from the point where you started **vi**.

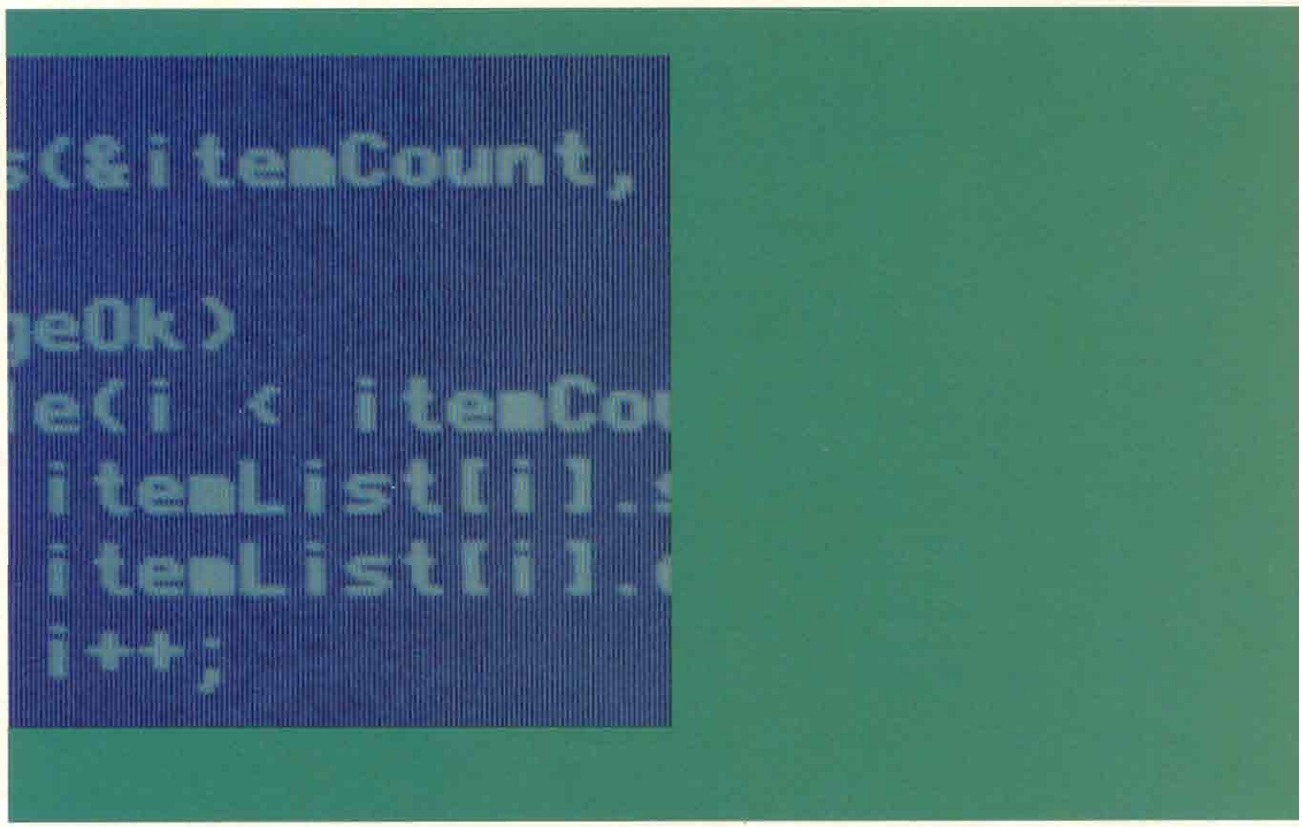
Also at the **—More—** prompt, you can execute another HP-UX command by pressing **!** and enter a command, for example, **!ps -af**. When the command completes, the **—More—** prompt is again displayed, and you may continue to page through the file.

The **vi** editor will probably take the longest to learn and fully understand, but you will use it more often than any other HP-UX program.

In subsequent columns, I'll describe some editing tricks. For now, learn how to use **vi** to add, delete and change text in a file.

Next month, I'll describe the method used by HP-UX programs to handle input and output and how to take advantage of this method. *—Andy Feibus is a software engineer for Bradley Ward Inc., Atlanta, GA.*

The Consumer's Guide to Buying a C Compiler for the HP 3000.



The release of Spectrum has sparked new interest in C among HP 3000 users. If you're adding a C compiler to your software shopping list, here are four criteria to consider.

- Is the compiler strictly ANSI-standard, ensuring the ability to run programs on both classic and Spectrum HP 3000s?
- Does it generate efficient, highly-optimized code?
- Does it work like all other HP 3000 compilers, providing accesses to the MPE file system and intrinsics and producing standard USL files?
- Does it provide a reliable programming environment through function prototyping?

There are four things you should know about C/3000,™ the C language compiler from Tymlabs. Yes, yes, yes, and yes.

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RDBMS

Fabian Pascal

The Tabular Foundation

Last month I discussed deficiencies of traditional data management and the practical difficulties they cause users. Usually, users are unable to directly access data for their more advanced needs and frequently must rely on specialized programmers working with unproductive, error-prone procedural code.

About 20 years ago, Dr. E.F. Codd, then an IBM research fellow, sought a universal, solid-data foundation that would minimize data access limitations for users and maximize the productivity of MIS/DP personnel. From the problems of traditional products described in last month's column, Dr. Codd inferred properties that such a foundation should have. These properties pertain to three basic aspects of databases:

Data Structure:
- *simple*
- *general*
- *parsimonious*
- *flexible*

Data Manipulation:
- *well-defined*
- *systematic*
- *precise*
- *reliable*
- *complete*
- *nonprocedural (high-level)*

Data Integrity:
- *accuracy*
- *consistency*

Data structure refers to the format data appears to users. There are several requirements that it must satisfy to maximize usability. First, it must be simple and avoid complexities. Second, it must be general enough to represent any type of data that users need — character, numeric, chronologic (dates and times), etc. Third, it must be able to represent all this data with a minimal structure, i.e, it must be parsimonious. Fourth, it must be independent of any internal storage structures, physical links and access paths. Finally, it must be flexible, i.e., easily adjustable to changes without imposing maintenance burdens.

Data manipulation refers to adding, viewing, modifying or deleting data. This is why databases exist in the first place. Here, too, there are certain requirements. Operations must not be vague, ad-hoc and arbitrary because they are difficult to learn and use and unreliable. If they are well-defined, systematic and precise they will yield predictable results and will be less demanding and more productive. They will not be error-prone, but reliable. They must be functionally complete so that users should not have to write their own programs to cover gaps. And, they must be high-level operations with no need for users to specify step-by-step procedures for the system to follow. In other words, they must be nonprocedural.

Integrity refers to data-quality assurance and in particular to the preservation of data accuracy, or correctness. Also, integrity refers to consistency, that is, related database parts should be in agreement with one another. In other words, data must reflect reality accurately and make sense.

If they are well-defined, systematic and precise they will yield predictable results and will be less demanding and more productive.

While these qualities may seem abstract, their practical importance should be obvious to the reader from the negative consequences of their absence in traditional DBMS. Those deficiencies described in last month's column and, in particular, the requirements for data manipulation, suggested to Codd — a mathematician — that he should look for a solution firmly anchored in mathematics.

Using Tables

What if data were represented in databases as tables? It turns out that structuring data as tables satisfies the requirements quite well. Tables are simple and familiar to everybody. They certainly can — and do — handle all types of data and usually negate the need for other formats to represent data. Tables can be readily restructured by vertical (add or drop columns) and, horizontal (add or drop rows), splitting or by joining.

These are the more obvious characteristics of tables. But tables also have

a less known property critical for database management. This is suggested by the fact that whatever you do to them — splits or joins — you always end up with tables. This is very similar to numbers that you can manipulate mathematically and always obtain numeric results, hinting to the possibility that mathematical operations also may exist for tables, as illustrated in *Figure 1*.

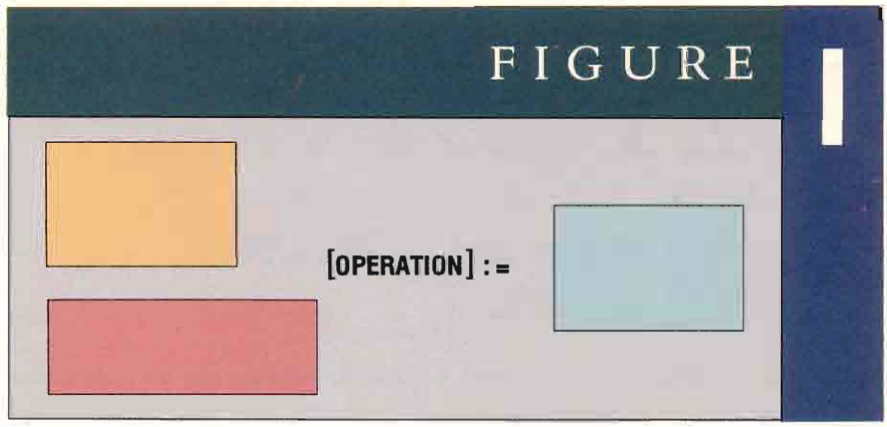
Does the splitting and joining of tables form a well-defined set of mathematical operations? Yes, but only if the tables satisfy certain conditions, conditions that are required to make computerized tables, amenable to such mathematical operations and thus easy to use.

Disciplined Tables

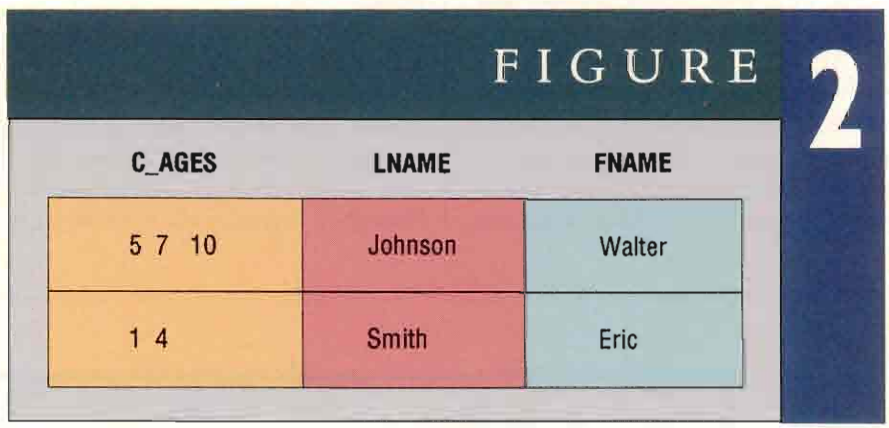
Tables resemble relations. Relations are mathematical abstractions that can be manipulated to yield other relations. Think of relations as tables whose columns and rows do not have any ordering. The manipulation of relations is called relational algebra and calculus, a branch of mathematics. It follows that relational operations do not need and cannot rely on row or column ordering to work.

Tables, on the other hand, are not abstractions but real, and therefore ordered: columns left to right, rows top to bottom. When tables are computerized, their data must be stored in a specific physical sequence on the disc. However, for users to be able to apply the purely logical relational operations to them, this order must be irrelevant, i.e. there should not ever be any need for users to rely on it explicitly.

This does not mean that the user should not see data ordered in various ways. It's the sequence in which the data happens to be internally stored at any particular time that is irrelevant. Any changes in storage — such as physical reorganizations — will not (and should not) affect the informational content of the data.



Mathmatical operations also may exist for tables.



The ages of up to three in a parent's record.

To get at a value in a table on paper, users must know its table, column and row. But, if users are insulated from the physical sequencing of data, how can they get at data values stored on disc? Well, if every row was uniquely identifiable by one or more values in it, users could use that as data identification. It would fall then to the DBMS to translate the user's logical request — the identifier(s) — into a physical access strategy — the disc address(es) — necessary to satisfy it. Hence, the second condition: Tables should have no duplicate rows.

A third condition for tables is that each data value lying at the intersection of a column with a row must be atomic. In other words, there should be no multiple values at an intersection, like in *Figure 2*, the example being the ages of up to three children in a parent's record (or row).

Multivalued table cells are known in traditional data management as repeating groups. They are allowed in some nonrelational databases where they complicate things for users, without adding any advantages.

First, tables that contain them no longer resemble relations, losing their mathematical properties. Second, consider the fact that for each object type in the database, there must be at least four commands: add, retrieve, change and delete.

By allowing single and multivalued objects, we are doubling the number of commands in (and thus the complexity

A relational database is a database that is perceived by the USER as a collection of R-TABLES and NOTHING BUT R-Tables.

of) the data language, because it now must distinguish between them. Because we loose mathematical properties and simplicity, without gaining anything (the same information can be stored in simple relations), tables should contain only atomic values.

If computer stored tables satisfy these conditions, specifically, no intrinsic ordering, no duplicate rows and no repeating groups, then certain mathematical operations will be applicable to them. We call these tables Relational Tables or R-Tables, and we now have a starting definition of a relational database: A relational database is a database that is perceived by the USER as a collection of R-TABLES and NOTHING BUT R-Tables.

Note: This is a *starting* definition that is far from complete. One misconception is that tables must be stored as such in a relational database, but the definition clearly states that they must only be perceived by users as tables. How they internally are represented is up to the vendor, as long as users are not exposed to that. Another common misconception is that tables are all it takes to make a DBMS relational. That is entirely untrue and misleading. It is the integrity and manipulation aspects of tables that make them valuable in the first place.

Relational databases based on disciplined tables have all the necessary (including mathematical) properties and therefore have the potential to solve traditional data management problems. What's more, the relational operations work on whole tables, not on individual rows, which promises to eliminate procedurality. —*Fabian Pascal is an analyst, consultant and author specializing in relational database management and SQL on the PC, and is affiliated with Codd & Date International.*

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FIELD SERVICE

Ron Levine

Standard With HP 3000 Line Hardware Service Contracts

Proactive Maintenance

Editor's note: *Ron Levine's column addressing field service issues, trends and products will appear periodically in* HP Professional. *Levine, who has 20 years of experience in the computer industry, has worked as a field engineer, customer engineer, consultant, teacher and writer. Levine also writes field service columns for two other Professional Press publications,* DEC Professional *and* MIDRANGE Systems.

Proactive maintenance, the prevention of potential problems (as opposed to reactive maintenance which is the repair of components in response to a system down call), is the goal of HP's 3000 line hardware service. Commonly called Predictive Maintenance, it provides many benefits to system users.

With maintenance support, system availability is maximized because early warning trouble signals are caught and analyzed, preventing potential problems. Many times, faults are diagnosed and corrected without impacting system usage and without the user being aware that a problem had been brewing, resulting in no loss in productivity.

By monitoring the system and pinpointing potential troublespots, unplanned downtime is turned into mutually scheduled preventive maintenance visits. If the monitoring procedure indicates that downtime is needed to facilitate a repair, it is kept to a minimum because the fault has been accurately diagnosed. The CE will arrive knowing the cause of the problem and with the right part(s) to fix it. By teaming up remote diagnostics and performance monitoring techniques and then combining them with rule-based software, predictive maintenance (proactive), not corrective (reactive), becomes the norm. Ideally, problems are solved without affecting system availability achieving zero downtime.

The goal of HP's predictive support service is to quickly locate, analyze and correct system errors before they become problems or bottlenecks affecting productivity. The service also can help troubleshoot intermittent faults, especially the kind that pop up only every few days and then disappear.

What The Predictive Support Package Does

Predictive Support software reads the various error logs maintained in HP computers and peripherals. It scans memory logs to monitor main storage operations, system logs to seek out possible I/O errors or power fail conditions and CS80 logs to check on disc drive functioning. These log results are read and compared against a set of predefined parameters. If the actual operating parameters exceed the reference values, an expert system type of ruleset is invoked to generate the proper response. The HP Customer Response Center (CRC) also is automatically notified of the out-of-tolerance condition. (Note: This automatic notification feature is an option that may be turned off by the user.)

When a call is received from the site (either automatically or via operator intervention) the CRC responds by routing the call to the appropriate specialist who analyzes the messages and determines what (if any) action is required. The center contacts the site CE and the customer to inform them of the situation and what is being done. The CRC may ask permission to log on to the system for further diagnostic study.

. . . problems are solved without affecting system availability achieving zero downtime.

Since the Predictive Support software signals potential problems before they impact system operations, the usual course of action is to schedule a maintenance call to the site at a mutually convenient time through your account CE. However, if a serious fault is found, the CRC will respond remotely to the customer with a suggested solution or it will dispatch a CE to the site.

Other features in the Predictive Support component of HP's maintenance service include configuration tracking, file system verification, ruleset downloads, network predicitive and data communication link testing.

Through its Configuration Tracking module, Predictive Support gathers and maintains the latest data on your operating environment. It records system device data, network configuration data and software revision levels being run on your equipment. This information can be invaluable in a troubleshooting situation.

The File System module is run at the users discretion to check MPE directory, file label and free space integrity. It scans through the file structures to check that all pointers are linked together and that there are no conflicts between assigned file space and free space.

An automated ruleset download feature enables HP to update or alter Predictive Support for existing products

Remember how computers remembered? Mercury delay lines? Punched cards with 90 columns and round holes? Hand-wired magnetic cores? In case your memory needs refreshing, The Computer Museum would like to share its memories with you.

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We have created a limited edition, 20"x32" poster of the picture shown below. Printed in full-color, it includes an identification key to help you recall the memories you've forgotten. To get your poster, along with an information kit on museum membership, exhibits and activities, send a tax-deductible contribution of $25 or more to:
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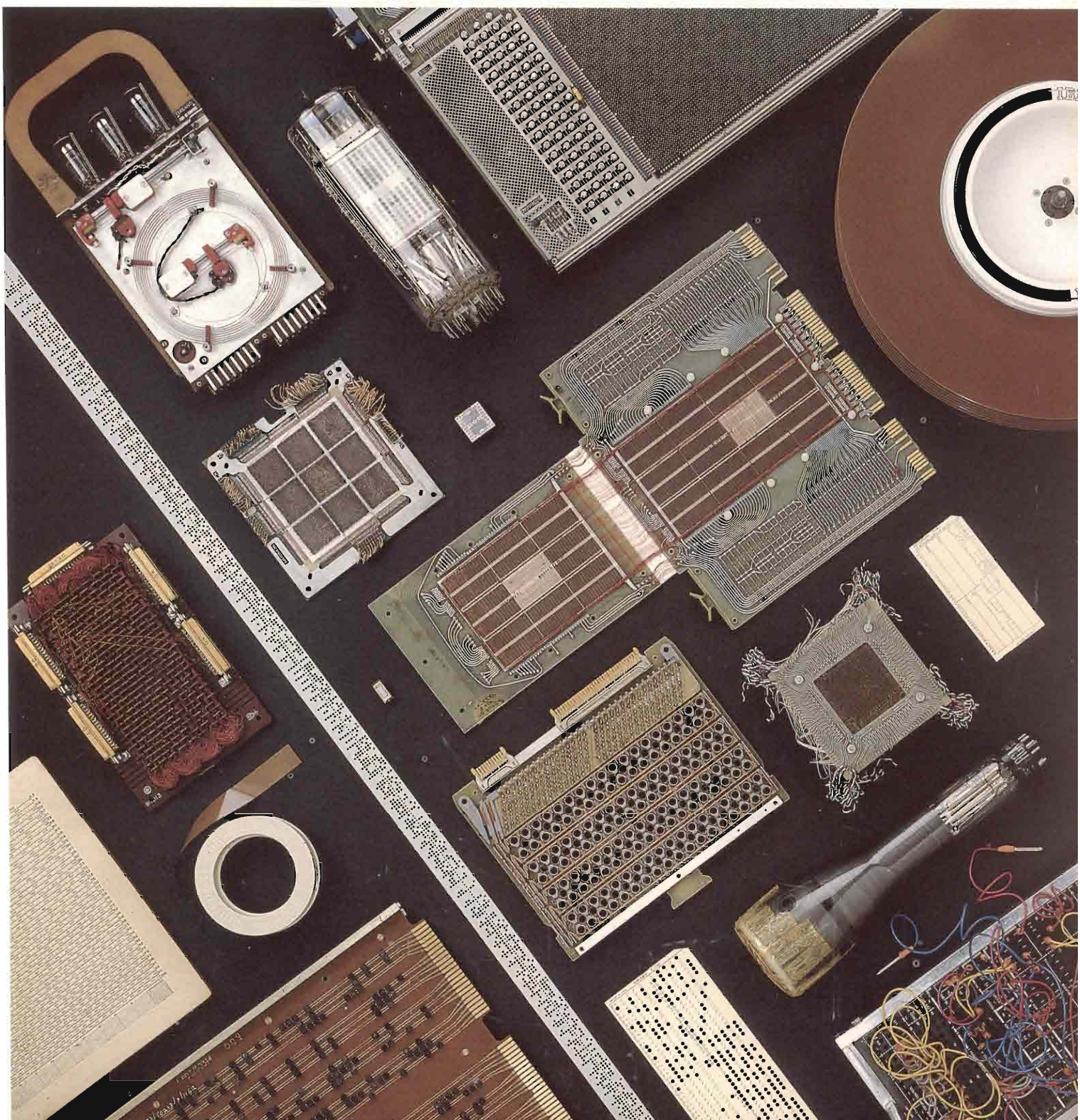
CIRCLE 152 ON READER CARD

COMPUTER MEMORIES FOR SALE

Special thanks to this publication, Scitex America Corp. (color separations), Grafik Communications, Ltd. (design), David Sharpe Studio (photography) and VM Software, Inc. (poster).



and to add new devices into the system without the need to install new software versions. At the CRC, all rulesets are combined into one file. This file automatically is downloaded to your system when you run the support program.

For network users, HP Predictive Support can analyze potential network problems by searching through the network log records in the NS log files to locate event data. (Customers must be under HP's NetAssure maintenance service and be using NS II network software.)

A testing feature is included to check the data communication link between your site and the HP CRC. The test program can be run by the user at any time and results in the transfer of a test file. (The Predictive Support operating program doesn't have to be activated to run this test portion.)

The Predictive Support software consists of two distinct components. The first component, the monitoring and rule-based programs, reside and run at the customer's site. They are run, by the user or automatically, as an ordinary job and have virtually no effect on system load.

The second of the software package resides at the CRC and consists of the system history and configuration data programs. By providing the center's engineer with a full history and current configuration of your system, center personnel can move quickly to determine if the received Predictive Support event messages are an indication of the need for immediate attention or if a scheduled preventive maintenance visit is required.

Other support tools available at the CRC include access to the full history of support calls across the entire HP 3000 installed base, and additional diagnostic programs to aid in analyzing complex system trends.

What's Needed To Acquire HP's Predictive Support Package?

Predictive Support is provided at no charge to customers as part of HP's 3000 line Standard, Basic, or Guaranteed Uptime hardware support/service contracts. The customer site must be equipped with: ■ *A telephone line for incoming voice calls.* ■ *A telephone line for data transfer.* ■ *A free port on their 3000 system.* ■ *An auto dial modem.* [Note: in some cases HP will provide a modem free of charge]

Additionally, the customer must agree to allow HP's remote support diagnostics to reside on their system and to permit HP support personnel timely remote access to the system. The site also must use Predictive Support's electronic transfer capability when "talking" to HP's CRC.

With all of the above in place, the Predictive Support software can be streamed as a regular customer job, or scheduled to automatically run without user intervention once each day (HP suggests that the package be included to run as part of the site's daily system backup procedure).

HP is busy enhancing its remote and predictive maintenance capabilities. Their worldwide Customer Response Centers (the two U.S. centers are located in Georgia and California) have a portfolio of remote service tools and are staffed with product experts for HP 3000 computers and associated peripherals.

By detecting the slightest performance changes through monitoring system activities, analyzing the data collected by the monitoring operation, and employing powerful rule-based (expert) systems technology, potential trouble spots can be identified and corrected before causing a catastrophic system failure.

While no predictive maintenance program can assure 100 percent uptime, (nor is it reasonable to expect this), predictive and solution-oriented service tools are the first major step toward the utimate goal of uninterrupted system performance.

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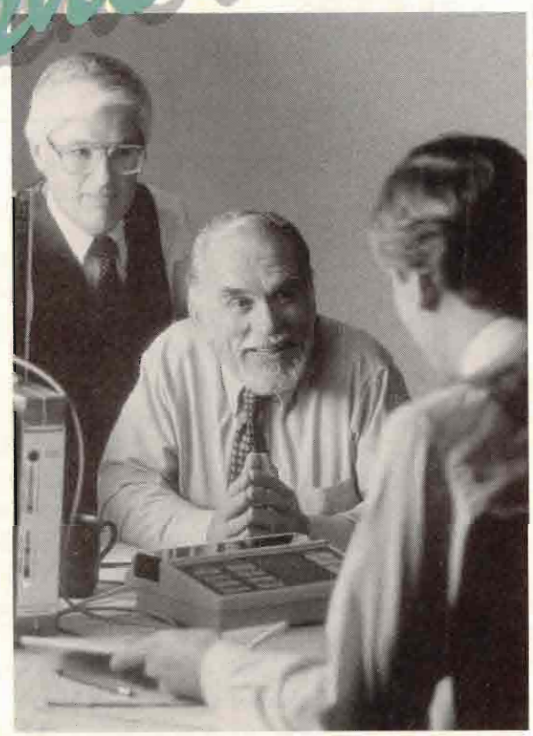
Meet the technology leaders in OEM Peripherals



—at the Invitational Computer Conference near where you live and work.

Every group has its meeting place. In your area, the meeting place for the major manufacturers of OEM peripherals—and the decision-makers that specify and select these products—is the Invitational Computer Conference (ICC). This year there are 12 ICCs dedicated exclusively to the OEM peripheral market in the United States and Canada, and six in Europe. One will be convenient for you.

These one-day, seminar/displays are so popular because they give you just what you need to know without wasting your time or money. You don't travel, there's no admission fee, the seminars and table-top displays from major manufacturers are all targeted to your interests (no searching through aisles), and the atmosphere is informative and hands-on, but congenial, with refreshments served. In a few hours you'll have the latest story on the newest and best in disk and tape drives, controllers, terminals, printers, test equipment, etc.

Invitations to the ICC in your area are available from one of the many exhibitors or the ICC management. Request yours today.

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CIRCLE 124 ON READER CARD

PC TIPS

Miles B. Kehoe

Making The PC Connection

Since the advent of personal computers, the ability to connect departmental and corporate resources has been an important function. Now that PCs are growing into powerful single user systems, the distinction between host and local PC is not as clear.

Historically, host computers have stored shared data. The host featured programs that allowed a user with a terminal to inquire into the centralized database and create reports, whether the information was sales statistics, customer profiles or corporate financial data. These programs typically were written by the data processing department, which often meant long lead times and high costs.

The PC, on the other hand, offered a variety of "off the shelf" applications and utilities that were easy-to-use, responsive to user actions and allowed customized reports and inquiries to be written with minimum effort. However, when there was a need to share data with a number of other users, the cost of the PC-based solution began to grow.

As more corporate users discovered the benefits of having computing power at their fingertips, the need to cleanly integrate the PC into the host environment became more pronounced. Today, there are a number of products enabling you to connect your Vectra or compatible PC to multiuser systems such as the HP 3000 and the HP 9000.

Making The Connection

In order to make PCs and minicomputers work together, you must first establish the physical connection. This is either easy or a hassle depending on the type of connection you use.

The well-established serial, or RS-232, specification is so universal that virtually all vendors' equipment allows rapid and easy connection. Data speed (baud rate), parity and device handshaking are all well-known protocols and any problems are easily diagnosed.

Modem connection is slightly more complex than direct serial connection but basically is an extension of RS-232 and also is easy to diagnose.

Local area network connections are becoming increasingly popular, but as with any new technology, getting the connection working properly can take some effort. Be sure the solution you choose is supported at all points by a single vendor, be it a dealer, OEM or system house, or computer manufacturer.

Elements Of PC Integration

At the lowest level of integration is the ability to act like, or emulate, an ASCII terminal to allow interactive sessions to the host computer. This emulation software allows the PC user to connect to the host and run programs that exist on the host. For example, using the Advancelink 2392 program on a Vectra, a user can log on an HP 9000 as a terminal and run any of the HP-UX application such as mail, the *vi* editor or custom applications.

Of course, the emulator must be able to behave exactly like one of the terminals that is supported on the host in question. For HP multiuser systems, there are a number of terminal emulators that can behave like HP's intelligent ASCII terminals such as the HP 2392 and HP 2393.

Capturing Data

As soon as you've established terminal emulation, I almost can guarantee that you will want to capture data from the screen into a local file or to your PC printer. You even may want to create simple text files with your PC word processor and send those files back to the host for electronic mail or printing.

Modem connection is slightly more complex than direct serial connection . . .

Fortunately, most terminal emulation programs this level of file transfer to almost any type of host system. There is a logging function that allows you to capture whatever data comes through the physical connection to your host system. The text is displayed on the screen and is stored into a local file. When you've finished, you can use a local word processing program to edit or print the captured text.

Many emulation programs also enable you to send a PC text file to the host one line at a time, as if you were typing the text on the keyboard flawlessly and at a high rate. While this requires a host program that can receive the text at high speed, most hosts do include an editor or other program that allows this type of text transfer. These programs often require a special character to mark the end of the input file. However, you can type this special character after the file has been "sent."

For example, on the HP 3000 there is the "PTAPE" or the "FCOPY" program

Reflection
Walker Richer & Quinn
2825 Eastlake Ave.
Seattle, WA 98102
CIRCLE 292 ON READER CARD

Multiplex
Network Innovations
20863 Stevens Creek Blvd.
Cupertino, CA 95014
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utility ending the input with a Control-D. On HP-UX and other UNIX systems, you can use the **cat** command to create a file, which normally expects Control-D to mark the end of the input.

Full File Transfer

The logging method described above works well for plain ASCII text, but if you are using more advanced word processors to create text, or if you want to share database files or actual programs, you will need to use a terminal emulation program that supports binary file transfer.

To support binary file transfers to and from the host, you need a file transfer program on the host as well as on the PC. With Reflection from Walker Richer & Quinn, you receive a program that must be uploaded to the HP 3000 or HP 9000 before any file transfers can be accomplished. However, once you have uploaded the program, you and all other users sharing that host can send and receive binary and text files with much less effort. Using Reflection or Advancelink by HP , you begin a file transfer by pressing a softkey.

Sharing Data

So far, we have been talking about connections that can be made over RS-232 lines, regardless of whether the PC is connected locally to the host, or whether the connection is via telephone lines and modems. While the methods described in the following paragraphs sometimes can be accomplished over RS-232 lines, they typically require higher data rates and usually are implemented only over local area networks within departments or facilities.

A major benefit of a centralized host system is that administrative services, such as automatic daily backup, helps insure against data loss. Furthermore, larger systems often justify faster and more expensive printers and disc drives. As users begin to appreciate these benefits, they want to extend their PC to take advantage of them.

Many products allow you to treat the host disc as a local drive. For example, with proper software you can configure a drive D: which looks and acts like a local hard disc when in fact it is located on your shared host system. Depending on the hard disc and network connection you may find the remote disc has faster access than the local hard disc.

Such a scheme allows users to share

common programs and data files with minimum difficulty. Please be aware, however, that most PC applications are licensed for use on a single PC. Storing a single copy on a shared remote hard disc does not give you the right to violate licensing agreements. Be sure to check with your application vendor. In all fairness, you should own one copy of the PC application for every system that will use it.

The same system software that allows you to share a section of the host disc drive often allows you to address the host printer as if it were a local printer. For example, you can configure your Vectra so that local printer 'LPT1:' is actually the 2680A laser printer attached to your departmental HP 3000.

Data Access

The highest level of integration is something that allows your PC to effectively access data stored on your host system and retrieve it in a format that can be used by your PC application. Applications such as Hewlett-Packard's HP Access and Multiplex from Network Innovations allow you to extract data from a host database and pull it across the serial or network link into a Lotus 1-2-3 file format. The intent of both of these packages is to allow the PC user to utilize all the features of shared access to a powerful host system without realizing that any of the resources were located on another computer.

At this point, these applications are just beginning to exist. Soon, I imagine we'll see system level routines that can establish a connection to the host, extract the data and format it in a PC file format transparently, so the user doesn't need to be concerned whether the data he wants is on the local PC or on the host. Once this starts to happen, PCs finally will be integrated with minicomputers and mainframes. At that point, the PC finally will have grown up.

Making The Connection

Depending on your needs and the software you choose, nearly any of the functionality I've described can be obtained with serial direct, serial modem or local area network access. However, like all transactions involving your money, I'd suggest you work with a trusted vendor who understands your needs and can take you from idea to implementation. Then you'll be on your way to successful distributed computing. — *Miles B. Kehoe works in product marketing for UNIX systems at Hewlett-Packard, Cupertino, CA.*

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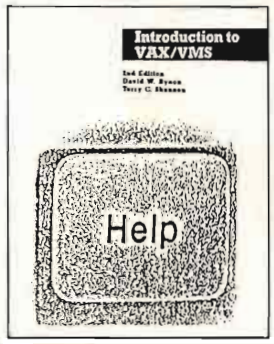

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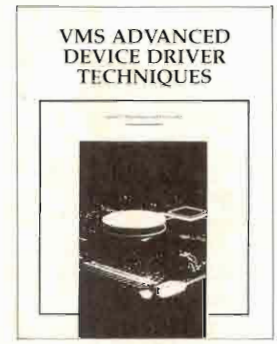

NEW . . . VMS Advanced Device Driver Techniques

By Experts Lee Leahy of Digital Equipment Corporation and Jamie Hanrahan of Simpact Associates

VMS Advanced Device Driver Techniques describes how to design, implement and debug device drivers for the VMS Version 5 operating system. Learn more about simple VMS device drivers, full duplex and state machine-based drivers, VAX BI Drivers, advanced strategies and techniques you can use for debugging VMS device drivers and much more. From the low-level "building blocks" to high-level design issues, it's everything you need to become a proficient user of VMS device drivers.

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Continued from page 24.

tion and envelope handling also have been added.

LaserControl 3.3 provides eight printer emulations; Diablo 630, Qume Sprint V; NEC 3550/5510/7710; Epson MX80/FX80 and IBM graphics printers. Software that supports any of these printers can be used with the HP LaserJets/DeskJets and compatibles through Laser Control 3.3. Besides printer emulation, Laser Control 3.3 provides menu-driven control of the LaserJet and DeskJet, eliminating the need to use complex escape sequences.

Contact Insight Development Corporation, 1024 Country Club Drive, Suite 140, Moraga, CA 94556; (415) 376-9451.

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Digital Design Offers Laser Check Printing

Digital Design Inc. (Jacksonville, FL) has developed the laser printer Model 636, which has the ability to produce bank checks from blank paper. Model 636 offers the insurance, brokerage, banking and Fortune 1000 companies a low cost Laser Check Printer.

With the Model 636, one device now can print all forms required in the accounting department, not just invoices or statements.

The model 636 is HP LaserJet Plus compatible. Digital Design provides a software developers tool kit that makes it easy to print the Magnetic Ink Character Recognition line required for bank checks.

Contact the Digital Design Inc., 2955 Hartley Road, Suite 101, Jacksonville, FL 32217; (904) 268-4307.

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BSI Announces Lasersoft/JetSetter

Business Systems International has announced the release of Lasersoft/JetSetter, an HP 3000 application that links the HP LaserJet printers and HP 3000. HP LaserJet (or compatible) printers can be connected directly to an HP 3000 and used with your application programs without having to deal with PCL escape sequences.

Contact Business Systems International Inc., 20942 Osborne Street, Canoga Park, CA 91304; (818) 998-7227.

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Inference Products Available On HP 9000/300

Inference Corporation (Los Angeles, CA) has announced that both of the company's expert system development tool product lines are available on HP personal computers and workstations.

A new version of ART (Automated Reasoning Tool), ART/UNIX Version 3.5 now is available on HP 9000 Series 300 workstations built on the standard Motorola MC68000 architecture.

This announcement is the result of the porting agreement forged earlier this year between the two companies. ART/UNIX Version 3.5 features ART Windows, a new facility that integrates X Windows or X11 standards into the ART environment. As a result, software engineers can develop and deliver export system applications with graphical interface that follow these standards.

Inference's PC tool, ART-IM/MS-DOS (Automated Reasoning Tool for Information Management), runs on the complete HP Vectra family. The ART-IM product line grew out of a consortium formed by Inference to build ART-based expert system development and deployment tools for use on IBM mainframe computers.

Contact Inference Corporation, 5300 West Century Blvd., Los Angeles, CA 90045; (213) 417-7997.

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Digital Design has announced the Model 636 laser printer.

RS/Decision Software From BBN Software Products

BBN Software Products Corporation (Cambridge, MA) has announced RS/Decision Software.

RS/Decision Software provides manufacturing and engineering professionals with practical expert system development tools for decision support. This new system specifically is designed for developing integrated, plant-wide quality manufacturing and engineering applications and is the first expert system shell integrated with quality control, graphics and statistics capabilities.

RS/Decision Software assists the capture and automation of expertise — without extensive AI experience. The RS/Decision involves two-day training, can integrate with existing applications and runs on DEC's VAX/VMS, IBM PC and VM, Sun and HP computers.

The RS/Decision system provides menu-driven utilities from building, maintaining and accessing knowledge bases. It is suited for applications such as training, quality control, process control, equipment maintenance and troubleshooting, production scheduling, product selection and formulation, and includes hotline support and online documentation.

Contact BBN Software Products, 10 Fawcett Street, Cambridge, MA 02238; (617) 864-1780.

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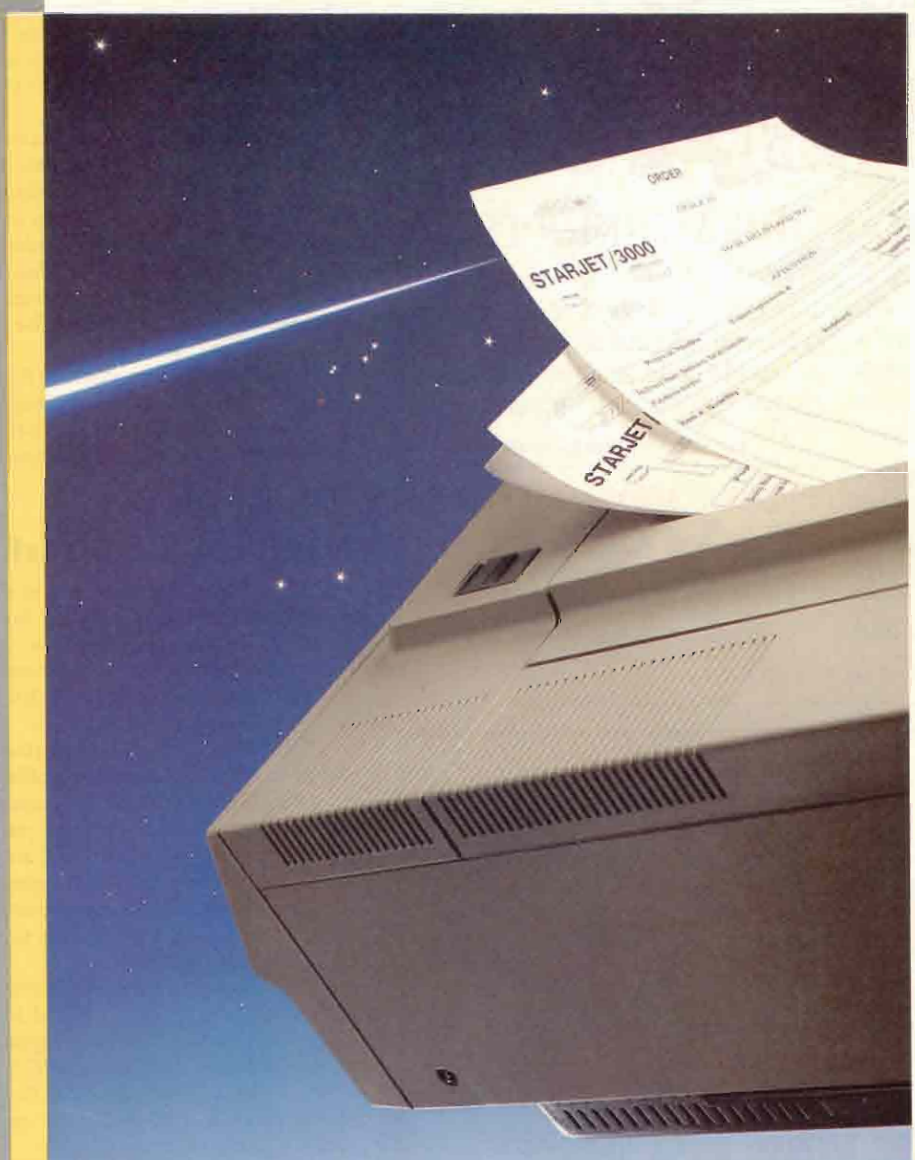
Bradmark's SUPERDEX Offers Speed And Flexibility

Bradmark Computer Systems has released SUPERDEX, a software package that adds data retrieval speed and flexibility to the IMAGE, TurboIMAGE and TurboIMAGE/XL database environments on the HP 3000.

SUPERDEX allows multiple keys in master or detail sets, generic and partial-key

STARJET / 3000

MAKING YOUR DREAMS A REALITY



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STARJET/3000 is a form generation software for any HP3000 (including 9XX's).

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Release the power from your laser printer and make your dreams a reality.
Transform the output of your programs by installing STARJET today.

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lookups, wildcards, automatic keywording and keyword retrieval, transparent field grouping and sorted sequential access using uncatenated keys. It also allows dynamic relational queries across multiple fields, datasets and databases, adding the flexibility and power of a relational database to the standard IMAGE environment.

SUPERDEX is a compatible extension to IMAGE, using enhanced intrinsics and requiring only minor program modifications. SUPERDEX automatically creates and manages new B-tree indexes in standard databases, maintaining full compatibility with transaction logging, existing applications and utilities. Interfaces are provided for PowerHouse and other packages.

For more information contact Bradmark Computer Systems, 4265 San Selipe, Suite 820, Houston TX 77027; (713) 621-2808.

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PPL Introduces MultiView and GrafixPro

Princeton Publishing Labs has introduced two high-performance products for document processing applications — the MultiView, a multiscan monochrome monitor, and the GrafixPro, a register level compatible VGA controller board.

The MultiView is a high-performance, monochrome multiscan monitor offering full page viewing with true VGA compatibility. The Multiview features ultra high resolution in both portrait (800 x 1000 dot) and landscape (1024 x 768) modes and supports both analog and digital (TTL) signals to run VGA, EGA, CGA, MDA and Hercules standards in all operating modes.

The GrafixPro supports existing TTL standards to run EGA, CGA and MDA in all operating modes. Hardware register level compatibility is provided with VGA, EGA, CGA, MDA and Hercules. The GrafixPro works with all IBM PC/XT/AT and PS/2 systems and compatibles.

The MultiView list price is $395; the GrafixPro list price is $595.

Contact Princeton Publishing Labs, 19 Wall Street, Princeton, NJ 08540; (609) 924-1153.

Circle 382 on reader card

StarJet/3000 Supports Duplex Printing

Following HP's announcement of the LaserJet IID, Appic has announced that its StarJet/3000 form management program supports the duplex printing. This feature, already available for the LaserJet 2000 allows you to print forms on both sides.

Also new is StarJet/3000's possibility to provide downloadable fonts for printouts coming from any HP 3000 application, including logos and signatures. StarJet/3000 is delivered with more than 100 portrait/landscapes fonts and can work with any PC-based soft or hard fonts.

Appic now is offering a PC-based version of the Design module of StarJet/3000. Using a colored, window-based interface, Design/PC provides the possibility to create/modify, scale, copy and move forms and fonts. Offered as an additional module at no extra cost, Design/PC is appropriate for complex forms.

StarJet/3000's version 2.10 now provides the possibility to access HP environment files. This feature allows one to use file equations to merge data and forms, without having to cold load the system to install Appic library in to the system SL.

Contact Appic Inc., 3600 North Hills Dr., #131, Austin, TX 78737; (512) 346-0962.

Circle 381 on reader card

Strategic Systems Enhances Its Performance Toolbox

Strategic Systems Inc., has announced the release of two new additions to its Performance Toolbox, PROBE/3000 XL v1.0 and GoFaster XL v1.0.

PROBE/3000 XL is a performance product for the MPE XL environment and executes in native mode. Featuring Global, Process and I/O contexts, PROBE/3000 XL is similar in nature to its MPE/V counterpart, PROBE/3000 it is a ease-of-use and easy-to-understand representation of system performance information. Also featured are MPE XL specific performance metrics, including information on Switch operations to and from Compatibility-Mode and Native-Mode at the process level, genealogy tree information at both the process level as well as Page Fault information also at the process and system wide levels.

GoFaster XL is the Native-Mode compliment to GoFaster that allows the user to more intelligently control resource allocation to user defined processes and programs. As with all SSI MPE XL based products, GoFaster XL executes entirely in Native-Mode, thereby ensuring maximum efficiency in execution with minimum resource requirements. GoFaster XL and GoFaster contain sophisticated process scheduling options that provide the user with greater options in resource allocation than ever before.

Both MPE/V and MPE XL based products are priced by CPU size thereby making the tools more accessible to HP 3000 users. For more information contact Strategic Systems Inc., 11050 5th Ave., N.E. Ste. 101, Seattle WA 98125; (206) 362-2231.

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USS Releases New USS/PMS3000 Version

Unified Software Systems recently introduced version C.01 of its Program Management System (USS/PMS3000).

USS/PMS3000 is a System Security package that offers the system manager the ability to control System access, Account access, User access, Device access and/or Application access. New features include message control at the System, Account and User levels; a new option of task related help for the user; security enhancements at the account manager level; a revamped task/application maintenance screen and several new options in support of PMS/XEQ processing.

A new feature, the USS/PMS AUTOLOAD automates the load/setup of the USS/PMS3000 database with the Account, User and Task information from the customer's MPE environment. This minimizes the system's manager's effort required in installing the system.

In response to customer requests, Unified Software Systems has revised the USS/PMS3000 maintenance manual. The new version improves the overall usefulness content and functional structure of the manual.

USS/PMS3000 is available for the full line of HP 3000 CPUs. The new version also supports the new Spectrum Series.

Contact Unified Software Systems, 6551 Loisdale Court, Suite 400, Springfield, VA 22150-1854; (703) 922-9800 ext. 232.

Circle 379 on reader card

Computer Peripherals Enhances JetFont 12/30

Computer Peripherals Inc., a manufacturer of enhancement products for IBM and compatible personal computers, has upgraded its JetFont 12/30 font cartridge for Hewlett-Packard LaserJet printers, configuring it with two additional font sizes.

The JetFont 12/30 cartridge, which previously featured CPI's Lotica typeface in four sizes ranging from 12 to 30 cpi pitch, has added 18 and 25 cpi pitch typefaces in both portrait and landscape modes. The cartridge was designed for use with spreadsheets or other text in tensive applications and can print up to 40,000 characters on an 8½ x 11-inch page, four times the denisty of any HP cartridge.

The JetFont line consists of a series of low-cost font cartridges offering type faces and capabilities not available from HP. JetFont products are part of the company's JetWare line, which includes JetMemory upgrade modules for the HP Laser Jet II.

The enhanced JetFont 12/30 is currently available through computer retailers nationwide at a suggested retail price of $325. Contact Mike Mock, CPI, 667 Rancho Conejo Blvd., Newbury Park, CA 91320; (805) 499-5751.

Circle 378 on reader card

WRQ Begins Shipping Reflection I V3.3

Walker Richer & Quinn has begun shipping release 3.3 of Reflection 1 terminal emulator.

This new release adds emulation of the HP 700/92 and HP 700/94 terminals to the list of terminals already supported by Reflection 1. The 700/92 and 700/94 are replacements for HP's 2392A and 2394A terminals. Reflection 1 will support all the 700/92 features with the exception of two downloadable character sets. Features present in the 700 series terminals that were not supported by HP's 2392 and 2394 series include: underline or block cursor, cursor on or off, inverse video or normal display, message line operation parameters, insert and delete characters with wraparound, additional terminal status responses, configurable Return and Tab keys, save and restore of configuration selection, 132-column support and near VT22 ANSI emulation.

Walker Richer & Quinn will continue to support the HP 2392A and HP 2394A terminals in the Reflection 1 product.

Contact Walker Richer & Quinn Inc., 2825 Eastlake Avenue East, Seattle WA 98102; (206) 324-0350.

Circle 377 on reader card

CCS Upgrades COBAL Debugger

Corporate Computer Systems (Holmdel, NJ) has announced the release of TRAX 1.3. TRAX is a source level COBOL debugger for use on MPE/V.

The new release of TRAX provides a special delayed break point that may be inserted into a child process. When a multiprocess application executes the child process, the break-point is struck and the child can be debugged interactively. The TRAX delayed break point may be set in any member of the process tree. This means that any level of multiprocess COBOL application now can be debugged by using TRAX.

With TRAX the MPE/V programmer can have access to the debugging power that had been reserved for MPE/XL users. TRAX provides full multiwindow interactive source execution, paragraph trace, user variable display and the ability to debug VIEW/PLUS applications interactively on a single terminal.

TRAX is provided on all classic HP 3000 computers.

Contact Corporate Computer Systems, 33 West Main Street, Holmdel, NJ 07733; (201) 946-3800.

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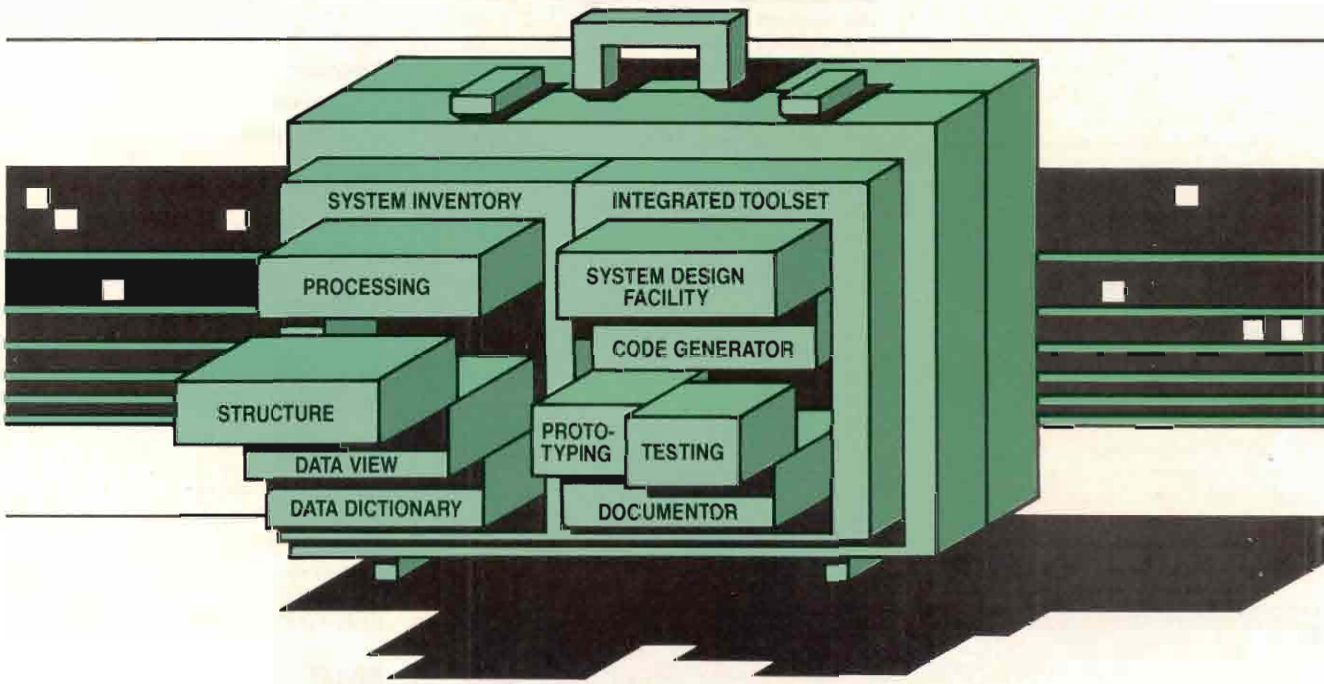

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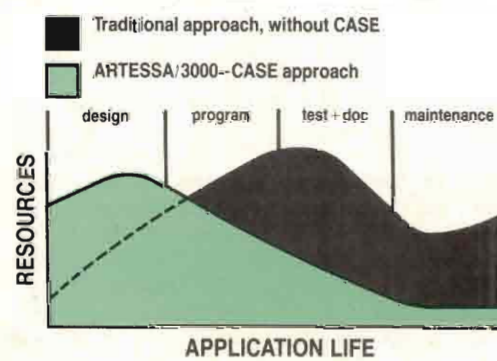

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[CALENDAR]

[FEBRUARY]

22: Speier Associates will conduct a workshop that will explore the ways to use IMAGE, QUERY and VPLUS to develop prototypes and working application systems simply, quickly and inexpensively. For more information, contact Speier Associates at 1720 Section Road, Suite 111, Cincinnati, OH 45237; (513) 351-8888.

28-3/2: The Sixth Annual UniForum, the International Conference of UNIX Operating Systems Users, will be presented at the Moscone Center in San Francisco, CA. For full details, write UniForum 1989, 2400 East Devon Avenue, Suite 205, Des Plaines, IL 60018; (800) 323-5155 or (312) 299-3131.

[MARCH]

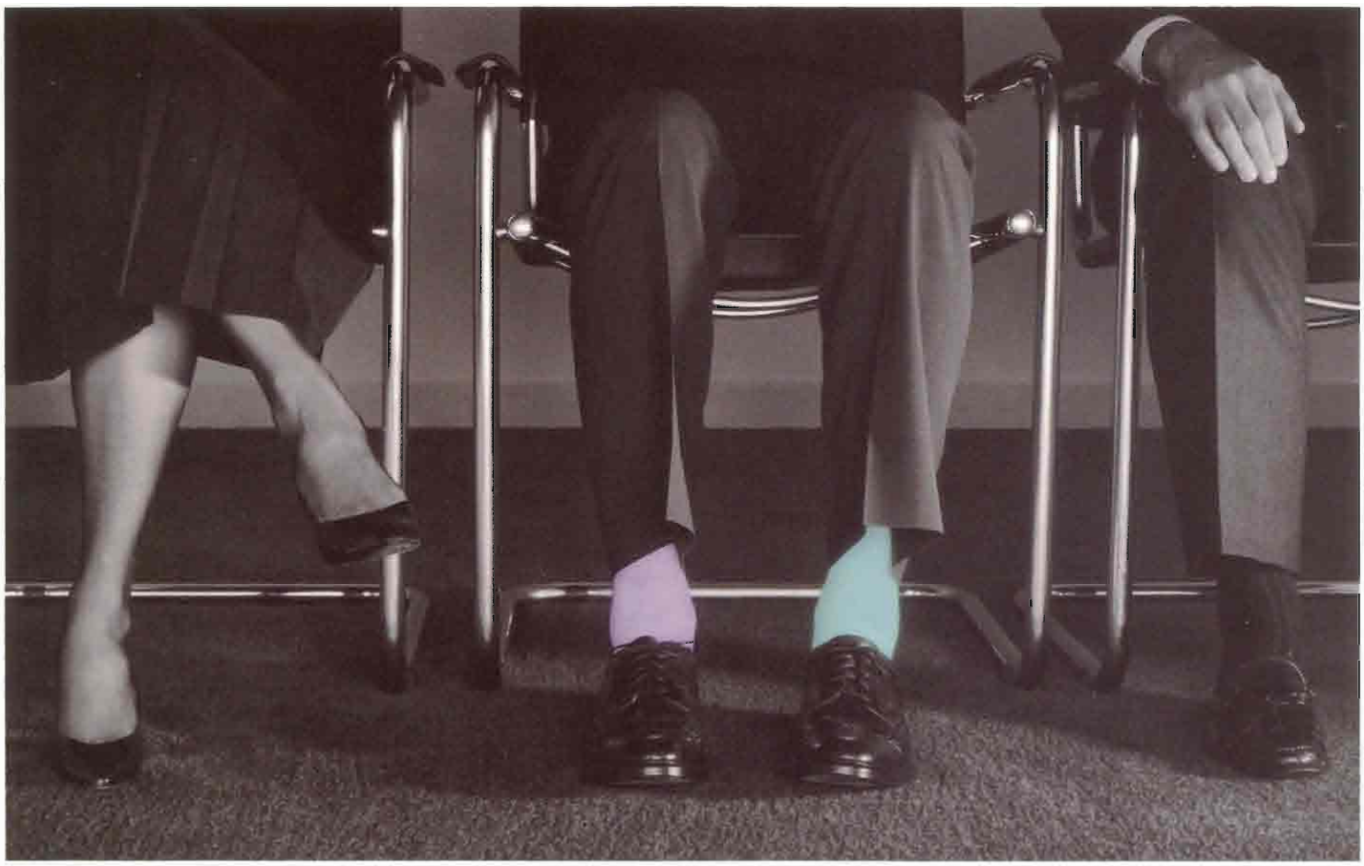
6-10: The 40th Pittsburgh Conference & Exposition on Analytical Chemistry and Applied Spectroscopy will convene in Atlanta, GA at the Georgia World Congress Center, GWCC. Contact Publicity and Public Relations/Pittsburgh Conference, Suite 322, 12 Federal Drive, Pittsburgh, PA 15235; (412) 795-7110.

[APRIL]

17-20: The 10th annual conference and exposition sponsored by the National Computer Graphics Association (NCGA) and dedicated to all applications of computer graphics will feature NCGA's Integrate '89, a systems integration demonstration showing how computer graphics standards can be applied to increase productivity. For more information, contact Michael Weiner at 2722 Merrilee Drive, Suite 200, Fairfax, VA 22031; (703) 698-9600.

26-28: /usr/group*, the International Association of UNIX systems users and Patricia Seybold's Office Computing Group will jointly sponsor a major UNIX executive symposium. The symposium is aimed at MIS executives of large end-user organizations (Fortune 500 and Government). The Executive UniForum Symposium will take place at the Santa Barbara Biltmore Resort Hotel, in Santa Barbara, CA. For further information, please contact Judy Hurwitz at Patricia Seybold's Office Computing Group, 148 State Street, Suite 612, Boston, MA 02109; (617) 742-5200.

There's one error even our software won't flag.



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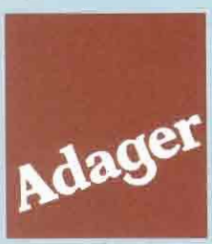

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