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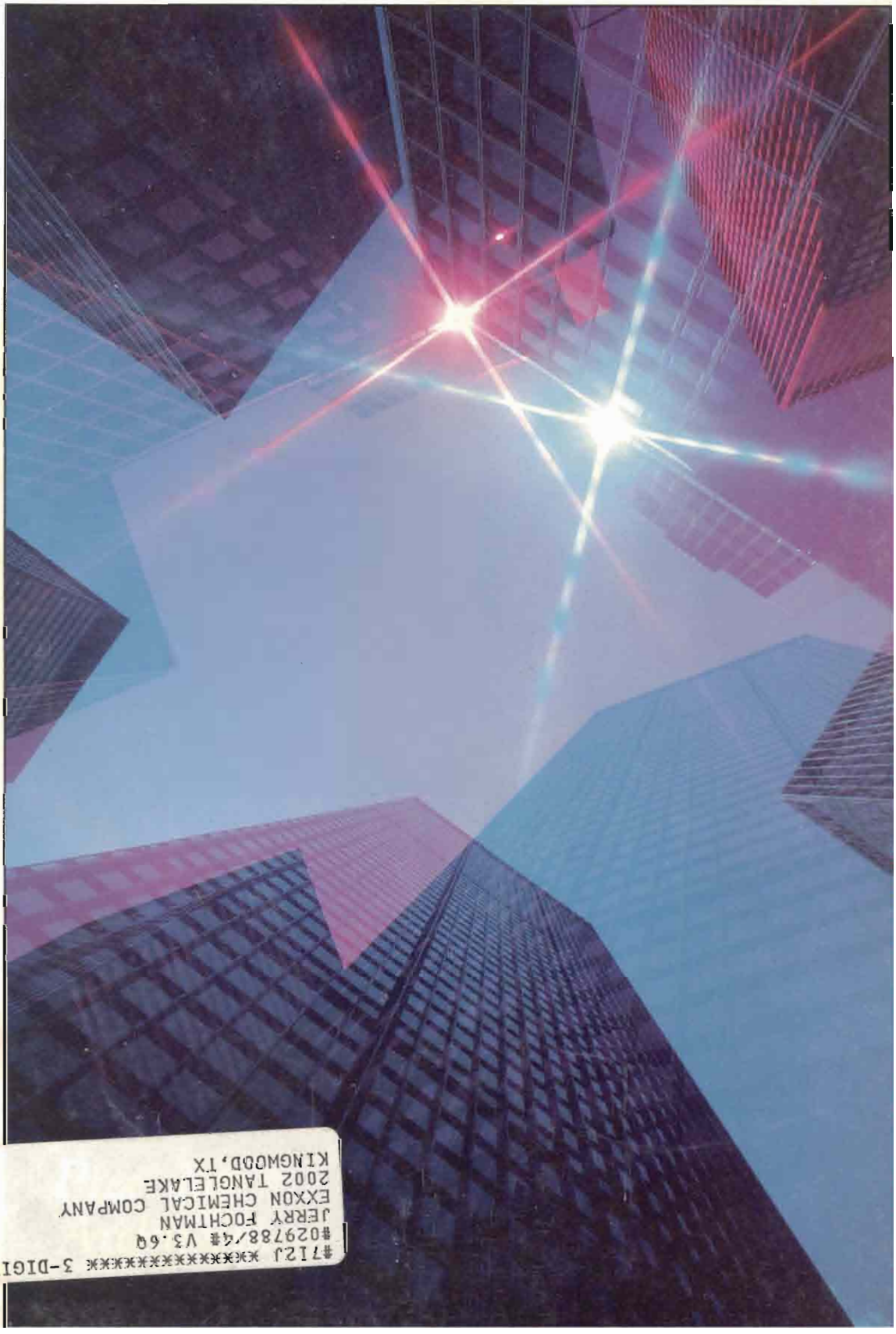

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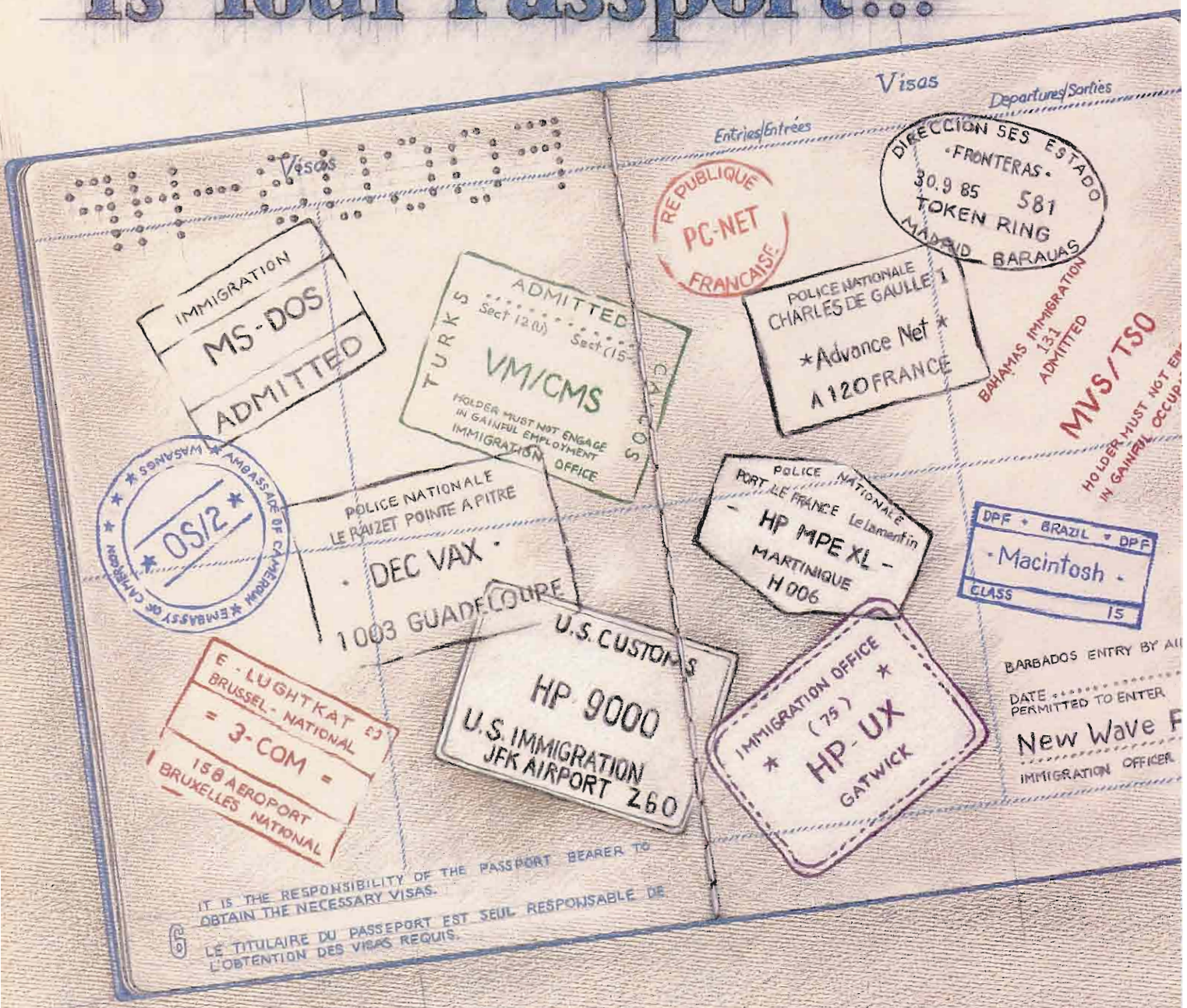

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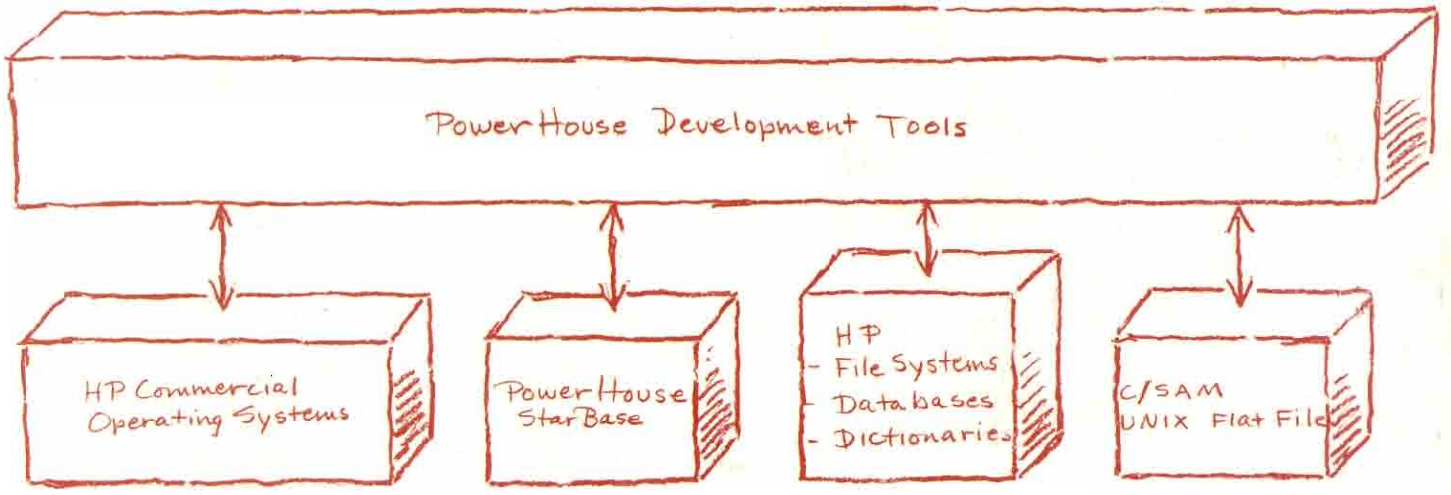

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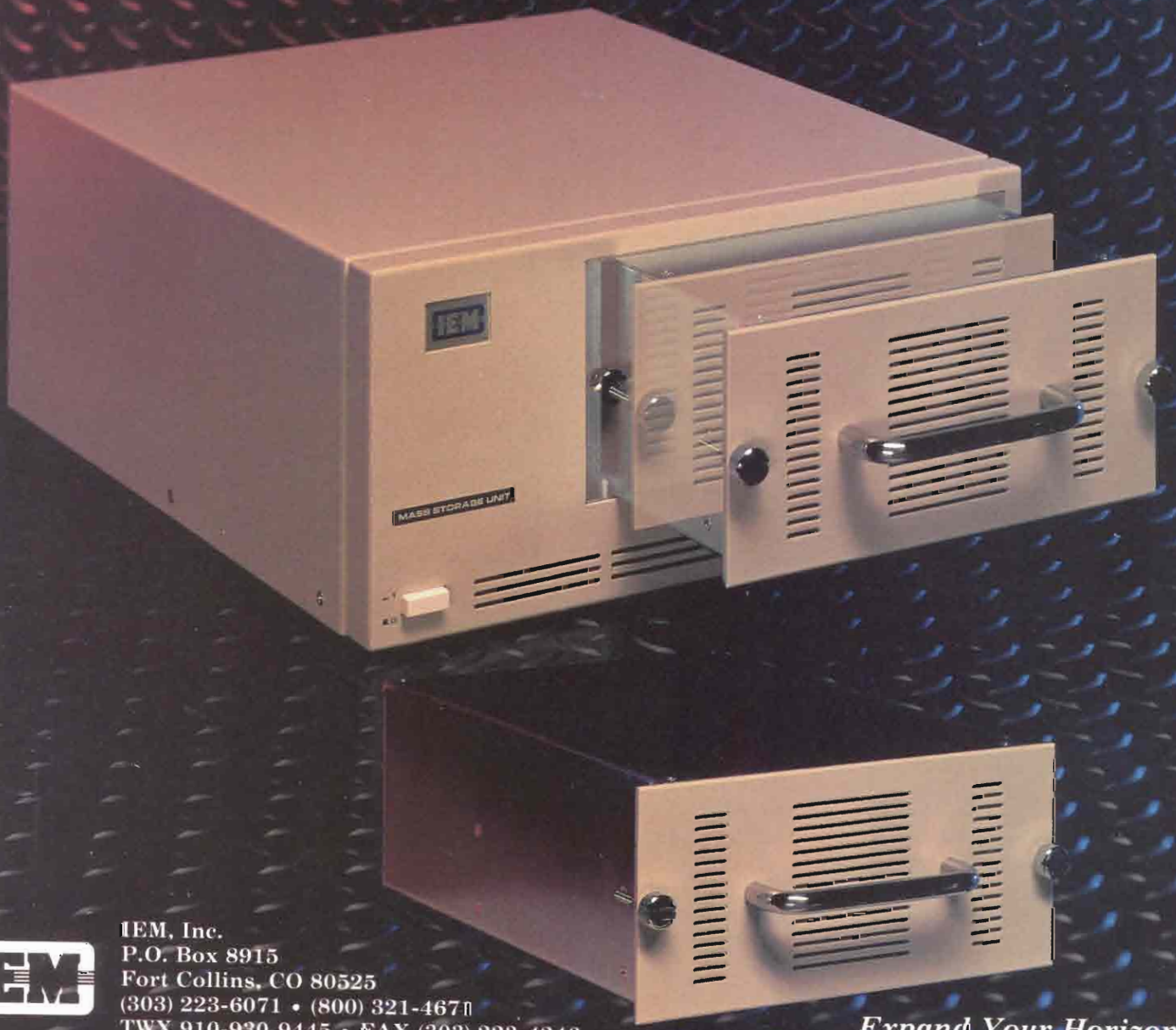

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Expand Your Horizons

CIRCLE 117 ON READER CARD

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On The Cover:
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Your HP 3000 system has helped you achieve success for your company. With it, you've survived in a competitive marketplace. But now you need to meet the challenges of the future. And with an upgrade to an HP 3000 Precision Architecture system you can do just that.

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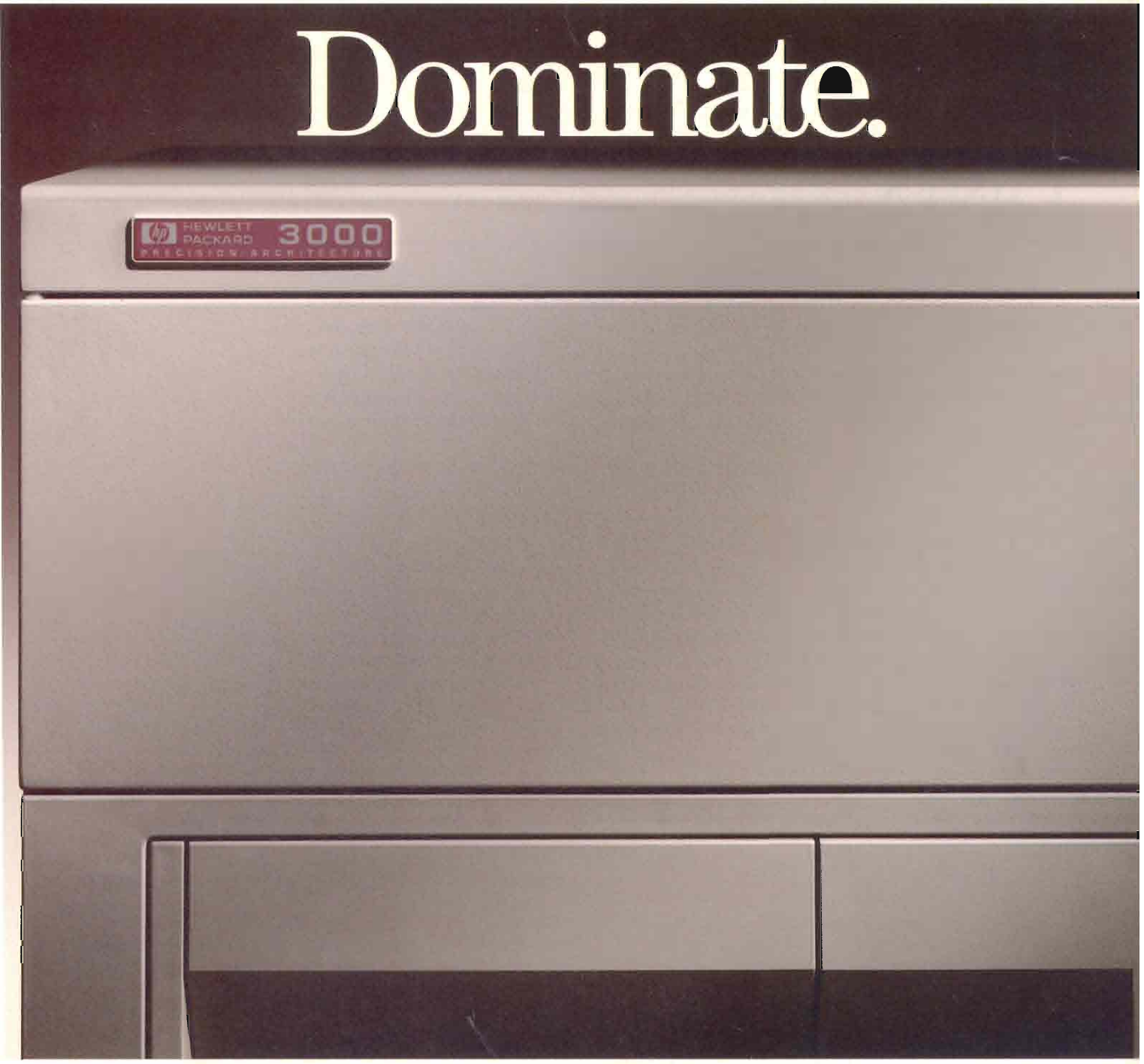
—Don Seweal, Corporate Controller, Spalding Sports Worldwide

Sporting goods manufacturer Spalding had been using both a Series 70 system and a Series 58 system from HP. But as the company experienced double-digit annual growth, large-scale data processing began to take longer and longer. The result? A bottleneck that kept end-users from accessing the system.

Spalding responded by upgrading to an HP 3000 Precision Architecture system. The migration was achieved with minimal retraining and disruption. Today, monthly batch-processing time has been reduced by more than two-thirds.

Dominate.



"Since our HP 3000 Precision Architecture system was installed, our claims entry is at a record high, and our claims backlog is at a record low. It's a very nice position to be in."

–Richard Villari, Vice President, Community Blue

Community Blue, the HMO for Blue Cross of western New York state, has enlarged its membership base dramatically since 1985. But an HP 3000 Series 950 Precision Architecture computer has helped ease its growing pains. Community Blue has been able to consolidate all of its business on a single interactive system. With it, the needs of 150,000 current members and a projected 250,000 more can be met reliably and cost-effectively.

HP 3000 Precision Architecture systems help businesses meet critical goals better than ever. Based on Hewlett-Packard's enhanced version of RISC, they provide timely information, increase productivity, cut computing costs, and lay the foundation for future growth.

If you want to insure your leadership position, upgrade to an HP 3000 Precision Architecture system. Call us today at **1-800-752-0900, Ext. 234D.** And we'll send you a free HP 3000 Upgrade Advantage Kit.

There is a better way.

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CIRCLE 190 ON READER CARD

UNIX

Like it or not, we're all participants in the computer market. And right now, that market is gyrating rather wildly in different directions than we might want it to go if we could call the shots. But ride we must. HP didn't buy Apollo for the Boston real estate alone. Ride they must.

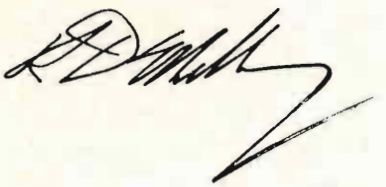
Because it's always easier to ride the horse in the direction that it's going, we're going to try to make your journey easier. No one expects that everyone will shut off their MPE machines in a mad rush to HP-UX. But, if you try to pretend that all this isn't happening, the results over the long run could be quite bad. At least, you need ammunition to tell your boss why you *don't* want to migrate!

This month, we're installing a base-line UNIX system server in our Lab network to provide us with a system to support NFS for other workstations and for us to start learning the UNIX system. We look forward to being able to do true interoperability testing in this environment.

We will try to feature regular articles that help you raise your consciousness about the UNIX system and related issues. We will attempt to connect our 3000 to the network and work on the difficulties we encounter. For our 9000 oriented readers, we will be able to review the full line of HP workstations and software. For the many subscribers that have both, we will deal with the connectivity issues as well as the interoperability issues that rise with our VAX cluster.

They say that an operating system should be like a cheshire cat...it gradually fades away until only the smile is left. The UNIX system has a long, long way to go before it takes on that attribute. In fact, it's more like a mangy alley cat that is all claws and teeth. The big money, however, is betting on it, and when the big money moves, a prudent man takes notice.

Stay tuned.



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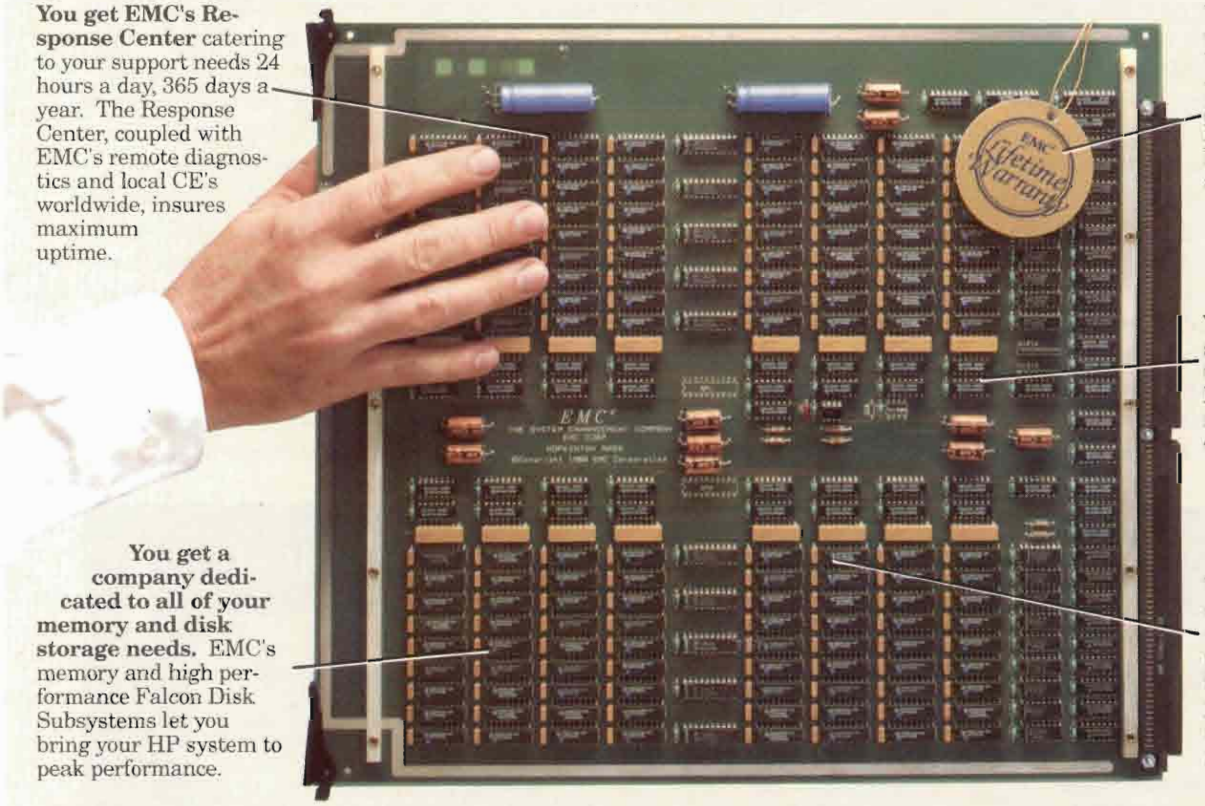

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CIRCLE 113 ON READER CARD

INDUSTRY WATCH

Peggy King

Now That HP And Apollo Are No. 1 . . .

Just when I was trying to guess whether HP or Apollo would be first in the market with a workstation based on Motorola's 68040, I heard the news about HP's plans to acquire Apollo. That second week of April was supposed to be Sun's week. But the public announcement of HP's acquisition plans reshaped the workstation race, especially because it came on the same day that Sun announced additions to its RISC-based SPARC line and new 68030-based workstations with advanced graphics capabilities.

Sun went from No. 1 with over 28 percent market share to No. 2 behind HP. By acquiring Apollo's 13.5 percent market share, HP went from third place behind DEC (17 percent market share) to take the lead with over 30 percent.

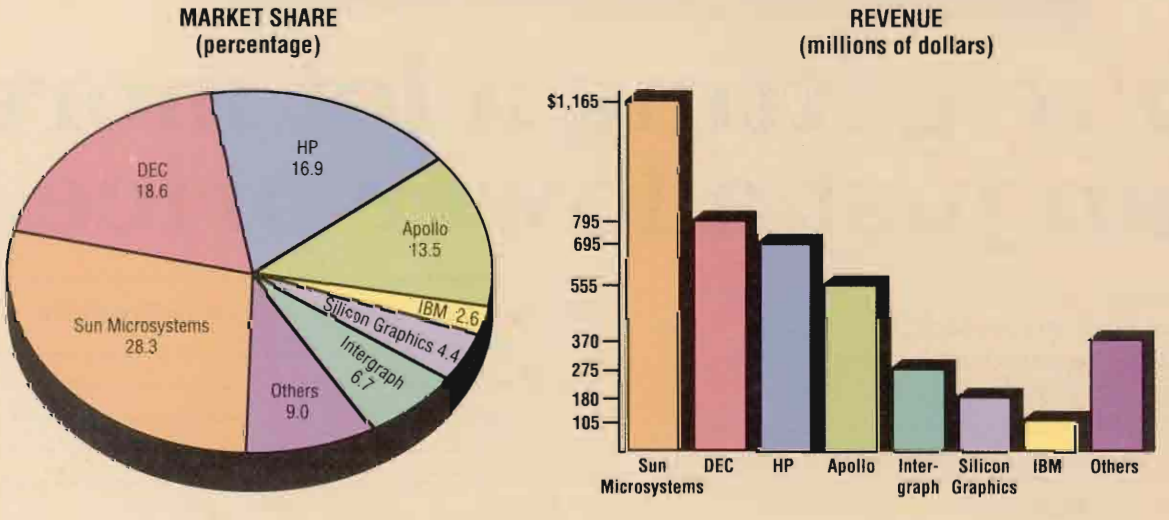
Although most of Sun's marketing salvos were fired at DEC on the day of the announcement, Sun soon may recognize HP as its main competition. Both companies support three separate workstation architectures: Intel-based systems in the 80X86 family, Motorola-based units in the 680X0 family and three proprietary RISC architectures between them. Sun has SPARC and HP now has Apollo's PRISM in addition to its own HP-PA.

RISC-based workstations will begin to dominate the market as more applications become available for them. At present however, customers are still choosing to stay with Motorola workstations in order to continue to run the applications that first led them to purchase workstations. On the same day that Sun added a low-end graphics workstation and a high end 7 MIPS machine to its 68030 offerings, HP inherited two Apollo models based on the same Motorola chip, the DN3500 and DN4500, along with several remnants of the 68020 product line including the popular Series 3000 priced as low as $5,490.

It's too soon to predict which Apollo models will disappear in time, but not too soon to recognize that there's some duplication in the com-

FIGURE 1

Estimated Worldwide Revenue And Market Share Of Major Workstation Vendors,1988



Source: Dataquest Inc.

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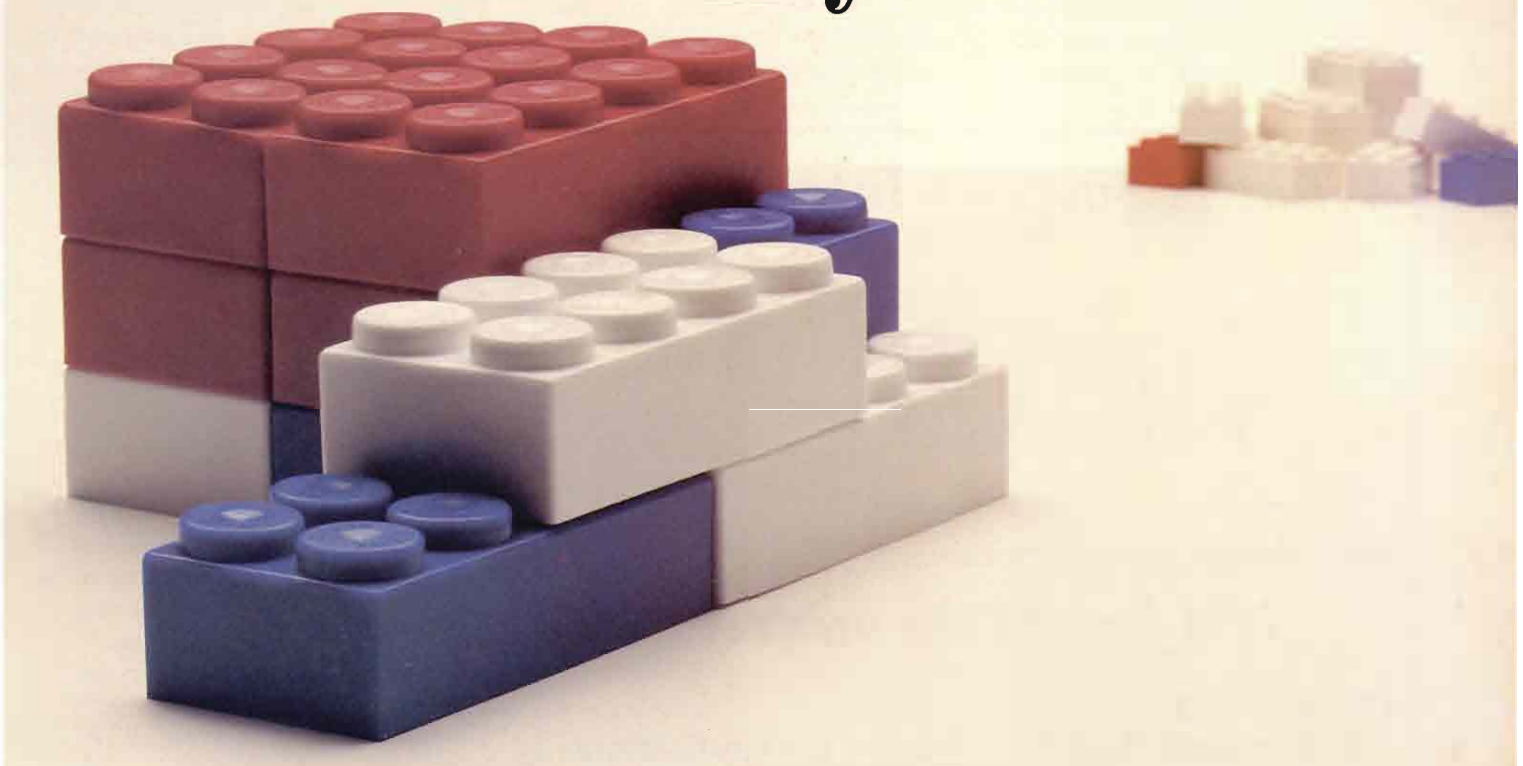

with the DataExpressSeries modular approach.

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

bined Motorola line. Both HP and Apollo have a number of older models based on 68000, 68010 and 68020 chips, many of which still are supported, although no longer sold. There are sufficient numbers of these machines to keep Apollo's technical support staff and field service organization in Chelmsford, MA and the repair portion of their newly opened factory in Livingston, Scotland busy for a few years.

Before HP consolidates its Motorola offerings, the company will have a few months more to track sales and determine which features and performance levels are most popular with customers. In the meantime, there probably will be some skirmishes in the price wars that cause HP and Apollo to synchronize their pricing schemes and join forces to compete against lower price-per-MIPS from other vendors.

Suddenly, HP's Motorola family has a few sets of twins, fraternal rather than identical. Both HP and Apollo have 25 MHz 68030-based workstations with 68882 floating point coprocessors. But HP's largest memory configuration is 16 MBs while Apollo's can be configured with up to 32 MBs of RAM. Another difference is that Apollo's DN3500 has a PC AT-compatible bus that makes it possible to use less expensive AT-compatible peripherals while the Model 360 comes with a proprietary DIO II bus. HP also offers a very expensive option for a 4-slot VME bus. The Model 360 was introduced in June 1988 and the DN3500 was announced in July.

By the end of 1988 both companies added 33 MHz 68030-based workstations to their product families. Both the Model 370 and the DN4500 come with 64 KB of cache memory, but the HP machine has the bigger option for expanded memory. The Model 370 can have up to 48 MBs of error-correcting RAM while the Apollo DN4500 has 32 MBs of parity-checking RAM as its top option.

HP decided that some of its 68030-based workstation prices were too high around the same time that Apollo concluded that its prices were too low. Apollo DN3500 systems cost about $500 more than they did when they were introduced last summer, and most DN4500 models sell for $1,000 more. In January, HP reduced the prices of Model 360 workstations an average of 13 percent across the product line. Even with HP's reductions and Apollo's increases, an HP usually ends up costing more for a comparable configuration, especially for customers who need 4, 8 or 12 MBs of very expensive add-on memory.

For a low-end example, compare the prices for a diskless 2D monochrome workstation with 4 MB of memory and a 19-inch monitor. As of mid-April, this configuration would

Continued on page 80.

FULL SPECTRUM.

BackPack/XL

System backup on a 900 Series HP 3000 is a big job ... and with inevitable file expansion, it gets bigger all the time. BackPack™/XL is a high-speed and unattended backup alternative that can keep backup chores under control. BackPack/XL runs over twice as fast as HP's TRANSPORT mode STORE, and faster than native mode as well. BackPack/XL also reduces tape use by half, and supports unattended backup. This approach reduces or eliminates user downtime.

BackPack/XL uses the same tape format as BackPack/V, so tapes created on a 900 Series HP 3000 can be restored on a stack system, and vice versa. HP's native mode STORE produces tapes which can't be restored on a stack HP 3000, and TRANSPORT mode, which produces compatible tapes, is very slow.

Use the system backup approach that's as dazzling as your new HP hardware. Call for your free demo today.

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CIRCLE 138 ON READER CARD

HP Releases High-Performance X Window Display Server

Available On HP Vectra PC

Hewlett-Packard announced HP AXDS/PC, an X Window System display server which gives personal computers high-performance network access to UNIX system X Window graphics applications.

Together with HP's intelligent-graphics controller for industry-standard PCs, the server accelerates graphics-application performance to 2 million instructions per second, equivalent to the HP 9000 Model 330 workstation configured as an X Window System Server.

The display server, which is based on the industry-standard X Window System Version 11 Release 3, enables the user to have network access to both UNIX-based X Window System applications and MS-DOS office-automation applications.

Adherence to X Window System allows users to access X Window System-based application on remote multivendor host computers over a standard local area network. A basic sequence of keystrokes allows HP AXDS/PC users to toggle between X Window System applications and the MS-DOS operating system.

HP AXDS/PC requires an HP Vectra PC (or another PC based on industry-standard architecture) with 640 KBs of RAM, the HP intelligent-graphics controller, ThinLAN or StarLAN 10 card and networking software, and one of a variety of high-resolution color monitors.

The HP AXDS/PC software has a U.S. list price of $500.

HP AXDS (Model D2300A) gives PCs the performance of a UNIX system graphics workstation.

Real Estate Services Supplier Buys HP 9000 HP-PA Minicomputers

Purchase Worth $3.5 Million

PRC Realty System, provider of computer based information systems for the real estate industry, has purchased more than $3.5 million worth of HP 9000 precision architecture (HP-PA) minicomputers from Hewlett-Packard.

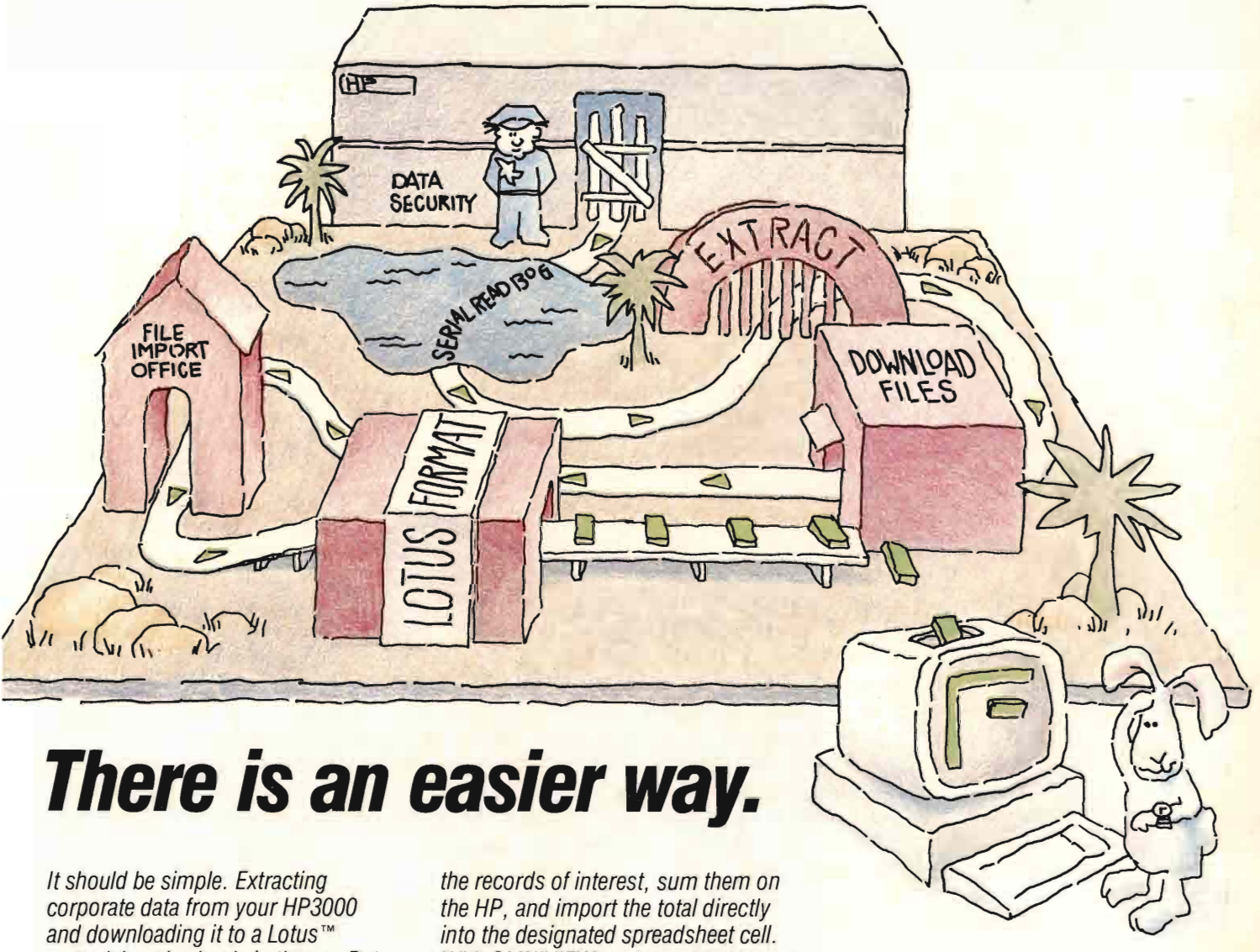
The purchase includes 20 HP 9000 Model 825S minicomputers, 16 Model 835S minicomputers and one Model 850 minicomputer, all scheduled to be installed before the end of 1989.

U.S. list prices for the HP 9000 range from $25,500 for a Model 825S to $188,500 for the Model 850.

PRC's computerized multiple listing service (MLS) system, STELLAR 2000 and TaxStar will be included on the HP 9000 computers. STELLAR 2000 assists real estate agents in matching home buyers with properties available in a market area.

TaxStar provides computer access to public records within a jurisdiction, that includes property owner's names and addresses, titles, zonings, appraisals, legal descriptions and taxes.

Struggling to get HP data into Lotus?



There is an easier way.

It should be simple. Extracting corporate data from your HP3000 and downloading it to a Lotus™ spreadsheet is simple in theory. But doing it is anything but simple.

Lotus users now have to exit the spreadsheet program, log-on to the HP, extract the records of interest (usually with lengthy serial and chained reads of the database), download the records to the PC, import them into Lotus, then modify the existing spreadsheet format to accept the incoming data. Simple in theory. Slow and cumbersome in practice.

Introducing OMNIVIEW.

OMNIVIEW turns theory into reality. With one simple Lotus function (e.g. @ODXSUM), you can instantly select the records of interest, sum them on the HP, and import the total directly into the designated spreadsheet cell. With OMNIVIEW, users can access corporate data instantly ***from within Lotus 1-2-3.***

Because OMNIVIEW is a Lotus Add-in, users design spreadsheets using familiar Lotus syntax. And because OMNIVIEW uses OMNIDEX, records can be selected instantly, regardless of the database size. Summary financial reports and sales forecasts can now be prepared in a fraction of the time it takes using currently available products.

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CIRCLE 112 ON READER CARD

The CASE For Teamwork

Will HP Continue Its Unique Alliance With Cadre?

Hewlett-Packard was the first major vendor to make an investment in CASE and is still the only major computer manufacturer that has formed an OEM alliance with a CASE vendor, Cadre Technologies Inc.

The alliance began in 1985 with HP becoming a major distributor of HP Teamwork the following year.

The working relationship between HP and Cadre has continued through two major releases of the product. In general, new features of Teamwork tend to be added to HP Teamwork a few months after Cadre incorporates them in its Apollo release. Because engineers at the two companies continue to meet frequently, Cadre obtains information about what features are most important to HP's customers and internal users. For instance, HP's emphasis on metrics influenced Cadre's decision to include the Bang Metric, a tool for assessing the size and complexity of projects. Engineers at HP's Logic Systems Division (LSD) incorporated design weight metric in HP Teamwork, and Cadre then included it in Release 3.0 of its product. The relationship continues, but a merger and an acquisition will bring changes.

In January, 1989 Cadre merged with MicroCASE, a company whose emulators and analysis tools compete directly with products developed at LSD. MicroCASE's FrameBuilder, a product that can generate C code from structure charts, doesn't run on the HP-UX platform. For the past two years, Teamworkers, Cadre's user group, has put out a UCSL (user contributed software library) tape that is available to both Teamwork and HP Teamwork customers. The first year the tape included a program called Code Generator, which could take structure charts and generate C code.

LSD claims that Code Generator serves the same purpose as MicroCASE's FrameBuilder. The program was not found on this year's tape because Cadre is turning FrameBuilder into Teamwork/CSB (C Structure Builder), a supported module for the Apollo, Sun and DEC versions of Teamwork.

Now that Apollo is to become part of HP, a five year agreement between Cadre and HP that is due to expire in two years will need to be renegotiated.

Cadre originally developed its CASE product Teamwork on an Apollo workstation. HP Teamwork customers may wonder which company will be supporting the product through future enhancements. Will HP's agreement between Cadre extend to the Apollo platform so that HP supports all of its own workstation customers? Or will support for HP Teamwork return to Cadre?

Since HP Teamwork has always stayed in step with Cadre's Apollo release, it wouldn't be difficult for LSD to begin supporting Apollo customers. It's very likely that HP will add Teamwork/CSB and support the new module internally. Cadre now has more customers on the Sun version of Teamwork than on Apollo, and the VMS version is also popular. Perhaps they would be happy to concentrate on supporting the expanding DEC and Sun markets and leave the rest to HP.

On the other hand, perhaps HP will be happy to return HP Teamwork to Cadre's support. HP has found that CASE tools help leverage the sale of workstations, but different customers want different CASE products. Before the Cadre/MicroCASE merger, HP sales reps could call Cadre reps for help with selling a Series 300 to be used for CASE. This arrangement may continue if Cadre stands to gain from steering customers toward HP workstations.

Within HP, there is a growing interest in forming alliances with other CASE vendors as HP starts to position its Series 300 line as an integrated environment for CASE tools and introduces its own CASE products from the Software Engineering Systems Division. For example, Software through Pictures is used within HP and by HP customers. It has been available for several years on HP 900 Series 300 workstations and has recently been ported to the Series 800. As HP begins working cooperatively with more CASE vendors, expect to see third party CASE products at the HP trade show booths.

Although the relationship between HP and Cadre has changed significantly, the partnership is still mutually beneficial. Recently, Cadre benefitted from being able to use HP's NLS (Native Language Support) to make Teamwork available in Japan on Kanjii workstations. Because of the OEM agreement, Cadre can work as a subcontractor to HP. This arrangement allows Cadre to bring HP's NLS to other platforms and to do so without the considerable expense of buying an AT&T source license for UNIX.

HP benefits from the arrangement by having invested in CASE before the industry took off. By working with Cadre, HP managed to get its own version of a CASE product on the market in 1986 before the other major hardware vendors had CASE products of their own. Compare the cost of sending two engineers away for a year to the development effort required to build a product from scratch. When the CASE industry was in its infancy, HP hooked up with Teamwork with a minimal investment of corporate resources and capital. Now that the industry is growing, HP may want to diversify its CASE lineup while continuing to be a Teamwork player.

—Peggy King

With SpoolMate you don't have to fly blind when distributing reports

That's because SpoolMate takes the guesswork out of report distribution.

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CIRCLE 141 ON READER CARD

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675 Almanor Avenue, Sunnyvale, CA 94086 (408) 245-3000

PhoenixPage System Software Ported To Intel's 80960 Embedded Processor

Compatible With LaserJet Series II

Intel Corp. announced that Phoenix Technologies Ltd. (Norwood, MA) has ported its PhoenixPage printer systems software to Intel's 80960 32-bit RISC microprocessor for embedded control applications.

PhoenixPage, a software solution for manufacturers of page printers, offers a platform for building different printer product lines. It offers compatibility with today's printing standards such as the PostScript language, HP LaserJet Series II and IBM's ProPrinter.

Contact Phoenix Technologies Ltd., Peripheral Products, 846 University Ave., Norwood, MA 02062-3950; (617) 551-4000.

Circle 370 on reader card

AGFA Compugraphic Releases Type Director Typefaces

Type Offering Supports Fonts Management Program

AGFA Compugraphic, a division of AGFA Corp. announced the release of the first 14 typeface volumes in support of its new Type Director font management program, the first product to be developed as a result of an alliance with HP.

The volumes retail for $195 each and most contain four typefaces. Each typeface is composed of 585 characters, from which 14 symbol sets can be created to address the needs of most English and other European language applications. In addition, user-defined reduced symbol sets can be created to save time and reduce memory requirements.

AGFA Compugraphic is offering a Debut Edition of Type Director that includes 12 typefaces (four from the CG Times family, four from the Univers family and four decorative typefaces) at a special promotional price of $225.

Type Director is a typeface scaling and font management software package designed for users of IBM PCs and compatibles who output to HP LaserJet printers. Compatible with the industry's word processing and desktop publishing software, Type Director creates downloadable PCL soft fonts from scaled typeface outlines. PCL is HP's proprietary printer command language.

The Type Director program is an easy-to-use, menu-driven utility that provides both PC users and software developers ready access to the AGFA Compugraphic Intellifont outline type library. With Type Director, bitmaps are generated at any desired point size from four- to 200-point in half point increments. These fonts then automatically are installed in supported application software and downloadable to a LaserJet printer or compatible to create a flexible, WYSIWYG office publishing system.

Contact AFGA Compugraphic Division, AFGA, 90 Industrial Way Wilmington, MA 01887; (800) 873-FONT.

Circle 363 on reader card

ATI Introduces Laser Printer

Offers Built-In LaserJet PLUS Emulation

Advanced Technologies Int'l. announced an agreement with Fujitsu America Inc. (San Jose, CA) to market that company's five-page-per-minute personal laser printer. The product is designed for use in small businesses or workstation environments where compact size, ease of use and flexible paper handling options are important.

LaserPRINT 0570 offers 300 by 300 dpi resolution and has built-in HP LaserJet Plus emulation allowing users to take advantage of the large library of existing application packages. In addition Epson FX-85, IBM ProPrinter, Diablo 630 an HPGL emulations are available as options.

Contact Advanced Technologies International, 355 Sinclair-Frontage Rd., Milpitas, CA 95035; (408) 942-1780.

Circle 365 on reader card

ATI offers a personal laser printer for small businesses or workstation environments.

OA, WP, SS, WYSIWYG?

VAX, HP, PC, SUN?

Technical professionals do not live by engineering alone.

Alis gives you the tools you need to communicate with the rest of the world: presentation-quality text, free-hand drawings, graphics, spreadsheets, and database access.

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And, with thousands of licenses in use worldwide, it's the number-one integrated office automation software system for today's multi-vendor technical office.

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What you need to do. On the platforms you use.

Tymlabs Corp. And Positronika Sign Distributor Agreement

Positronika Offers Product Line In Germany

Tymlabs Corp. and Positronika (Germany) have signed a distributor agreement announcing that Positronika is offering the whole range of Tymlabs products in Germany.

Positronika is a multinational company that has subsidiaries in Belgium, Germany, Spain, Switzerland and The Netherlands. Positronika specializes in distributing, planning and installing networks.

As Wollongong's distributor in Germany, the company offers the ARPA-Services for the HP 3000 computers enabling terminal emulation, file transfer and mail with disparate hosts, as well as gateways to PC-Networks running Novell-, 3COM- or IBM PC-LAN software.

Contact Postronika GmbH Postfach 102955 4300 Essen 1

Circle 371 on reader card

Four Software Developers To Add NewWave Products

Future Soft Engineering, Da Vinci, Microsoft And Micrografx To Write Applications

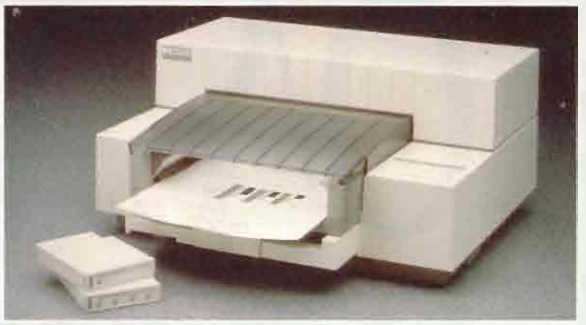
Micrografx Inc. has joined Microsoft Corp., Da Vinci Systems and Future Soft Engineering in developing applications for HP NewWave software.

The four companies are among several hundred HP NewWave independent software vendors who have purchased the HP NewWave developer kit, which includes software tools needed to write HP NewWave applications.

HP NewWave adds object management and task automation capabilities to industry standard windowing systems. This makes it easier for personal computer and workstation users to move and update information among multiple applications and to automate routine tasks.

HP NewWave is currently available for computers running MS-DOS with Microsoft Windows. Future versions are planned for the UNIX and Microsoft OS/2 operating systems.

The products announced for availability in 1989 are: Da Vinci systems Da Vinci eMAIL, a LAN-based electronic mail system; Future Soft's DynaComm, a PC- and Macintosh-to-host communications product; Micrografx's Graph Plus, a business charting and drawing package; and Microsoft Excel, a spreadsheet application.



DeskJet offers faster print speeds and larger fonts.

Improved HP DeskJet Printer Now Available

Offers More Font Capabilities And Faster Print Speed

The new HP DeskJet PLUS printer has print speeds two to five times faster than the original HP DeskJet printer and larger improved fonts.

The printer offers laser-quality output for less than $1,000.

The HP DeskJet PLUS printer has the same features as the original, plus the new capabilities including: faster printing speeds, built-in landscape printing, larger fonts, better font spacing and more built-in fonts.

These features, along with the printer's compact design, quiet operation and high quality output, make the HP DeskJet PLUS printer a alternative to the personal 24 wire, dot matrix impact printer. Business professionals who want laser quality at a personal printer price will find the HP DeskJet printer a practical move to non-impact printing.

The HP DeskJet PLUS printer, with one year warranty is $995.

Megatek And Radan Announce OEM Relationship

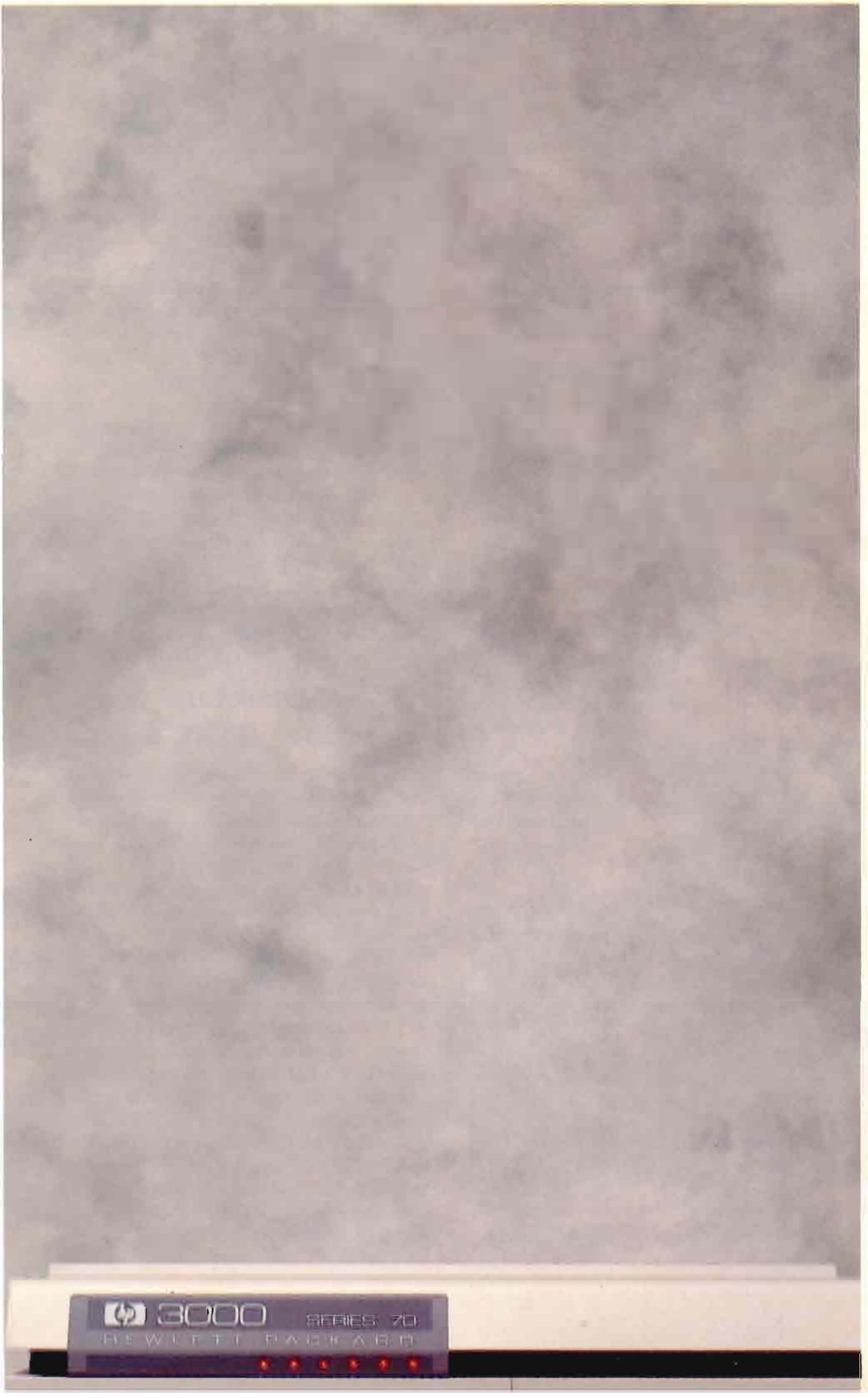
Brings High-Performance Advanced Graphics Solutions To CAD/CAM Market

Megatek Corp. (San Diego, CA) and Radan Computational Ltd. (Bath, England) have announced an OEM relationship that brings new high-performance advanced graphics solutions on a standard platform to CAD/CAM markets. Under the agreement Radan will package its own software with Megatek hardware and market these systems throughout Europe.

For more information contact Megatek Corp., 9645 Scranton Rd., San Diego, CA 92121; (619) 455-5590.

Circle 366 on reader card

What's The Last Thing That Comes To Mind When We Say Spreadsheet?



Mention "spreadsheet" to a lot of people, and you can see the wheels turn a total of once. For them, spreadsheet equals PC.

Pity. For as many of you will soon discover, the HP™ 3000 running MPE is an *ideal* spreadsheet platform. Especially when the spreadsheet is 20/20.™

Developed by the leading supplier of spreadsheets for multi-user computers, 20/20 is 1-2-3™-like in the way you use it. But it's more useful.

With 20/20, you and your people can create and share models of virtually unlimited size. 20/20 supports HP graphic devices, and integrates tightly with other applications. It also supports PC's as terminals and runs under MS-DOS and UNIX.™

So you can create a budget on the 3000 and distribute it to department managers running PC's to do their projections. Then the whole thing can be consolidated into a corporate-wide forecast on the 3000.

As for all those Lotus files you presently depend on—20/20 reads and writes them.

Our Evaluation Kit is proof of 20/20's advantages. To order one, call 508-655-9191. Or write Access Technology, Two Natick Executive Park, Natick, MA 01760.

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CIRCLE 101 ON READER CARD

Information Builders Announces FOCUS For HP

Information Builders Inc. announced FOCUS for the HP Series 9000 emphasizing four key technologies: workstations, gateways, integrated office functions and cooperative processing. It uses industry-standard communication facilities to link HP to the rest of the FOCUS environment, including FOCUS for IBM mainframe, VAX/VMS, Wang VS, FOCUS for PC and for UNIX.

The key to FOCUS is a suite of interfaces designed to maximize client data stored via HP's IMAGE or SQL data bases on the classic 3000 Series. Capable of reporting from many different data structures, FOCUS allows users of these systems to leverage their investment in other third-party database engines. It also provides a distributed processing solution that is the key to success in the networked workstation environment. Users are able to access FOCUS and other database structures regardless of where the data resided in the network.

Contact Information Builders Inc., 1250 Broadway, New York, N.Y. 10001; (212) 736-4433.

Circle 400 on reader card

Proactive's BACKBONE Builds HP 3000 Systems

Proactive Systems has released BACKBONE for HP 3000 users who wish to build distributed systems. It provides data location transparency to Image users. You can run your application programs where you want irrespective of data location and spread the workload over multiple computers.

Whenever users log on, this product can automatically route them to the correct database on the right node.

BACKBONE makes the inefficiency of multiple remote sessions a thing of the past. It optimizes transaction throughput to minimize system resources consumed in a distributed environment. There is access to remote database, with no changes to existing application software required.

If a computer fails, users can be automatically switched to an alternate node, enabling them to get back into action in seconds. BACKBONE facilities provide you with the muscle to manage and control your distributed applications.

BACKBONE can be used in conjunction with BACKCHAT to build distributed applications, but also can be used independently. Proactive Systems also has released a new version of BACKCHAT that provides database replication for Image users. The new feature is the ability to schedule data transmission that's is useful if transaction are intermittent or it's preferable not to keep the communications lines open all the time.

Both products have been fully validated to run under both MPE V and MPE XL on Proactive Systems own linked Model 925 and Micro3000 HP 3000s.

Contact Proactive Systems, P.O. Box 7102, Bloomfield Hills, MI 48302; (800) 356-7117.

Circle 398 on reader card

TransEra's HTBasic provides a utility to transfer data files and ASCII programs between HP LIF and MS-DOS discs.

HTBasic Emulates Workstation BASIC on PCs

TransEra Corp., a manufacturer of hardware and software for scientific and engineering applications, has introduced HTBasic, a software product that emulates the HP 9000 Series 200/300 workstation BASIC. It runs on MS-DOS based computers, HP Vectra, IBM at or IBM PS/2 in native mode without the need for any additional hardware.

HTBasic provides a method for developing and running HP BASIC programs on your PC.

HTBasic provides the entry language environment including the high-performance unified Path I/O system, the graphic commands, the full-screen edit mode and the interactive debugging commands. Utility programs also are included that transfer data files and ASCII programs between HP LIF format diskettes and MS-DOS discs. Once transferred, many HP basic programs can be run with little or no change.

HTBasic is available in two versions, DOS 386 version supports up to 16 MB of memory and the DOS PC version, provides up to 300,000 bytes of user memory.

The HTBasic software package is $500 and is available for immediate delivery.
Contact TransEra Corp., 3707 N. Canyon Rd. Provo, UT 84604; (801) 224-6550.

Circle 381 on reader card

Intech Communications Announces Dialafile

Intech Ltd. has released Dialafile Prime. It allows for programmatic file transfer between HP, DEC and now Prime machines. Both binary and ASCII files can be transferred with full error checking written into the software.

Dialafile requires no extra hardware or change on the existing operating system. It works over RS 232 or ordinary British Telecom lines.
Contact Intech Ltd., Vale Industrial Estate, Horwich, Bolton, BL6 5HT; (0204) 699660.

Circle 380 on reader card

TAPEDOC Offers Reel-To-Reel Storage

Computer Systems Engineering Inc. has released its TAPEDOC reel-to-reel tape documatation storage hub, specifically engineering to make use of only the wasted space with each reel cartridge.

With this new system, directory information always is available, avoiding the process of mounting and reading the tape for identification of contents. Users also can eliminate the need for maintaining separate directory files since all directory lists and revision data are contained with in the TAPEDOC.
Contact Computer Systems Engineering Inc., 3721 W. Kelton Ln., Phoenix, AZ 85023; (602) 241-8470.

Circle 379 on reader card

Carolian Systems' GALCON Monitors System Activity

Carolian Systems announced the release of version 04.00 of GALCON, a data center of the classic 3000 and the XL operating system of the HP-PA 3000 Series.

This release allows users to monitor and control system activity on any HP 3000 from one central machine. Users can examine operational messages and issue and respond to the console commands from any system. The latest version gives users the ability to monitor and control remote systems whether they are MPE V or XL-based, thereby allowing them to centralize and automate their entire HP 3000 operations.
For more information contact Carolian Systems Int'l, 3397 American Dr., #5 Mississauga, Ontario L4V 1T8 (800) 263-8787.

Circle 378 on reader card

Herstal Automation offers a rewritable optical disc drive.

Herstal Automation Offers Optical Disc Drive

A rewritable optical disc drive available for HP computer systems was announced by Herstal Automation.

The drive features the ISO/ANSI standard 652 MB erasable cartridge for interchange compatibility and an SCSI interface for high performance.

Erasing is performed automatically as new data is written allowing the drive to mimic a magnetic disc while providing the benefits of optical technology. These include cartridge removability, immunity to vibration and magnetic fields, and media life and erasability of more than 10 years. Erasable optical discs are compatible with RTE, MPE and HP-UX and are considered removable volume devices by these operating systems.

This high-performance optical drive has an average seek time of 44 milliseconds, a 256 KB read-ahead buffer and a SCSI interface for faster transfer rates that are possible with CS/80 (HP-IB) devices. Media is available from 3M at a cost of less than $250 for a 652 MB cartridge. Herstal Automation supports erasable optical disc drives on most HP 1000, 3000 and 9000 systems.
Contact Herstal Automation Ltd., 3171 West Twelve Mile Rd., Berkley, MI 48072; (313) 548-2001.

Circle 394 on reader card

Device Controller Provides Point-Of-Sale Solutions

To simplify and improve the efficiency of PC point of sale operations, a universal POS device controller has been developed by Printer Products. The multifunction controller, termed the Data Director 1000, acts as a clearing house for data going to and from the host and interfaces with virtually any I/O device.

The controller can be connected to a printer, cash drawer(s), bar code scanner or wand, magnetic stripe reader, customer display and two auxiliary devices. It also can act as a keyboard wedge, funneling selecting live data to the keyboard input. To simplify operations only one communication port is required for operation of all the peripherals.
Contact Printer Products, 25 Denby Rd., Boston, MA 02134-1694; (617) 254-1200.

Circle 377 on reader card

MicroPlot 80B Plotter/Printer Buffer increases productivity of HP 9000 systems.

DTACK Systems Introduces Expandable Memory

DTACK Systems Inc. introduced the MEM360 expandable RAM daughter board for all HP 9000 Series 360 workstations. The expansion capability results from all RAM locations being socketed. The CPU-based 4 MBs of RAM can easily be upgraded to 8- 12- 16- or 20-MBs using the same MEM360 board. With the purchase of one MEM360, all RAM configurations are possible.

In addition to the memory expansion capability the MEM360 offers a total of 20 MBs of RAM.

Prices begin at $4,895.

For more information contact DTACK Systems; 120 Chaparral Court, Suite 150, Anaheim Hill, CA 92808; (714) 998-2244.

Circle 399 on reader card

DOS-a-LATOR.PV Converts Data Files Into DOS

Meadow Soft Works announced a new utility called DOS-a-LATOR.PV for converting Series 200/300 data files into DOS and vice versa. The advantage of this product is that multiple file conversions may be performed unattended during off-peak hours. This offering is a programmers version with absolutely no operator interface. It's written as SUB programs and CSUBs designed to be installed in existing software so that it may run unattended.

DOS-a-LATOR.PV provides the capability to read, write and create DOS files on the HP 200/300s running HP BASIC 3.0 or higher. The conversion utilities can be used to convert multiple or single files. Data aquisition and control functions can be performed while the conversion is in progress. Because source code is provided for most routines, any HP-UX, BDAT or ASCII file can be read, formatted and written to a DOS file. Conversely, DOS files can be read formatted and written to any HP file type.

The utility can access HP files on LIF, HFS, SRM and SDF mass storage volume. To access 5¼" DOS discs, the HP 9125 or 9127 disc drive is required. However, all double sided or high density 3.5" HP discs may be used as DOS drives.

Contact Meadow Soft Works, 9714 Beversbrook, Houston, TX 77031; (713) 561-7500.

Circle 392 on reader card

MicroPlot 80B Increases Productivity Of HP 9000

Intelligent Interfaces Inc. has released its new MicroPlot 80B Plotter/Printer Buffer for downloading output from HP 9000 Series workstations. With its speed and memory capacity, the product is ideal for off-loading CAD/CAM/CAE and other graphics files.

Successor to the MicroPlot 80A, the MicroPlot 80B features double the speed of its predesssor and can store up to four times the data with eight MB of memory.

Diagnostic routines and status display assure continuous user feedback. The 80B has its own automatic, self test initiated on power-up. Using simple routines described in the 80B operating manual, you can troubleshoot the buffer when system problems occur.

The workstation user also gains control of printouts as well as plots. Both can be queued in the MicroPlot 80B. Plots or marked printouts in the queue can be skipped by simply pressing a key for each plot to be skipped.

The MicroPlot 80B features a one-year warranty and 30-day money back gaurantee. The starting price is $995.

Contact Robert Jarvis, Intelligent Interfaces Inc., P.O. Box 1486, Stone Mountain, GA 30086-02486; (404) 381-9891 or (800) 842-0888.

Circle 386 on reader card

Knowledge Access Int'l. Announces KAware

Knowledge Access International (Mountain View, CA) announced an electronic publishing and retrieval system PC software packages that make commercial quality information products producible in house.

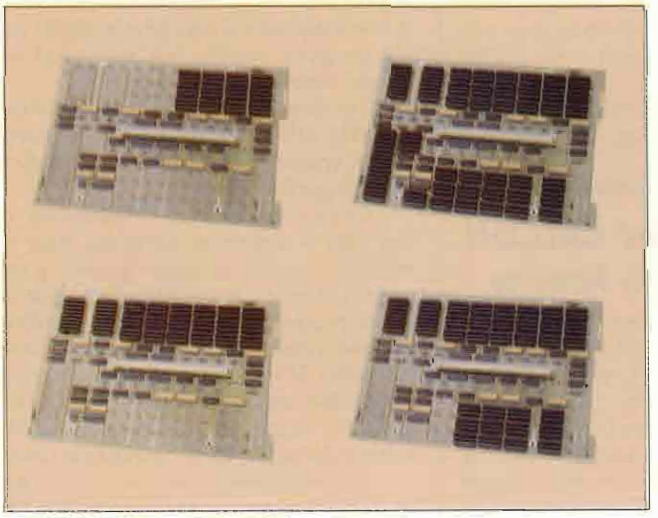
The company's proprietary KAware software makes it possible to create electronic publications on CD-ROM, worm or floppy discs without expensive programming or long development cycles from outside service bureaus.

Four packages support development for full text, fielded data, image file or graphic information retrieval products; a fifth package is provided to access and display the information product. The KAware Disk Publisher is available for $795; KAware2 retrieval systems, $149 each. Site licenses and quantity discounts are available.

Contact Knowledge Access Int'l., 2685 Marine Way, Suite 1305, Mountain View, CA 94043; (800) 2KAWARE

Circle 383 on reader card

Continued on page 86.



DTACK introduces the MEM360 expandable RAM daughterboard for all HP 9000 Series 360 workstations.

The leading HP terminal emulator for the Mac is now the only Windows-based emulator for the PC.

Session for Windows: The next generation in HP terminal emulation is here.

Four years ago, Tymlabs pioneered the development of Session™ for Macintosh, an HP terminal emulator for the see-and-point desktop environment. Packing a sophisticated feature set into an intuitive, enjoyable and productive user interface, our Mac products have won acclaim from users and critics alike.

Building on the foundation of Microsoft® Windows for the PC, Vectra, and compatibles, we have been able to bring the power and ingenuity of our Mac-based emulators to Windows users as well. On both Mac and PC platforms, Session makes terminal emulation a full partner with today's desktop applications. For example, you can extract data from a database on your HP host and display it on your "terminal screen" (your Session window). Using the mouse or keyboard commands, you can copy the information into your PC or Mac-based spreadsheet, perform a few calculations, then paste the results into a memo which you send out via HPDESK. You can even run multiple concurrent sessions on the host, leaving HPDESK or a lengthy compile running in one window, while you go on to other HP-based activities in another.

If this sounds like the solution you've been waiting for, don't wait any longer. Whether your organization has PCs, Macs, or both, you can standardize on Session for all your emulation needs. And because Windows is the stepping stone to HP NewWave and OS/2 Presentation Manager, Session protects your investment in software and training as you move to these powerful new environments.

Tymlabs

CIRCLE 165 ON READER CARD

Tymlabs Corporation • 811 Barton Springs Road • Austin, Texas 78704 U.S.A. • (512) 478-0611 • Telex 755820 • Fax (512) 479-0735
HPS Software Developments Ltd. • 196a Whittington Road • London N22 4PD England • 01-881-6644 • Telex 9312130398 • Fax 01-888-4087
Tymlabs-APPIC • 123 Rue de Petit-Vaux • 91360 Epinay sur Orge, France • (1) 64-54-87-37 • Telex 603409 • Fax (1) 69-34-03-23
Megatec Pty., Ltd. • 2 Brunswick Road • Mitcham, Victoria 3132, Australia • (03) 874-3633 • Telex 152692 • Fax (03) 874-3633
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Reflection...
Now you see it, now you don't. No

Not quite magic, but almost as good. Reflection's unique multitasking feature turns your PC into a double-duty workstation. Only Reflection lets you **hot-key** between your terminal session and a DOS application.

Not bad! But what makes this feature like magic is the way Reflection continues to execute commands, perform file transfers, and monitor the host session, even while it's in background. Improve your productivity by getting two things done at once.

Reflection does more and uses less memory than the competition. And Reflection lets you connect to your host through tried-and-true RS-232 or a variety of PC networks, including Novell and even Digital's LAT.

Reflection has set the standard against which all others are measured. Over 250,000 users worldwide enjoy the advanced features and superior support they get when they choose Reflection.

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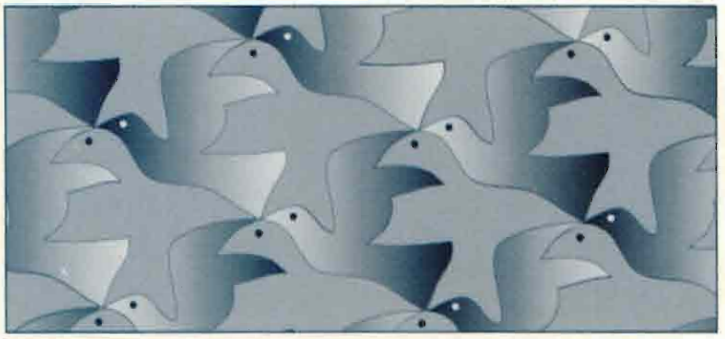


MIGRATING TO MPE XL

[By Peggy King]

Your company finally has authorized funding for an HP 3000 Series 950. As the system manager who is in charge of the new system, you tell your system operator and the company's programming staff to keep running the shop on that overloaded Series 70 just as always, and wait patiently for the new machine to arrive in approximately 12 to 14 weeks. There's no reason to tell end users of the change. Let them find out when they first notice how much more quickly the system is running the day after it's installed. The only difference for them will be the first logon and the five new commands that they won't mind learning.

At first you were dead set against migrating. You once had worked in an IBM shop during a migration and remembered how nothing worked right for several months and how the users didn't like having to learn a new user interface. However, your HP sales rep has assured you that migration won't be a headache. After all, it's just another HP 3000 and you can run everything in compatibility mode until you get up to speed. So why worry?

All of this is a pleasant piece of fiction. In other words, if you just sit back in-

stead of preparing for migration, you may have a few carefree months while you wait — but months, or even years of trouble lie ahead.

Communication

WAITING UNTIL THE MACHINE arrives to begin preparations for migration makes it more difficult for a company or a department to adjust to the new operating environment.

Even though you hope to make changes transparent to users, keep them informed of the upcoming migration. They need to know that things will be in flux for a while and that the system won't be as bulletproof as the Series 70. Don't ignore the fact that you're replacing a 16-bit machine with a 32-bit machine, a CISC (complex instruction set computing) with a RISC (reduced instruction set computing) machine, single word integers with double word integers and octal with hex. Expect some significant changes.

Although HP has made efforts to retain the look and feel of the "classic" MPE Vs, the Series 900s are a different breed. Victoria Shoemaker, director of customer service for Taurus Software, (Palo Alto, CA), explains that all of the classic HP 3000 emulation is done via software on the HP-PA machine. "Underneath the software are two different machines. For all the differences between the two computers, they might have been put out by two different manufacturers."

Despite a tendency to underestimate the migration effort, HP's sales force and Customer Service Organization certainly have encouraged their customers to plan ahead. HP's FASTLANE consulting services, customer education classes and a $100 package of migration tools are among the services the company offers. Other companies and consultants also offer products and services to help you and your staff adjust to the new system when it arrives.

How should a company or department prepare for the arrival of a Series 900? Your chances for a successful migration not only depend on your budget but also upon how effectively you plan for migration and take advantage of free or inexpensive sources of information. Much of the planning for migration begins before you sign the purchase order.

Steps to prepare for migration might start six months to a year before the new system arrives and continue as long as new users need to be trained. Some suggestions listed in this article may be too expensive for a small company or department to implement. If your budget doesn't allow for all the products and services you feel are needed, keep in mind that some of the most helpful ways to prepare require more time and effort than money.

The following suggestions are specifically addressed to companies or departments that will replace an MPE V system with an MPE XL system. Most suggestions also will be relevant in computer rooms were the classic machine will continue operating in parallel after the HP-PA machine is installed. Some tips also are relevant to companies who don't yet have definite plans about migrating. It's never too soon to start preparing. (How many years has HP warned you to quit using Privileged Mode?)

Some of the most helpful ways to prepare for migration require more time and effort than money.

Before You Sign The Purchase Order

CONSIDER ATTENDING SESSIONS about preparing for migration. Many regional users groups sponsor meetings devoted to migration issues. Yearly regional conferences are likely to have several sessions on migration related topics.

■ ***Take inventory of your applications.*** For each application written by your programming staff, list the programming language used. Be sure to note programs written in one language that call procedures written in another. For purchased software packages, note any customizations or extra routines the programming staff has added and what language was used.

When you have completed the list, arrange the applications from critical to non-essential. The applications at the top should be either programs that run most frequently or ones that are most critical to your operations. These are the ones you'll want to get running in native mode as soon as possible. If you're lucky, your programming team will have written critical applications exclusively in Pascal, FORTRAN 77, COBOL, Business Basic and SPL (Software Research Northwest), the languages that currently have native mode compilers, and the vendors supplying your purchased packages will have completed their XL versions of your application.

In the middle of the list are the applications that you use occasionally but not enough to make conversion to native mode worthwhile unless it's very straightforward. Performance is less of an issue for these applications, but you don't want to lose them.

As you approach the bottom of the list, you'll see programs you haven't used in years, great routines that a departed

programmer had never bothered to document and purchased applications with missing manuals. If you're lucky, these are the ones that will be written in COBOL/66, BASIC/3000, FORTRAN 4, RPG and other more exotic languages not

> Talk with a company that already has migrated; asking the right questions saves time and money.

available in native mode. Ideally, these also would be the ones that are filled with privileged mode routines. You can live without these.

Compare a list of the peripherals, device interfaces and terminals that HP supports on MPE XL systems with the equipment currently used with your Classic 3000. Don't jump to any conclusions about what needs to be replaced. You won't be able to get away with using that old quarter inch tape drive that was purchased with the Series III. But, don't assume that a device won't work just because it's not on the list of products HP supports on MPE XL. Don't forget the terminals. You'll need to find out which older models need to be replaced or to get ROM upgrades in order to work with the Series 900 machine.

■ ***Get matched with a company that already has migrated.*** Taurus Software keeps a file of 3x5 cards from MPE XL customers who are willing to share their experiences. For prospective customers, the form asks questions about the current configuration and the most critical applications. When you get matched up, call the company that has migrated and learn from their experiences. Be sure to schedule an adequate amount of time on both sides to meet or talk via conference call (you'll want to involve other members of the migration team). If you ask the right questions, you can save time, frustration and money. Here are some questions you can ask:

—What applications did the company or department convert to NM and which are running on CM? Did they abandon any efforts to convert applications to NM?

—Did purchased software packages run faster on MPE XL? Was this software running in NM or CM?

—What peripherals from the company's MPE V system worked with their new system? (You may find that they had no trouble using some older units that HP doesn't support on the Series 900.)

■ ***Obtain HP migration guides.*** Ask your customer engineer or sales rep about these handbooks. They may be helpful for system managers, programmers and other members of your migration team. It's especially important for programmers using PASCAL, COBOL II or FORTRAN 77 to read the language-specific guides as soon as possible so that they can begin eliminating potential incompatibilities from their MPE V programs.

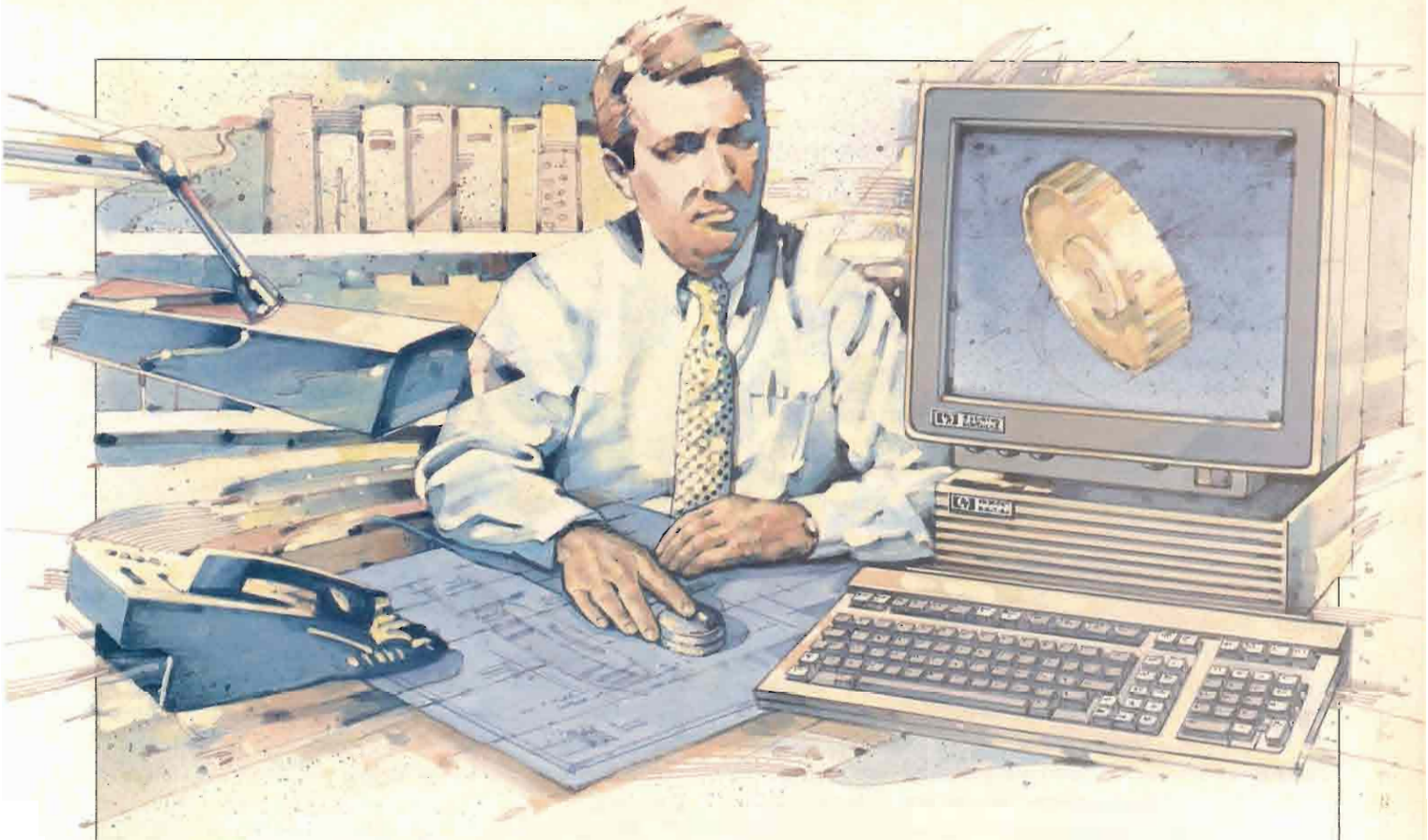
■ ***Order multiple copies of Beyond RISC!*** (Software Research Northwest Inc., Vashon Island, WA.) Read it and evaluate which sections are likely to be most useful to your system operator and programmers. Hand them the book with "must read" sections marked; this will decrease the odds of their setting it aside until the new machine is delivered.

■ ***Order an additional copy of "Moving to MPE/XL: Getting Started."*** HP includes a copy of this self-paced tutorial with every 900 Series system it sells, but you can order separate copies through the direct marketing division. Having the tutorial available early in the migration process is recommended especially if you and other staff members plan to take HP customer education courses. Parts of the course are listed as prerequisites for all the courses in the "Moving from MPE V to MPE XL" series.

■ ***Buy HP's $100 migration tool package that runs on MPE V.*** This set consists of RTM (Run Time Monitor) and OCA (Object Code Analyzer). Shoemaker describes RTM as "a utility intended to help you identify areas within your MPE V programs that could cause a problem when ported to MPE XL." RTM consists of two programs, one that logs calls to MPE V instrinsics and another that prints the results. OCA is a utility that scans program or segmented library (SL) files for intrinsic calls that may cause problems in MPE XL programs. The difference between the two utilities is that OCA allows you to see immediate results while RTM must first log the calls and then print the results. According to Shoemaker, "RTM and OCA need to be used together because RTM will not know that an intrinsic has been changed unless it has been called."

■ ***Analyze the results after you use the migration tool package.*** If you find that any of your most commonly used applications are filled with potential porting problems, you may need to re-evaluate the list of applications that you plan to convert to NM. You might find that a program isn't worth converting and will need to consider whether it will be possible to convert data from your previous program to a new application that runs on MPE XL. Once you can estimate the extent of your migration problems, you'll be able to make better use of consulting services.

■ ***Arrange for consulting services.*** Seeing the results of OCA and RTM on your most frequently used applications may make you want to scream for help. The type of consulting help you can get depends on what you can afford and who is available in your area. You may find that consultants are booked for weeks or even months in advance. This especially is true on the West Coast where consultants from Allegro Consultants Inc. (Redwood City, CA) Software Research Northwest and Mattedor



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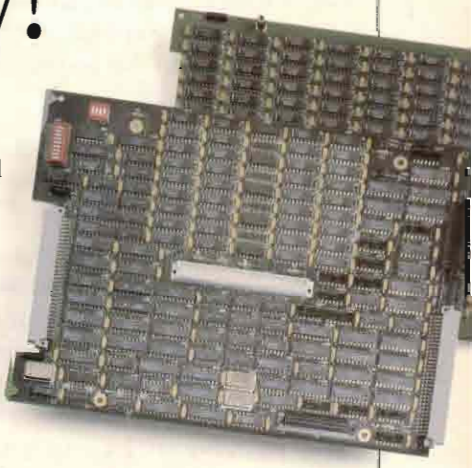

INFOTEK SYSTEMS

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Computer Services (Bellevue, WA) are busy conducting training at various HP sites.

Call the nearest chapter of SIGconsult to recommend a person who can help you plan migration. Be sure to specify that you need someone with experience in porting applications or conducting training in MPE XL. You don't want to pay for the services of an MPE V specialist who's learning MPE XL on the job.

The most extensive consulting is HP's consulting service called FASTLANE. If your company or department can afford to pay $8,910 for approximately seven days of consulting, this is one way to make migration easier. The two parts to FASTLANE, systems planning and applications planning, may be purchased separately, but system planning is a prerequisite for applications planning. Purchased separately, the fee for systems planning is $4,785 and the fee for Application Planning is $4,565 (per application planned).

In the systems planning segment of FASTLANE, your migration team holds a planning meeting with the consultant to review your overall migration strategy. Before the consultant's visit, you'll receive the migration tools RTM and OCA with instructions to run them with some of your applications before the consulting sessions. The one day class the consultant holds for the migration team is different each time. During this session, the consultant uses the reports from RTM and the results from running OCA to help your team predict problem areas with your existing applications and suggest changes in programming that would facilitate migration.

In the applications planning portion of the program, the deliverable is the development of a comprehensive migration plan for a selected application. The consultant once again uses RTM and OCA, this time to observe the selected application's performance on the MPE V system. Included in the cost of the service is up to 10 hours for the consultant to analyze the results of testing and to prepare a migration report. FASTLANE applications planning services especially are worthwhile if you have one application that is crucial to most of your users but potentially difficult to convert.

Just Before The System Arrives

SCHEDULE THE CLASSES your migration team plans to take from HP customer education to be held in the month before your system arrives. You will need to schedule classes that are especially designed for customers moving from MPE V to MPE XL. These courses include a four-day course for system managers ($950), a four-day course for applications programmers ($950) and a two-day course for system operators ($520). At times, HP has offered discounts for companies that send at least three students to a single course at the same site.

The System Operator Course covers starting the system, including VOLUTIL for initialization, new features of STORE/RESTORE and powering down the system.

The System Manager Course includes definitions of the components of 925 and 950 systems, start up, back up and configuration, migrating the V/E operating environment, migrating a TurboIMAGE/V database to TurboIMAGE/XL, volume management commands and the Diagnostic User Interface.

The Application Programmer course covers differences between MPE V and MPE XL that affect program development, an introduction to the compilers available on the system, instruction in generating switch stubs to run programs in multiple modes and procedures for creating and managing libraries. The course also teaches procedures for TurboIMAGE database migration.

Some consultants offer training not currently available from HP. For example, Jason Goertz of Mattedor Computer Services can offer more in-depth training on the MPE XL debugging tools than is available in the course for application programmers. In most cases, the consultant will come to your site and train on your equipment after it has arrived. It's best to book several months in advance for training that you'll need when your system arrives.

■ ***Inform end users of the change in systems and arrange training.*** Users need time to learn the new MPE XL commands and adjust to a new user interface. Chameleon from Taurus software can help ease the transition because the program runs on MPE V but emulates MPE XL. A license for Chameleon costs $3,500 per CPU with discounts available for government and educational institutions.

Hewlett-Packard
San Francisco Area Customer Education Center
100 Mayfield Ave.
Mountain View, CA 94043
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Chameleon
Taurus Software
770 Welch Rd. Suite 3A
Palo Alto, CA 94304
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Software Research Northwest
17710 100th Ave., S.W.
Vashon Island, WA 98070
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Redwood City, CA 94061
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Mattedor Computer Services
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Bellevue, WA 98006
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User Training Services Group
125 University Ave., Suite 145
Palo Alto, CA 94301-1630
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After The MPE System Is Installed

THE NEED FOR TRAINING continues long after the system is installed. Even if every person who needs to understand features of MPE XL to do his job receives adequate classroom training, you'll need to provide for peo-

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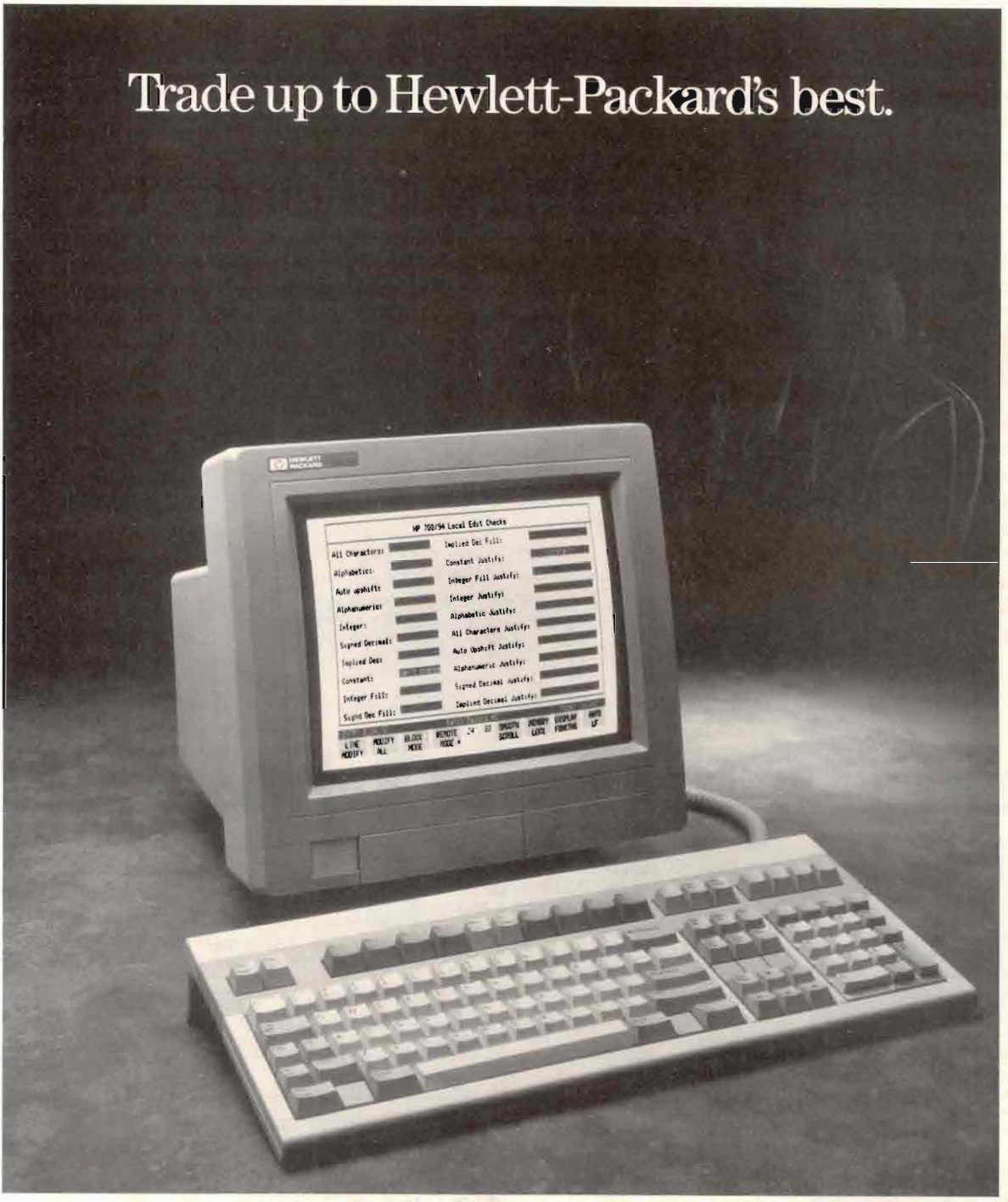

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ple who need to review concepts and for new employees.

■ ***Buy or create self-paced instructional materials.*** User Training Services Group sells courseware for MPE XL that runs on their audiodigital system. (See the Focus article on Training Technology in the May issue.) The course for users includes instruction in the new MPE XL commands and an introduction to command files. The user course sells for $1,495. For programmers, there will be a course that covers how to build MPE XL command files and it will sell for $1,695.

If you have purchased Chameleon, you can use it to design training for users before the Series 900 is up and running. By using the command files (lists of commands that can be executed as small applications), you can produce menus and multiple choice computer based training (CBT). You also can use Chameleon to invoke FOPEN, FREAD and FWRITE commands directly from the interpreter command stream. This capability makes it possible to save information from one training session to use in another.

■ ***Inform everyone who needs to know about the change in systems.*** Remember to consider the less obvious consequences of migration. Be sure to make other employees, even those who don't have terminals at their desk, aware of the changes and help them know what to expect before the new system arrives. For example, schedule time for the facilities crew to plan for increased demands on the power and air conditioning during the months of parallel operations (when both the Classic and the XL computers are operating).

And what will happen when the manuals arrive? The manuals for the Series 70 take up about half a shelf. Have you planned for the extra two or three shelves of bookshelf space it will take to store all the volumes of documentation? You may need to tell a clerical person about the new system so that you'll have an additional bookcase to hold the manuals when they arrive.

Migration never will be painless. Expect to hear complaints well before you hear compliments. The careful planning that you and your migration team did during the months before the new system was installed won't eliminate days when everything seems to be going haywire, but there will be fewer of them.

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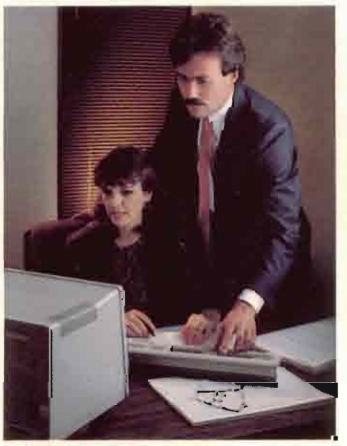

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The Art Of Managing Software Development

CONFIGURATION MANAGEMENT

[BY RICHARD HARTER]

Software configurations describe the components of a software system, the interfaces between those components and the processes used to create them. If your software is very simple or has a very short lifespan, you may feel no pressure to track software configurations. However, when you're involved with a group developing a program of any significant size that will be used over several releases, you must have a configuration management process.

Configuration management (CM) is a process consisting of several subprocesses. *Change control* means tracking the process whereby changes are defined, authorized and implemented. *Version control* refers to the ability to gather the correct version of each file which results in a specific release. While change control and version control are fundamental to configuration management, each organization knows its situation is more complicated than that.

Other issues addressed by CM include *access control* and *synchronization control*. Briefly, access control is concerned with who has the right to enter history and under what circumstances. Synchronization control is concerned with ensuring that parallel changes don't overwrite each other.

A value added system reseller may need to track many variants of a release customized for individual clients. A software company may need to support its products on many platforms. Every software organization has operational releases, debug versions and working versions in the process of being enhanced. All of these need to be distinguishable and recoverable.

Most organizations archive and track copies of their software beginning with the first

formal release. (Ignore the fact that the software development process leading up to that first release has its own CM concerns.) Traditionally, computer software developers and management have had a model of software evolution that looked like *Figure 1*.

In *Figure 1* we see several things. First, we start with three paths of development, perhaps for three target machines or three customers, or for the usual release, R&D and maintenance versions. Very shortly we merge one of the paths back into a main stream. This is an effort involving considerable manual integration effort. The other streams continue to evolve in a tree structure. Each formal release is a node on the tree. Naming conventions become tricky and storage requirements grow with the number of versions.

Many organizations attempt to manage change control by maintaining elaborate hierarchical file systems, which reflect the structure and evolution of the software. This works for awhile until the effort consumes one or more full-time people and still results in lost information. The amount of detail required to track the correct versions of hundreds of files making up a large program is impressive. This is the sort of detail computers handle well and people handle poorly.

This tree-structured view creates some sort of order while obscuring the nature of the changes being made and the amount of human effort involved. If you think about what really happens, it looks more like *Figure 2*.

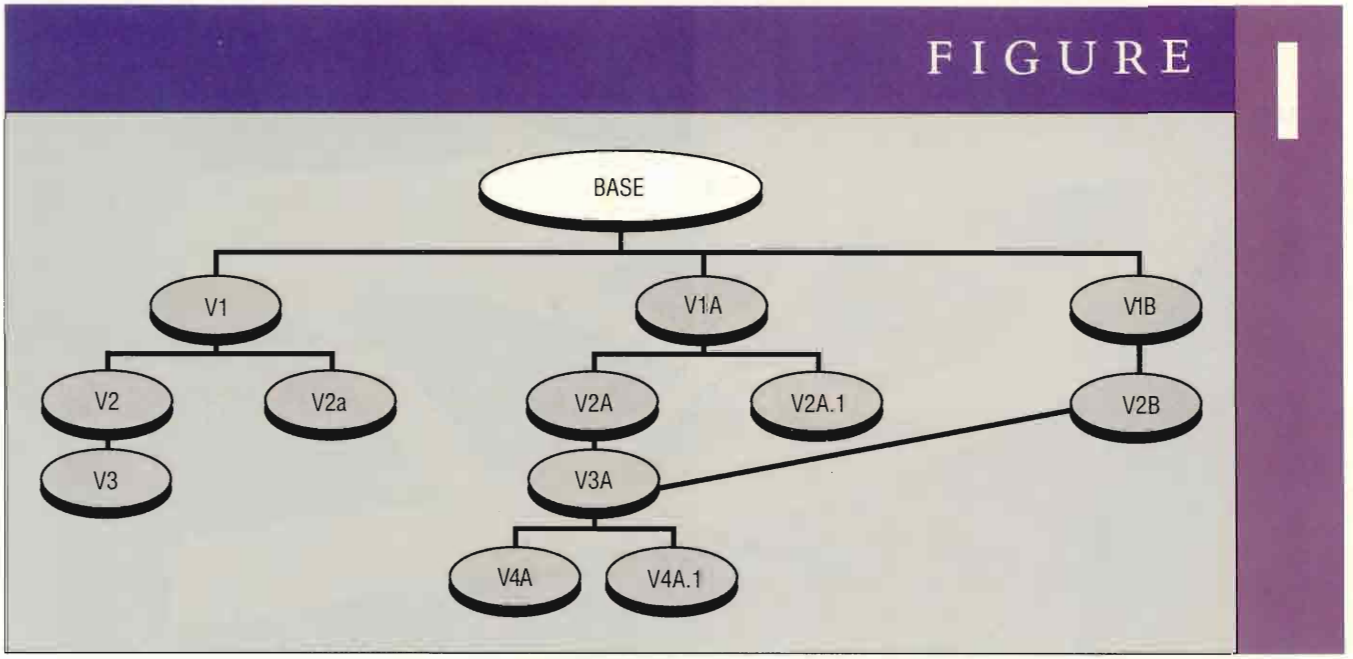
When you have several streams of development, make changes in one stream and then migrate those changes into other streams. Software is more of an organic thing than we generally credit. Without automated assistance, bug fixes and enhancements made in any stream are recoded manually into other streams, wasting large amounts of time. In this view, a release can be any point along any development stream.

It's helpful to human beings to "chunk" information. There are typically only so many things you can keep in your mind at one time. The information required to write software far exceeds the five to seven pieces of information we actively can manage at one time. With computer assistance, human beings can focus on the creative side of development while leaving administrative details to the computer. Productivity is enhanced when the computer manages as much administrative detail as possible.

Information Management

REGARDLESS OF THE MODEL, a release of a software program involves more than the source code to duplicate that release. It involves a coordinated snapshot of source code, library modules, build procedures, internal and user documentation, test suites and other information. Each organization has its own particular set of information needs to be tracked on a release-by-release basis.

If you haven't seen the problem before, you have to solve it in release 19 and be prepared to move the fix into later versions. Your CM tools should be able to rebuild release 19 the way it was shipped so we can verify the bug. Ideally, they also will provide research assistance, such as determining which modules and files are related to the problem area. It helps if our problem report and change request tracking is integrated



Traditional view of software evolution in a tree-structured hierarchy.

with our CM because you can determine whether anyone else has seen this problem before, is working on it now, or is working on related problems.

You must be able to recreate versions of your software on demand. The build process can be automated easily if the CM system tracks software structure and components.

Configuration Management Technology

THE OBJECTIVE OF CM is to track the many versions of software and related information created over a program lifecycle in an orderly, economical and useful manner. The component technologies for a good CM system include:

- a file history system
- a method for describing releases that correlates with changes to files across those releases
- an ability to build new releases and regenerate build procedures for any release, both completely and incrementally
- an ability to select the correct build procedures for a given version
- an ability to report on details and summaries of changes to the software.

The value of specific tools and their use in your organization depends on your local CM process. Where separate tools are used for different functions, the operation of one tool will depend on what the others have done as part of the ongoing process.

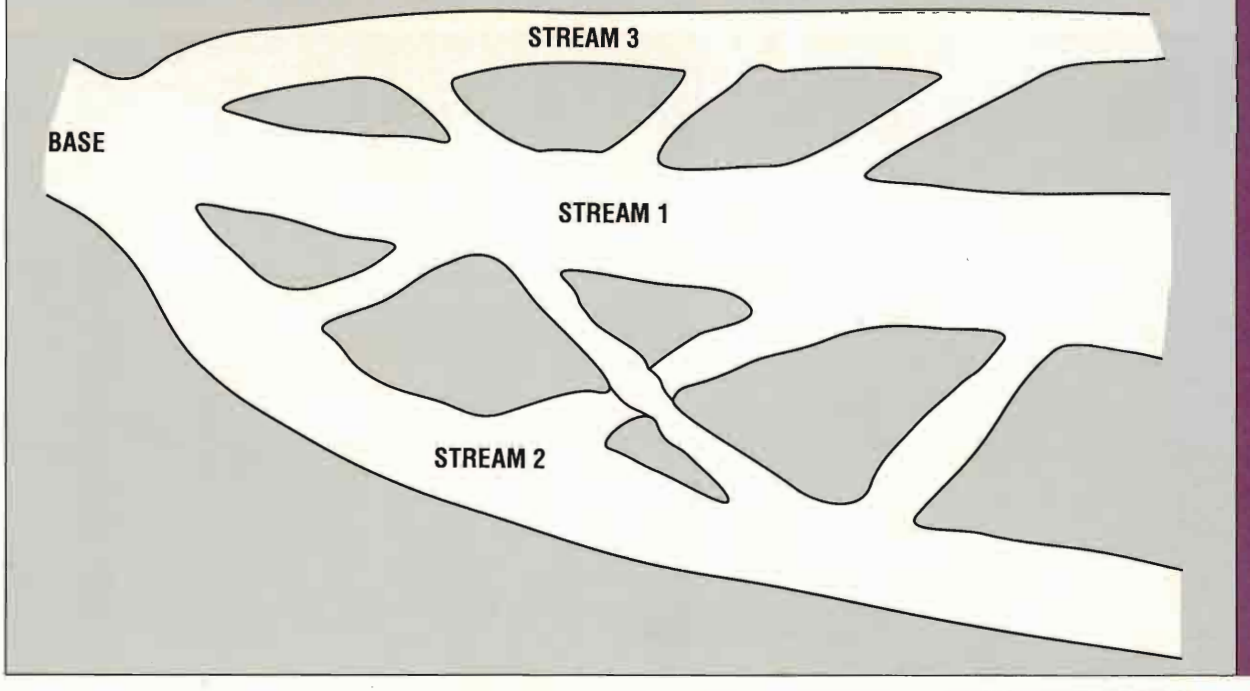
CM tools have to be an integrated system to effectively support the CM process.

The basis for all CM is managing source code and the differences between versions of source code. An update to a file can be managed by storing the old copy of the file and the new copy of the file. Or, it can be managed by storing one of those copies of the file and the differences between the two files. This difference set is a key concept. All CM systems have a mechanism to generate the differences between one version of a file or program and another.

For most revisions, the difference set is much smaller than either full version of the file. In fact, studies have shown that (barring major enhancements) the storage of a base file and all of its lifecycle difference sets consume about 20 percent more storage than the base file itself. By storing differences we save disc storage space and provide a clearer picture of what changes have been made and why.

A CM system tracks difference sets for you. It can

FIGURE 2



Real world software evolution with changes moving between major development streams.

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regenerate any version on the basis of its component pieces. How it does that mechanically, how efficient the process is, and what else it can do for you distinguishes the systems available today.

A good CM system not only can resurrect the pieces of a program release for you, but it can build an executable version of that release. Having separate tools to do change control and builds is a lot like having separate word processors and spelling checkers. Either way can result in a document with correct spelling, but an integrated program is simply more efficient use of a person's time, and that's what it's all about.

By now it's obvious that a good CM system saves time for developers: research time, integration time, time spent searching for the right versions of the sources and time to perform complex builds. It eliminates the human error associated with handling large amounts of detail. It saves disc space.

A good configuration management system integrates the work of many people: analysts, developers, quality assurance people, maintenance programmers, documentation specialists and management. People working off the same information base can coordinate their efforts. The computerized information repository is available at all hours of the day and night and doesn't get transferred to the next department or leave, taking its understanding of the system with it.

The more aspects of the development process addressed by the CM system, the more valuable it is. These systems require a commitment by the organization. That commitment should be made carefully based on current and projected needs.

Who Uses Configuration Management?

NO COMPANY WOULD THINK of designing hardware without a formal procedure for tracking design, development and changes. Software development has been relatively free of constraints throughout its young lifespan. Those days are virtually over.

The U.S. government has taken a leadership role in requiring software CM as part of defense contracts. There are standards such as DoD 2167A that require attention to software design and development information similar to that traditionally associated with hardware. These contractual re-

quirements mean that most government contractors and agencies are sensitive to CM.

Financial institutions such as banks and insurance companies relay on their software to support their services. This is the lifeblood of their industry. The difference in financial companies is often the difference in their proprietary software. Auditors are sensitive to the value and fragility of these strategic software resources. Most financial institutions now are automating CM efforts that have been handled manually in the past.

Nearly all organizations with strategic software that determines their success or failure already have or now are implementing CM. The strategic advantage to these organizations is to enable them to respond more quickly to changing market conditions. Already the airline industry admits that its most important resource isn't its fleet of planes but its automated reservations systems that directly bring in revenue. No airline today can function without being part of the complex network of airline reservations.

Manufacturing organizations, scientific laboratories, hardware engineering groups building products with embedded computer systems, software companies and value added resellers of computer hardware all have CM issues. The need to make many changes, make them quickly, and move those changes to parallel development paths appear in every organization that develops software.

Whether the organization's management recognizes the nature of the development process and the efficiencies to be gained through tools will determine how quickly CM will be put in place. The developers already understand the need and the benefits. Universities are starting to use CM tools and other CASE tools as part of the computer science curriculum. Management is becoming more tuned to the strategic advantages of good software control.

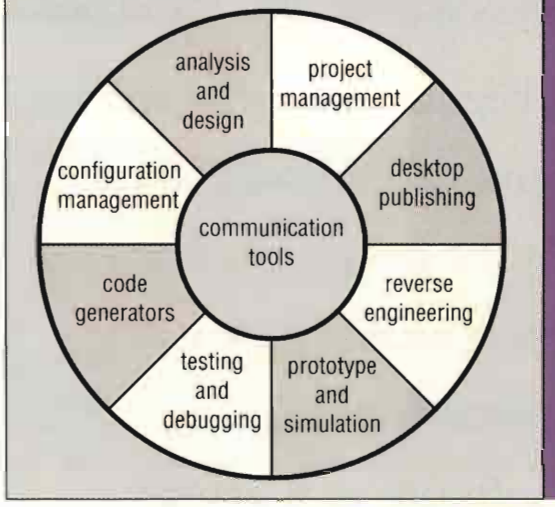
A Bit Of History

SOFTWARE MANAGEMENT BEGAN as a manual process approximately 15 years ago. AT&T's UNIX operating system offered a facility called Source Code Control System (SCCS). SCCS has evolved over the years, but basically it's a tool to determine the differences between two files. Elaborate shell scripts and manual efforts must be added on top of SCCS to provide CM.

Somewhat earlier, both IBM and CDC offered what they called "update" facilities. These were batch-oriented programs designed to enable you to ship a change in a program deck (We're talking huge decks of cards here.) from one place to another without shipping the entire 50-plus pounds of cards and metal trays.

These tools addressed a limited aspect of what was, even then, recognized as a big problem: tracking software changes.

FIGURE 3



CASE tools/1989

Software technology has evolved over the years to provide developers with commercial relational databases, AI support systems, fourth generation languages, object-oriented programming, and so on. Each of these technologies pays some attention to the problems of CM. That there are so many little pieces of CM support in so many places is an indication of how important the problem is. Only in recent years have software tools tracked broad categories of information, automated build procedures, integrated problem report tracking capabilities and addressed the full range of the CM problem.

A collection of separate tools, however, isn't CM. CM is a systems approach to tracking change. It involves tools and methodology. A process must be in place at an organization and that process can be enhanced by tools. CM is the total process. Historically, tools automated some pieces of the process while the entire process was managed manually or not at all. Quite frequently manual systems are incomplete, allowing tasks and special cases to go unaddressed. For example, if your configuration management system has no facility to merge development tracks, this effort must be handled as a special case on an ad hoc basis.

The Total Development Environment

TODAY, THERE ARE MANY software development tools available, mostly as separate tools, each for an individual purpose. There also are attempts by several companies to offer "backplane" products that purport to integrate separate software development tools. *Figure 3* is one

way of looking at the world of today's software development tools.

It would be nice to "integrate" all of these CASE tools. That isn't necessarily desirable because the different tools may be most valuable when run on different machines by different parts of an organization and need not share data. However, certain sets of tools or functions can be integrated usefully to provide an efficient software development environment. Unfortunately, today's technology, even with the so-called "backplane" development environments, doesn't integrate these functions because the individual software tools aren't prepared to take advantage of this data sharing. It's very important, therefore, to choose tools that completely address the development considerations of your organization.

CM begins where the analysis and design tools stop. Once the design is completed, you need a systematic approach to tracking the software as it evolves.

Project management and desktop publishing are frequently done on personal computers. Many packages are available on machines from PCs to minicomputers. Project management addresses resource planning and scheduling. Desktop publishing addresses the production of public documents such as manuals and technical documents such as specifications. These tools typically don't need to integrate with other aspects of the development effort.

Analysis and design tools normally are used at the start of a development project. They typically involve bit-mapped graphics which enable developers to design a system and document that design. This can save substantial amounts of time on the front end of the project. If a project is well-designed at the beginning, the implementation will be better and the overall cost of the project should be lower. These tools generally fall into disuse after the initial design effort and the original design documents aren't kept up to date as the software evolves.

CM begins where the analysis and design tools stop. Once the design is completed, you need a systematic approach to tracking the software as it evolves. Because 80 percent of a software project's lifecycle cost is in enhancements and maintenance after the first release, a good tool that automates part of this process and assists with what can't be automated significantly decreases the cost of software development.

Code generators and fourth generation languages can make software development a much faster process. These tools are specialized to particular classes of problems, mostly commercial in nature. They aren't applicable to all problems, but where they are useful, they save significant amounts of time that would be spent writing lower-level code.

Test and debug tools typically are available from hardware vendors or from providers of language processors. Good test and debug tools can help find problems in software before it's released for use. Finding problems before software is released significantly decreases the cost of support.

Prototype and simulation tools are specialized tools that belong to one of two classes: commercial prototyping tools and real-time prototyping and simulation tools. In commercial prototyping the major concern tends to be tuning the human interface. In real-time projects, concerns center around timing.

Reverse engineering tools are used mostly in a commercial context where old programs are no longer understood and must be rewritten in whole or in part. Reverse engineering tools help by providing a structural outline of the program(s): the subdivisions of code, what sort of processing is done in them and how those subdivisions relate to each other. Having this information enables analysts to plan the replacement system more quickly than if they started without that information.

Communication tools tie it all together, enabling information to be transmitted between individuals, between machines and between programs.

There's no question that we're headed for increasingly integrated software development products. The government specification of the Ada language, for example, attempted to address this by not only specifying a language, but specifying the development environment support that's part of a full Ada implementation. Even so, the Ada support environment addresses only a subset of software development concerns.

Like a good hardware CAD system, in time you'll have a seamless software development environment that will enable you to go from a graphics-oriented design and analysis function, through automated prototyping of the whole or portions of the program, employing code generation and automatic test generation. Underlying it all will be a powerful CM system with the ability to capture the state of the project at any point and resurrect that state along with its related information for later analysis.—*Richard Harter is president of Software Maintenance and Development Systems Inc. (SMDS), Concord, MA.*

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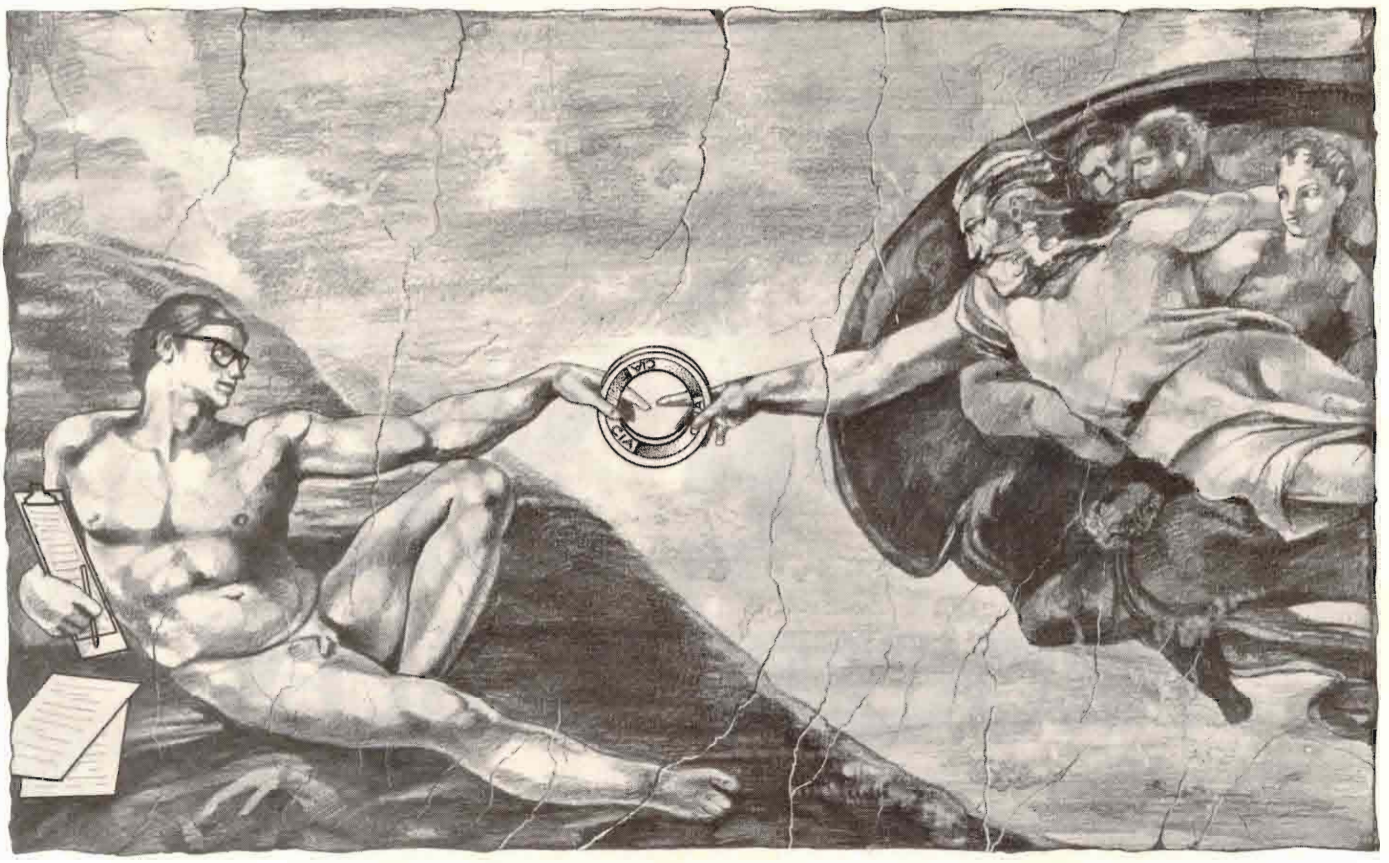

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Introduction To MPE XL PROCESS TABLES

A Look At Some Of The Differences And Similarities Between MPE V And MPE XL

[BY LEN PARENT]

The open discussion of XL internals is a sensitive issue because of the controversy over architected interfaces (AIs) to be provided by HP versus a desire by some customers and third-party developers for disclosure of XL internals. Nevertheless, now there are enough available facts to paint a picture in order to understand and utilize the HP AIs when they become available, or to prototype your own AIs.

However, this article will be limited to a few process tables, namely the PIB, PIBX and KPO, which have many interesting characteristics because of the coexistence of native mode (NM) and compatibility mode (CM) execution. All information is based on XL 1.1 and some details may change in future XL releases. However, it seems reasonable to assume that the general structure of these process tables will remain relatively stable for some time. Similarities with MPE V tables will be highlighted throughout.

Beginning with a brief description of virtual memory and the separation of code and data, the details will move from the system global table to the open file information of individual processes. Along the way, there will be a quick side trip through the process data area where some file information still remains.

THE MPE XL SYSTEMS are register-based machines rather than stack machines like those of MPE V. In other words, XL machine instructions operate on register values that can be loaded from and stored to virtual memory, whereas MPE V instructions operate on values near the top of the stack.

MPE XL has a processor status word (PSW), instruction address queue registers (IAQs), 32 general registers (GRs), eight space registers (SRs) and 32 control registers (CRs).

The space registers give rise to a virtual address space which may have up to four giga-spaces. A virtual address requires 64 bits. The first 32 bits, known as the Space ID (SID), are stored in a space register and select the virtual space; the remaining 32 bits specify the byte offset within the space.

Each virtual space is divided into four, 1 GB quads. The first 2 bits of the offset into the space determine the quad

(00->QUAD 0, 01->QUAD1, 10->QUAD 2 and 11->QUAD 3).

To eliminate the requirement that virtual memory always must be accessed by 64-bit pointers or long pointers, space registers SR4, SR5, SR6 and SR7 were given a special meaning to specify a short pointer (32 bits). A short pointer is treated as an offset into a virtual space so that the first two bits specify the quad within the space and these same two bits are used to select a space register (00->SR4, 01->SR5, 10->SR6, 11->SR7) containing the space ID. As a result, short pointers define four quads of separate virtual spaces (assuming the four space registers, SR4 to SR7, are all different). See *Figure 1.*

By convention, SR4 provides access to code in QUAD 0, SR5 points to process data in QUAD 1 and SR6-7 allow access to operating system spaces in QUAD 2 and QUAD 3.

As a result, virtual memory has been cleanly divided into code and data through the introduction of space register, quads and short pointers.

Space "a"

THE VIRTUAL SPACE with space ID "a" contains operating system code and tables. QUAD 0 of space "a" contains kernal code and QUAD 3 contains system tables. In fact, short pointer access is available to the system tables in QUAD 3 starting at byte offset c0000000 (because SR7 is set to "a" for active processes).

The system globals table is located at a.c0000000 and plays the role of MPE V SYSGLOB. Both system global tables contain directions to additional system tables, system configuration information, current system state and active process information.

The directions to other system tables are contained in the Known System Object (KSO) table. Among other tables, the virtual address of the Process Information Block (PIB) table is given. The PIB table is analogous to the PCB table of MPE V.

Basic Process Tables

LIKE THE FAMILIAR PCB table of MPE V, the PIB table describes process tree information, stack locations (both NM and CM), code locations, process state, event flags and priorities. Moreover, the PIB entries are of fixed length and the entry index is still referred to as a PIN. The PIB entry is considerably larger than the old PCB entry and contains more detailed information as well as additional information. For CM, locations of the remnants of MPE V process tables are available. In particular, an execution mode (CM or NM), a pointer to the PIBX entry and register storage for interrupts have been added. See *Figure 2.*

The PIBX entry doesn't reside in the NM stack of the process. The program name, job/session number and capabilities

Figure 1.

SPACE REGISTERS, QUADS AND SHORT POINTERS

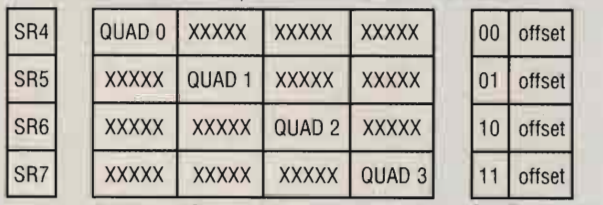


Figure 2.

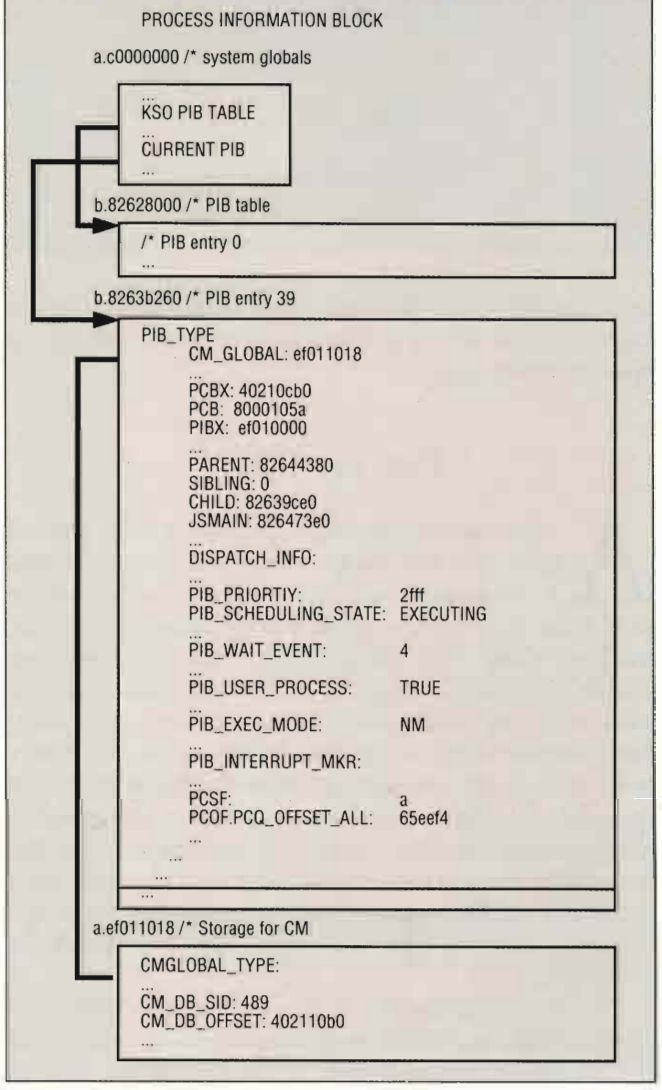


Figure 3.

PROCESS INFORMATION BLOCK EXTENSION

```
b.8263b260 /* PIB entry 39
    ...
    PIBX pointer
    ...

a.ef010000 /* PIBX entry
        PIBX_TYPE:
            ...
            JOBNUMBER: 4010
            ...
            CM_MODE_INITIALLY: FALSE
            ...
            PROGNAME:
            PART1 :'CI'
            GROUP : 'PUB'
            ACCOUT : 'SYS'
            ...
            CAPABILITY: [ 18, 19, 1c, 1e, 1f ]
            ...
            KPO_TABLE
                KPOS
                ...
                [ KPO_FILE_SYSTEM]: a.ef01157c
                ...
            ...
```

Figure 4.

STACK FRAME

REGISTER SAVE AREA
LOCAL STORAGE
CALL PARAMETER STORAGE
FRAME MARKERS

Figure 5.

GENERAL REGISTER CONVENTIONS

GR0	zero
GR1	scratch
GR2	return address (RP)
GR3-18	entry save
GR19-22	call save
GR23-26	parameters
GR27	global data pointer (DP)
GR28	function return value
GR29	millicode return value
GR30	stack pointer (SP)
GR31	millicode return address

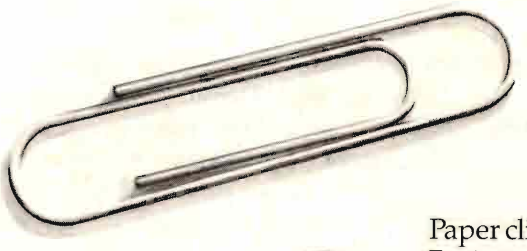
are contained within the PIBX entry, as well as pointers to known process objects (KPOs) that describe such objects as open files. See *Figure 3*.

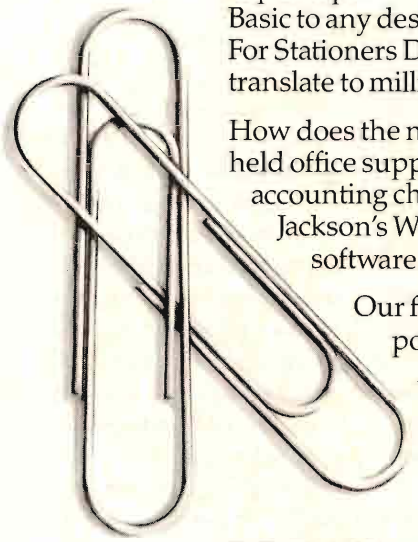
Process Data

AS DESCRIBED ABOVE, process data is short-pointed as QUAD 1 with the space ID defined in SR5. Like MPE V, the program stack contains system tables including a CM stack, cross-reference table (XRT), global data, NM stack and heap storage. The XRT is similar to the MPE V segment transfer table (STT), but the XRT resides with the process data and not the code (where the STT is located on MPE V). Global data is similar to DB storage and the heap storage is similar to DL storage. The CM stack is a reproduction of the MPE V stack including the familiar four-word stack marker which is still used whenever the process is executing in CM. The NM stack retains the information needed to return after a NM procedure call, sufficient space for the parameter list for subsequent calls, space for local variables and space to save registers across calls.

On MPE V, the procedure runs on top of its four-word marker, that is, local storage is on top of the marker (Q relative) and operations are performed on the top of the stack (S relative). The parameters to any called procedure are built on top of the stack, the PCAL instruction builds the four-word marker (saving the necessary registers) and the called procedure creates any local storage above the marker.

On XL, a NM procedure runs within its NM stack frame; i.e., a register save area is allocated (for the entry save area where the running procedure can store GR3-18 if used so they can be restored prior to returning to the caller, and the call save area for registers GR19-22 which the running procedure must store if used prior to calling another procedure because these registers won't be restored after the call). Local storage is allocated and parameter storage is prepared for actual parameters to be passed to any procedures called by the run-





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ning procedure. Finally, a 32-byte frame marker is laid where a called procedure saves the register and clean-up information that would be required to return to the current running procedure. Only the areas required are allocated so that a leaf procedure (one that calls no other procedures) that has no local storage and only requires registers GR19-22 may not allocate a stack frame. See *Figure 4*.

> Tracing frame markers can be complicated by the fact that not all values are set.

The procedure-calling convention dictates a convention for general register use. By design, GR0 is a hardwired bit-bucket that defines zero and may be better described as a read-only register rather than general register. By convention, GR1 is a scratch register, GR2 (or RP) is set to the return address by the caller and GR3-18 are entry save registers that must be restored by the running procedure prior to returning to the caller. GR19-22 are the call save registers that must be saved by the calling procedure because they may be modified by the called procedure. GR23-26 are parameter registers to give quick access to the first four parameters, GR27 (or DP) is the global data pointer of the running procedure and GR28 is used to return a function value. GR29 is used to return a millicode value, GR30 (or SP) defines the stack pointer (top of the NM stack) and GR31 indicates a millicode return address. See *Figure 5*.

A closer look at the 32-byte frame marker reveals the maximum information for calls. Storage is available for the DP of the caller, SR4 (space ID of caller's code) and external/stub RP (RP'—return address of the caller) If an export or calling stub is required to complete the call. The current RP is used to save GR2 so that the running procedure can call yet another procedure. Static link and clean-up are reserved for use by various languages including PASCAL. Import stub RP (RP") is a special return address for some import stubs that may be required to complete the call. Finally, the previous SP points to the top of the previous stack frame. Tracing frame markers can be complicated by the fact that not all values are set. For

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example, the previous SP may be kept as a code literal for some intra-modular calls while RP may be preserved in GR2. See *Figure 6*.

In order to make CM work, several new intrinsics have been written that allow processes to switch between NM and CM. Two such intrinsics, which belong to the switch subsystem, are HPSWITCHTOCM and HPSWITCHTONMNAME. Besides setting the execution mode in the PIB entry, these procedures set up the environment (registers, storage, etc.) so that the CM stack is active in CM with its four-word marker or the NM stack is active in NM with its 32-byte frame markers.

KPO File System

ON MPE V, THE ACTIVE FILE table (AFT) easily can be searched to determine which files a process has open. The AFT is part of the PCBX which is part of the process data stack.

Because a CM stack containing the AFT is maintained within the process data quad on XL, it may be possible to use an MPE V program to display the open files of a process. However, this approach will fail for many reasons; for example, the CM type system tables may have slightly different layouts or the CM type system tables may no longer be the final authority. The AFT is a case in point.

To determine the open files of a process, start with the PIB entry, go to the PIBX entry and locate the File System KPO address within the KPO TABLE. This address specifies the header record of the process local file descriptor table (PLFD) which supersedes the AFT as the NM authority on open files. See *Figure 7*.

In fact, the PLFD entry contains a file type flag that could be set to a CM file so that the logical access control block (LACB), physical access control block (PACB), file control block (FCB), etc., describe the file. For NM files, the global unique file descriptor (GUFD) entry contains similar file information and leads to the file label (FLAB). In any case, detailed file information can be obtained only from the file system tables at this point.

By filling in the details of the process tables outlined above, it should be possible to write a utility to display process file information by using the HP AIs when they're available or by prototyping your own AIs (with a little luck and/or help). *—Len Parent is a software engineer for Carolian Systems Int'l. Ontario, Canada.*

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Figure 6.

FRAME MARKER CONVENTION

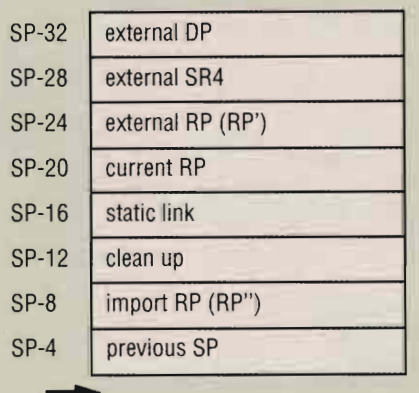
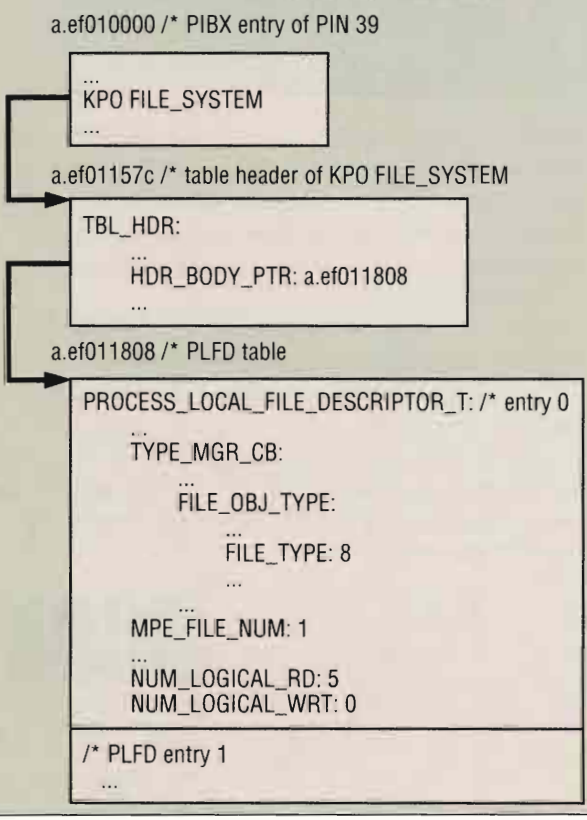


Figure 7.

PROCESS AND FILE SYSTEM TABLES MEET



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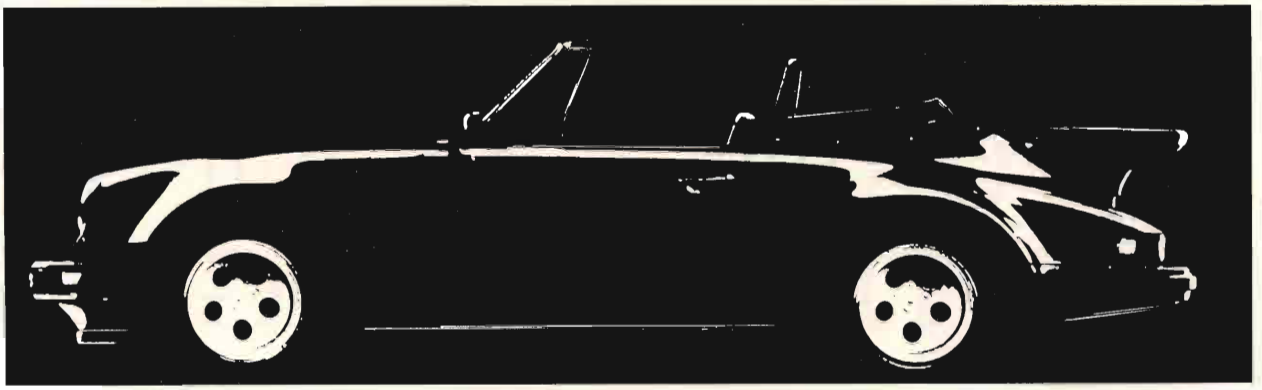

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SURFACE MOUNT TECHNOLOGY

SMT Is Bringing Sweeping Changes To HP's Product Line

TECHNOLOGY

Bill Sharp

Hewlett-Packard advertisements won't brag in banner headlines about it, and HP product literature won't mention it, but surface mount technology (SMT) is making big changes in the cost, performance, reliability and profitability of new HP products. In fact, SMT is important enough to HP that it formed the HP Surface Mount Development Center in Palo Alto, CA, to help quickly implement companywide use of surface mount techniques.

SMT is a method of attaching electronic components onto a circuit board. On a traditional printed circuit (PC) board, parts such as resistors, capacitors, integrated circuits and others have wire leads designed to stick down through holes drilled for each part in the PC board, hence the name, "through-hole" or pin-through-hole (PTH). Solder is applied to the underside of the board to hold parts in place and complete connections. Parts are applied to one side of the board only.

Surface mount technology makes significant changes to this picture. First, each component, small to begin with, has shrunk to about one-third of its former size.

The wires for the components, as well as the holes they passed through, are gone: SMT components are soldered to the surface of the PC board.

Electrical connections are actually part of the component body, and the component sits directly on a connector pad that is part of the PC board surface.

Usually, a solder paste is applied to the points on the PC board where SMT parts will sit holding them in place. Heat is carefully applied to the whole board to reflow the solder paste and bond the parts firmly, completing the connections.

Currently, SMT allows manufacturers to fit anywhere from two to four times more parts than PTH does on a similar size board. The difference will become even greater in the next few years. Part of the reason for this is the smaller size of the components. Also, because SMT uses only the surface of the board for mounting parts, components may be placed on both sides of the PC board. The distance between the center of adjacent contacts for PC board parts is referred to as their "pitch" or standard through-hole spacing. The pitch, is 0.10 inches, or 100-mil, while SMT spacing between contact points is typically 0.05 inches (50 mil), or about half the PTH distance. Using still smaller SMT spacing, which requires more sophisticated design and automated assembly techniques, will yield contact spacing of 0.025 inches, called "fine pitch" SMT.

This won't be the end of the shrinking process. Already, spacing requirements of less than 0.020 inches have been demonstrated, according to Bert Anderson, manufacturing technology manager for Hewlett-Packard's Medical Products Group (Andover, MA). "I have some extremely small SMT resistors that I keep as examples, but they're so small that it's very difficult to handle them without machines," says Anderson. "While a through-hole resistor can be handled with machinery and inserted into a circuit board automatically. The comparable SMT device is designed to be installed by machine and cannot be effectively installed by hand."

Typical dual in-line integrated circuit packages for through-hole can be used for automated assembly with PTH boards using current methods. But integrated circuits are becoming larger. Some of these, with 48 pin connectors on one device, cannot be reliably inserted into a PTH board using automated

assembly techniques. "You just can't ask a machine to hit 48 bull's eyes simultaneously, time after time," says Anderson. "So this is costly hand-work that has to be done to complete the PC board."

SMT devices that serve the same function, while not all that much smaller in size, don't need to be hand-installed, because they don't have pins that must fit simultaneously through holes in the PC board. These parts can be placed automatically on an SMT board. This means faster and less costly assembly.

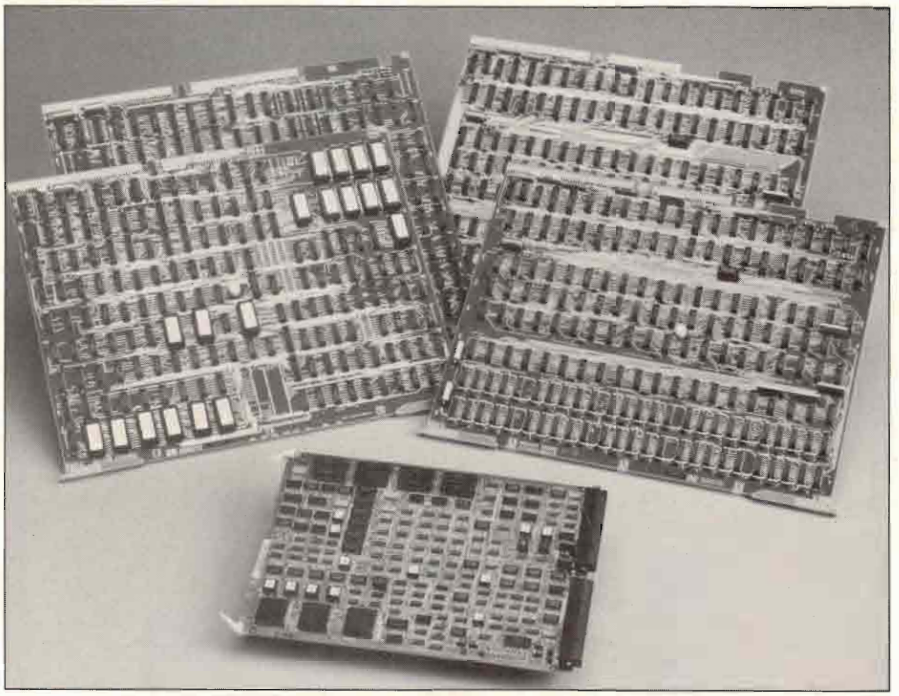
SMT will increase dramatically in the next five years.

Don't make the mistake of thinking SMT is brand new technology. Surface mount techniques have been around for more than a decade, slowly coming along in cost and performance to look more and more inviting. Japanese firms decided SMT was inviting enough to use several years ago, and SMT is likely a contributing factor in Japanese dominance of consumer electronics (peek inside a hand-held video camera if you have doubts about this).

Slow Growth In U.S.

Surface mount technology has been slow to take off in the U.S., because manufacturers have concentrated on fully exploiting the capabilities of PTH technology before investing in something new. Now that PTH has gone about as far as it can go, and SMT techniques have developed more fully, most market experts expect use of SMT to increase dramatically in the next two to five years. Dataquest Inc. (San Jose, CA), a market research firm, projects SMT in North America will grow 40 percent per year or better through 1992, compared with 10 percent growth per year in PTH technology. While SMT devices accounted for 7.5 percent of the market in 1987, they're expected to account for 35 percent by 1992. High-technology electronics will lead the way in this transition, as leading-edge designs for new products use SMT to provide price/performance advantages.

A wide variety of SMT components are now readily available in standard configurations and at prices comparable to those for PTH devices. Both of these factors have helped reduce the manufacturer's cost of switching over to SMT. Computer manufacturers in both Japan and the U.S. will move quickly into SMT to gain the speed advantages of integrated circuit devices packed more tightly onto PC boards for shortened



Not only is the SMT board in the foreground visibly smaller than the four pin-through-hole boards it replaces (background), but the components on the SMT board are visibly smaller as well. SMT board is part of the HP SONOS 100 Cardiac Imaging System.

wiring and less interconnect delay. The tiny delays imposed by the small distances on PC boards become significant in markets where the speed of product functions is critical, as in computers and medical systems.

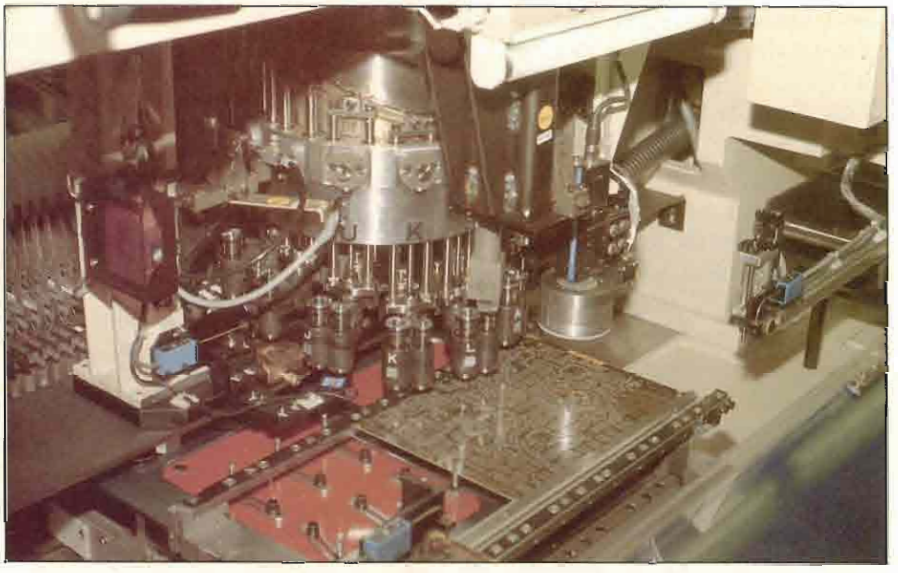
Historically, manufacturing processes in HP have been under the control of the local divisions. An HP division making oscilloscopes made them the way it felt like making them and, within reason, nobody questioned it. In establishing the Surface Mount Development Center (SMDC) within the parent Computer Manufacturing Division, HP is centralizing where there are clear advantages to doing so.

Jim Evans, R&D manager for SMDC, says his organization has the companywide charter for developing assembly interconnect processes for all HP product lines and manufacturing facilities. Evans calls his organization an example of "selective consolidation" in a corporation that still prides itself on decentralization. Evans is in a strong position to direct manufacturing processes. "SMT is a technology applicable to virtually all HP product lines," he says. "We began changing some products to SMT about four and a half years ago. Prior to that, SMT was used in HP solely for calculators. Now, many products are making the move to SMT."

The extent of that change is striking. All the newer computer products seem to incorporate SMT and are changing over as quickly as possible. Disc and tape drives, printers and plotters include substantial amounts of surface mount technology. HP's DeskJet printer is roughly 90 percent SMT. All of the personal computer products are 80 to 90 percent surface mount.

Clark Mozer, Surface Mount Center manager for HP's Manufacturing Test Division (Loveland, CO) put it simply, "I know of no significant new HP computer product that isn't being designed to use SMT." Bert Anderson, manufacturing technology manager for HP's Medical Products Group notes, "All new products from HP's medical divisions will have high percentages of SMT parts by 1990."

What's the big deal? Why the urgency to make the change to SMT? HP perceives an opportunity in SMT. It's a technology that's difficult to implement. It requires attention to detail, strict quality assurance methods, greater process automation and process control. Evans and others in HP believe the company is in an excellent position to gain a significant competitive advantage in



Three surface mount parts placement systems are in use at HP's Andover facility. These systems place an average of two parts per second.

several markets at once by making an early conversion to SMT.

Manufacturing Process

An SMT PC board blank is subtly different from a through-hole board. It's made of different materials and is more easily damaged by excessive heat. Process control is crucial to success. A number of different production processes can be used with SMT parts. At HP's Loveland and Andover facilities, a mask is placed over the board and a layer of solder paste containing solder and flux is applied precisely where needed for each component. An automated system places the parts into position. Boards then move through a hot-air reflow system that gradually heats the entire board in carefully controlled stages to reflow the solder and properly connect all the components.

In the case of some SMT boards, there may be only one or two pieces to be added to the board once SMT parts are in place. Connectors for SMT boards usually require hand-assembly, for instance, because of the stresses they endure when installed or removed from a product. PTH bonds can take more ham-handed treatment.

The tough part, though, is the transition from PTH to SMT. Says Anderson, "You don't just take out an old through-hole production line and slip in SMT. The engineering know-how is radically different, requires strict process control and more thermal and chemical knowledge. SMT is a very unforgiving process, and statistical quality control is essential to using it well. We use total quality control, statistical quality control and Taguchi methods as well. All of these methods help ensure that we will get the best out of our SMT processes."

Mozer in Loveland notes that just assembling with SMT isn't enough. "You have to be able to test it effectively. The boards we're seeing now include so much functionality, so many parts on one board that it becomes difficult to perform functional tests on them." Bear in mind that Mozer works in the facility where HP makes board test products.

Products incorporating SMT are becoming more reliable. Those HP calculators that work fine even after you drop them on the floor owe that reliability to SMT. SMT components inside that calculator are bonded directly to the PC board and physically become part of it. This makes them resistant to shock and vibration damage. The physics of locating a PTH resistor at the end of a wire lead makes it behave under severe conditions like the tail end of a whip. PTH connections therefore are less resistant to shock and vibration.

In more complex products, another advantage to SMT becomes clear. Multiple PC board products using PTH tend to share functions across two or more

[The Advantages Of SMT]

1. Chip components are half the size of PTH devices or less and have no lead wires.
2. Because only the surfaces of PC boards are used, both sides of a PC board are available for mounting SMT components.
3. SMT devices don't require holes drilled in the PC board, which reduces the space required for each part, saves the manufacturer process time and reduces production costs.
4. SMT devices are designed for automated assembly and can't be used effectively otherwise. Automated assembly cuts production costs.
5. Higher density on PC boards means smaller PC boards or fewer of them for the same functionality. This saves materials and time for the manufacturer. It also permits increased functionality in the same space.
6. SMT devices are bonded directly to the PC board and effectively become part of it. This makes them far less susceptible to mechanical vibration and shock than PTH devices.
7. Elimination of lead wires on SMT parts reduces stray capacitance and inductance, improving the performance of the PC board overall.
8. SMT reduces interconnection wiring, improving product reliability.
9. Decreased distance between parts improves processing speed.

boards, requiring multiple interconnects between boards and greatly complicating troubleshooting and repair. Because they can fit so much functionality onto a board, SMT boards are likely to include entire functions on one board. This reduces interconnects, thus improving not only the logical organization of the product, but its performance and reliability as well (interconnections are a leading cause of product failure). This is the way that SMT technology will be used in more and more electronic products, increasing functional integration and decreasing the PC board space devoted to each function.

Specialized Repair Equipment

Now for the reliability flip side. The advent of 50-mil SMT designs is the beginning of a trend toward smaller PC board technologies. As the technology evolves, repairs will be impossible without specialized and expensive equipment. SMT board blanks, while sturdy in the face of shock and vibration, can't tolerate careless application of heat during repairs.

HP's manufacturing divisions include repair facilities for board defects that show up during production. This means placing defective surface mount boards on a system that directs finely tuned jets of hot air to remelt the solder holding a defective part in place. Time and temperature control for solder reflow is critical to avoiding damage.

Design Innovation

Designing with SMT has allowed HP workstations to fit 16 MB of memory into a space that used to hold 2 MB. The same space reduction process makes it possible for a workstation board to include all processor and I/O functions. "Computer design is at a point now where the length of wires begins to make a significant difference in product performance," says Mozer. "SMT gets the performance of new designs a lot closer to the theoretical." This means devices such as static RAM and cache structures will be more effective.

This same tendency makes a significant reduction in electronic interference problems. Stray radio frequency and magnetic effects are part of every electronic circuit, and are simply by-products of sending electricity through wires. By shortening those wires, the damaging secondary effects also are reduced. "Historically, we try to contain EMI and RFI (inside products)," says

Evans. "But surface mount helps to reduce these effects at the source."

SMT is both boon and bane for the design engineer. Most find it difficult to work with at first. A few months ago, the single obstacle Mozer wanted to remove was "the reluctance of design engineers to try SMT." Now, not long after, he notes that every new design seems to use SMT. "It's not unusual to see an engineer tentatively to try using SMT for one portion of a board design," says Evans. By the time the board reaches production, "it's usually 80 percent or more SMT. You get to that level very quickly once you get over the hurdle of thinking about SMT."

CAD Conundrum

Some design problems remain, such as tools that aren't fully up to the designers' challenge. "SMT board designs are much tougher to develop, and the computer-automated design (CAD) systems on the market often aren't tuned as well for SMT as they might be," says Anderson. "Some of the board design software still doesn't make it easy to use both sides of an SMT board, for instance. So the SMT board design job is a tough one, and likely will remain difficult for a while."

All the reasons for using SMT come down to profitability in the end. For example, approximately 15,000 products HP makes need to be serviced and supported for years to come. Redesigning some of those as SMT products would result in dramatic reductions in parts that HP must maintain, and thus huge savings in support costs. "Customers don't care about SMT generally," says Evans. "They want us to stay on the leading edge, and they care about product attributes, present and future. SMT won't look like a new technology from their perspective. It will look like better price, performance and functionality."

SMT offers HP a chance to add to its products some new punch while shedding old paunch. But HP's advantage won't last long. Other firms also have SMT programs, but with the exception of the Japanese, the competition may not be as far along with SMT. So don't expect lots of fanfare about HP's work in SMT. Quiet, steady work is what they're after, and they admit it. "We haven't exactly been pursuing a high profile to this point," says Evans, who heads the SMT program. "We don't necessarily want to tell everybody to run in this direction." At least not until they have a good lead. *—Bill Sharp is a freelance writer with Fresh Air Communications, Newburyport, MA.*

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Easy E-Mail

WRQ's PostHaste Is Easy To Install, Easy To Maintain And Easy To Use

Figure 1.

PostHaste 1.00 VALERIE page 3 of 5

Outgoing mail summary

Num	To	Posted		Received/Stat		Del	Type	Subject
31	RUSSELL	05/01/89	11:08	05/01/89	11:11		MSG	Bid
32	STEVEB	05/01/89	12:13	05/01/89	15:27		MSG	Overheads — Reminder
33	GEORGE	05/02/89	11:38	05/02/89	14:26		MSG	5/2 topics
34	JOHN	05/02/89	11:38	05/08/89	11:23	YES	MSG	5/2 topics
35	JOHNV	05/02/89	11:38	05/05/89	09:29	YES	MSG	5/2 topics
36	KALANIS	05/02/89	11:38	05/04/89	21:51	YES	MSG	5/2 topics
37	LINDI	05/02/89	11:38	05/02/89	11:52	YES	MSG	5/2 topics
38	MIKER	05/02/89	11:38	05/03/89	09:56	YES	MSG	5/2 topics
39	SCOTT	05/02/89	11:38	05/02/89	11:39	YES	MSG	5/2 topics
40	STEVEB	05/02/89	11:38	05/02/89	13:58		MSG	5/2 topics
41	VERREE	05/02/89	11:38	05/02/89	12:09		MSG	5/2 topics
42	WES	05/02/89	11:38	05/02/89	15:41		MSG	5/2 topics
43	JOHNV	05/02/89	14:52	05/05/89	09:29	YES	MSG	PH Interface
44	MIKEB	05/02/89	17:59	05/03/89	10:56		MSG	AREV MISSION IMPOSSIBLE
45	JILL	05/02/89	17:59	05/04/89	10:25	YES	MSG	AREV MISSION IMPOSSIBLE

Outgoing Mail Summary

Help | Read All | Delete | 22 | 24 | Next | Previous | Print | Exit

Walker Richer & Quinn is a well known name among PC users connected to a 3000. In the early 1980s, WRQ's Reflection product was among the first third-party terminal emulation packages on the market. Being first in this business entitles you to scrutiny exceeded only by the U.S. Congress. Reflection proved to be about the best package of its kind. It also has withstood the test of time. Now, WRQ is building on its success with PostHaste.

When I first learned of PostHaste, I unconsciously connected it to Reflection. What could be added to Reflection? What could be *written* about Reflection that wasn't already? Boy, was I wrong! First and foremost, PostHaste has nothing to do with Reflection. My initial reaction was a mistaken prejudice.

PostHaste is an electronic mail package that runs on your 3000. You don't even need a PC. However, you may need to reconfigure your system

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DEL LUKENS

tables through SYSDUMP or a cold start to change the following:

- Maximum extra data segment size = 32,764 words
- Maximum number of extra data segments per process > 11
- Maximum code segment size = 16,384 words
- DST size = five times the number of concurrent PostHaste users plus whatever else is needed on your system
- 13,000 sectors of free disc space for demo. More needed for actual use.

Once you have the system configuration set properly, the actual installation is quite simple. You restore three files into PUB.SYS and then run the PHINST program. You can install the software into any account, or just take the defaults by pressing return to each prompt. You're supposed to run this install procedure from the console, and the last prompt will be a reply to a tape request. This will restore the rest of the files into the new account.

I'd recommend installing PostHaste with the demo data first. This way you can run the system and see how you want to configure it for your specific site requirements. The entire procedure takes approximately 20 minutes, so once you're finished with the demo, you can purge the account and redo the installation. You also can start over at any time during the install by aborting and purging the PostHaste account and starting over. That's helpful if, like me, you have flying fingers that seem to work independent from the brain.

Running PostHaste

Running PostHaste is simply a matter of using one of the UDC files supplied. One note: A job is streamed by the application when the first user logs on, if not already running. This is a "gotcha" if your limits are set too low. Although it's plainly documented, I missed it the first time around.

This stream job is a supervisor program and controls the execution of the housekeeping utility and other real-time functions. I hope in the future, software developers find a way around this. I get nervous when there must be a job running all the time.

You never know when one of these job streams will abort. Then your job limits are one too high. This can cause problems in many shops.

Once up and running the system is fairly easy to maintain. There is always context sensitive help available. This can be a time saver if you have many users who aren't techies or programmers and hate to read (there must be a system like that somewhere in the real world).

An added bonus for HP compatible terminal users is the use of function keys for most commands. Instead of memorizing all the commands, you can find your way through the multilayered

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Hewlett-Packard recently acquired the worldwide rights, with unrestricted usage for their own company, to two advanced tools, HIBACK and DBTUNE from HI-COMP.

This partnership provided sufficient reason for Klaus Stamer, General Manager of Hewlett-Packard in North Germany (photo right) to personally present Uwe Hinrichs of HI-COMP Hinrichs GmbH with a special certificate.

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PostHaste

SYSTEM REQUIREMENTS: HP 3000 MPE V; Series 39-58, 925, 925LX; Series 6x-70, 935; Series 950 or 955

PRICE: $5,000 — $15,000 depending on model

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Seattle, WA 98102
(206) 324-0350

FOUNDED: 1981

PRODUCT LINE: Reflection RSVP, Desk Direct, MNP Soft Modem, 3270 File Exchange, R-LAT, TelnetManager, Crystal Clear, Process-To-Process Link

CIRCLE 293 ON READER CARD

package quickly by using the appropriate key.

PostHaste has all the features you'd expect in an E-mail system. A nice touch with PostHaste is the ability to list your outgoing mail, when you sent it, the date and time it was read and if it was deleted. Another feature gives you the option of canceling the message if it hasn't been read by the recipient. This could save you your job if you're the hasty type and fire off a burner to your boss. *Figure 1* shows a sample of the outgoing mail screen.

Most E-mail systems allow you to reply easily to incoming mail with the reply command. PostHaste not only utilizes this, but also lets you forward an inbound message to other users. Another utility is the use of a "call type" message. This is used to forward a telephone message. For example, suppose you answer Joe Smith's phone. Instead of writing down the message on one of those pink slips, you just send off a call type message to him. The message can be created faster than regular mail messages and Joe has one less piece of paper on his desk.

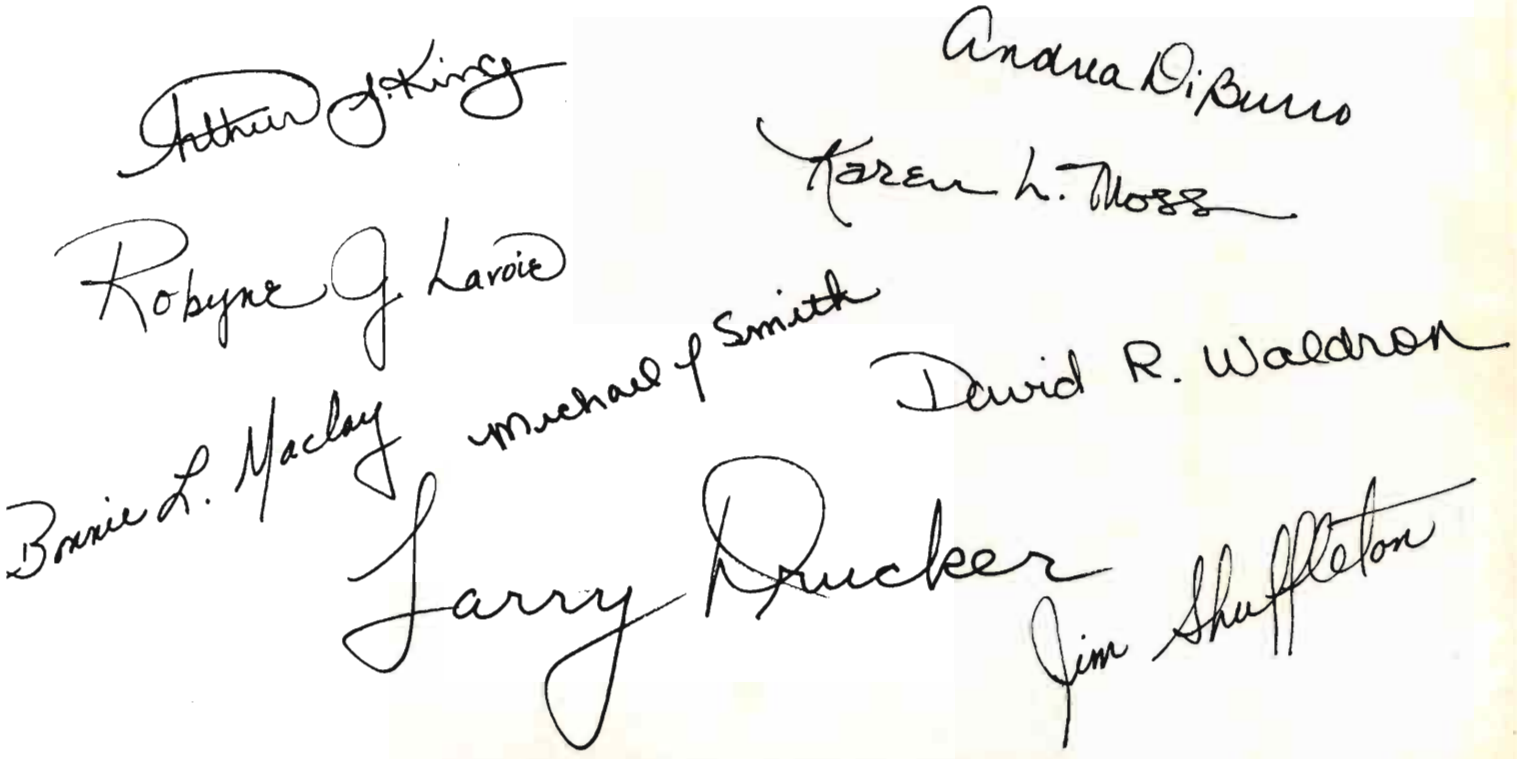
Message Editor

WRQ has included a message editor with the package. This is a full-screen editor that lets you use the edit keys already supplied on your keyboard. The editor is appropriate for short messages, but is somewhat limited for longer documents. There is no word wrap at the end of each line, so you must use the return key on every line. It's also limited to the amount of display memory available to your terminal or PC. You can send messages prepared with other editors. If you save an Edit/3000 file, it should be unnumbered, or the numbers will show up in your message. Of course, you can use Reflection to send a DOS file residing on your PC. The file can either be sent alone or can be merged into your message on the fly.

If you want to add punch to your message you can use the screen enhancement escape sequences to highlight portions of your message. This is a little clumsy in that you need to know the exact codes and sequences. For example, if you want to use inverse video on a portion of text, you need to bring up the MODES keys, activate DISPLAY FUNCTIONS, press "escape" then "&" followed by a lower case "d". The next key you press is the enhancement key. An upper case "B" will get you inverse video. This will remain in effect until you repeat the entire sequence again, except you use the commercial at sign "@" in place of the upper case "B". As I said, it's a little clumsy.

PostHaste is a good E-Mail package. It's easy to install, easy to maintain and easy to use. With online help, it's a package that you can quickly set up and manage without extensive user training or data center support. ■

"WE'RE THERE WHEN YOU CALL."



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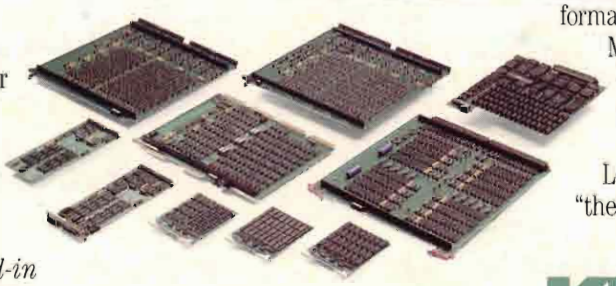

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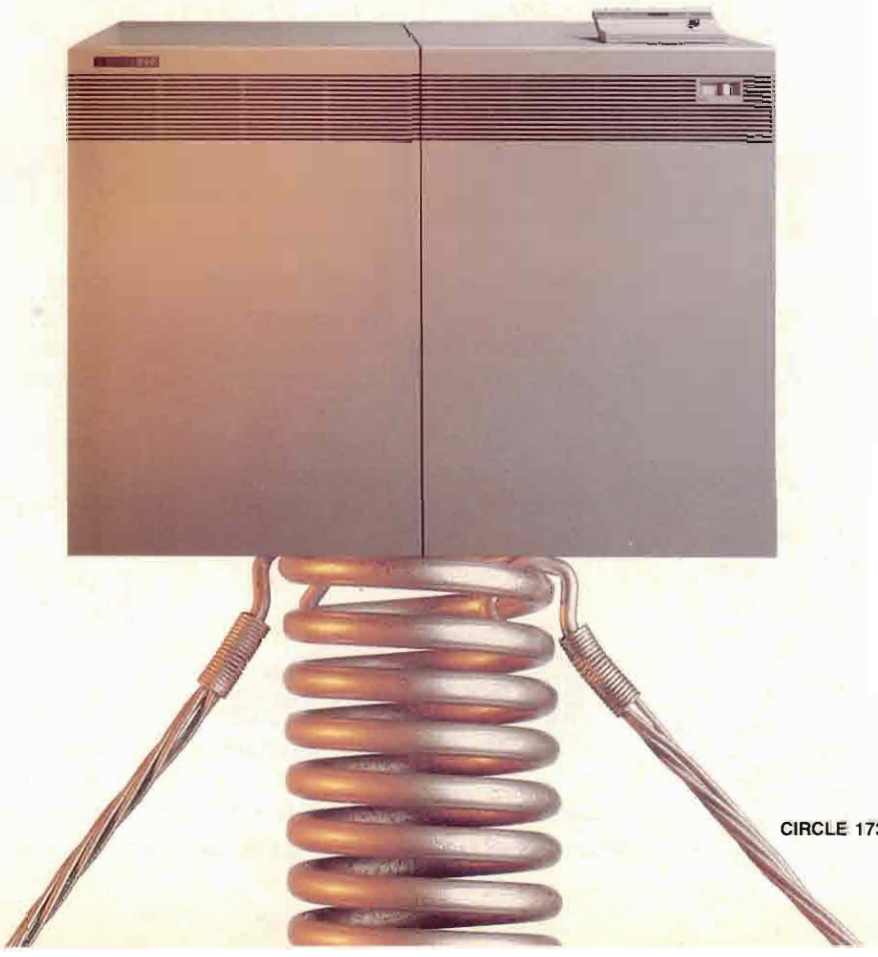

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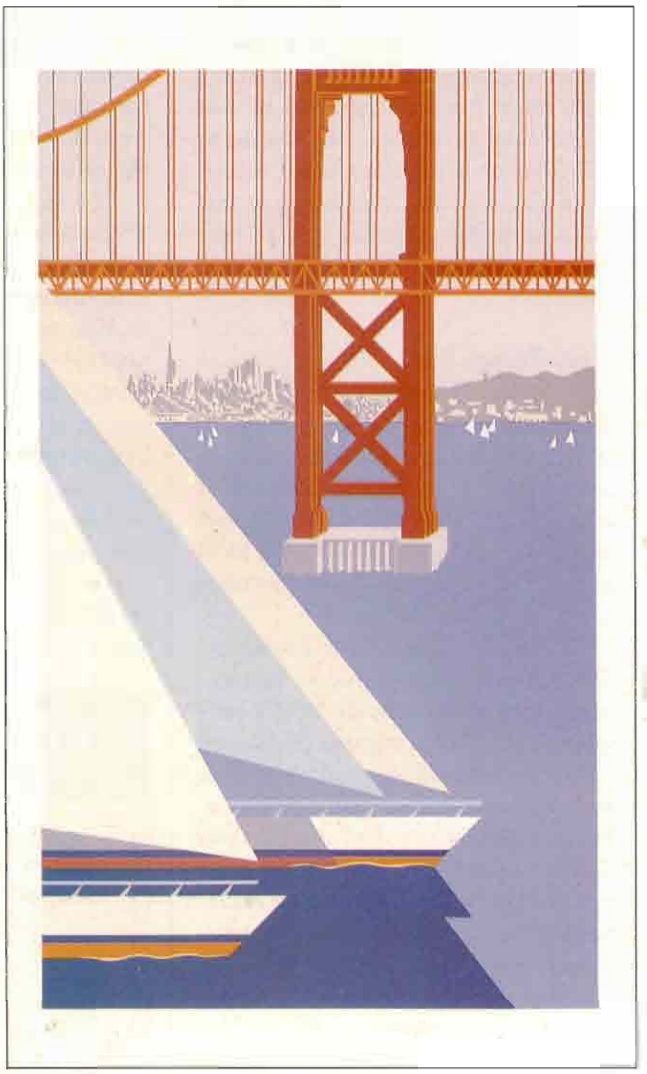

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CIRCLE 122 ON READER CARD

PC TIPS

Miles B. Kehoe

HP's Program Application Manager Protects The User

PAM: The Link Between The User And MS-DOS

In the last few months I've written about C language programming on the Vectra and how people with programming knowledge of the PC can improve the performance and ease of use of their applications. In the coming months, I will be returning to a more fundamental level to talk about what an average user can do to make his or her system easier to use. If you use a HP 150, Vectra, or any IBM PC-compatible system, you'll find relevant information pertinent to your system.

First Things First

Most IBM PC-compatible systems follow the same sequence at start-up. When you turn on the power, your system tests all of its critical components in a process called the Power On Self Test (POST). The system tests the BIOS and user memory (RAM) and identifies some of the interface cards.

On an AT-class system, configuration information is stored in battery-maintained memory by the SETUP program. The POST compares this stored information to the equipment it finds and reports any discrepancies to you. For example, if you've indicated that you have two floppy disc drives and your system detects only one during POST, you'll see an error before MS-DOS starts. In fact, you'll have to acknowledge the error by pressing a function key before the system continues.

Once the POST has completed successfully, the computer attempts to locate and load MS-DOS. There are two files that together make up MS-DOS, and both must be present for the process to complete.

If there's a floppy disc in *Drive A:*, the boot process expects to find a system on it. If the disc doesn't contain a system, you're prompted to insert a system disc and retry. Usually this means you wanted to boot from your hard disc but forgot to remove a floppy you had in the drive before. Opening the latch on the drive and pressing any key continues the boot process from the hard disc. If you really did want to boot from the floppy, insert a system disc in the drive and continue.

Next, the boot process looks for MS-DOS on the hard disc. For historical reasons, the first hard disc on IBM-compatible systems is identified as *Drive C:*. If an original IBM PC or AT found no MS-DOS on *Drive C:*, the system loaded BASIC. However, as far as I know, there are no clone computers that provide built-in BASIC.

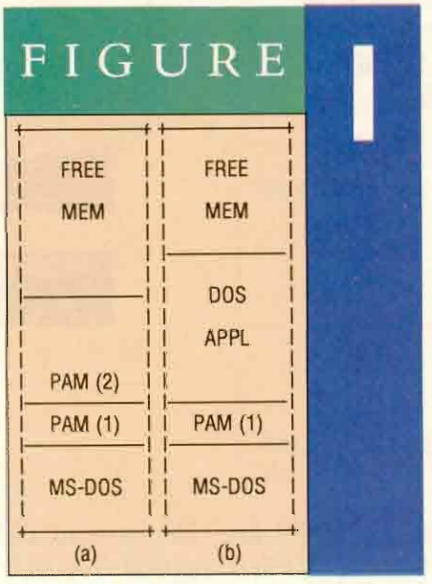
Once the two system files are loaded into memory, they take control and begin a well-defined sequence of events. First, this MS-DOS kernel looks on the boot disc for an optional file called CONFIG.SYS. This file, which is found on most systems, provides information that MS-DOS needs in its preliminary setup. This information includes:

- The names of additional device control programs, called drivers, you want to add.
- The maximum number of files you'll want opened at any point. The default is 20, but advanced programs often require more.
- The number of disc buffers to be reserved to enhance disc performance.
- The maximum number of disc drives allowed on your system. The default is five.
- What program you want to serve as the primary interface, or shell, to MS-DOS.

It's in this last area that HP differs from most other manufacturers and an area that needs some clarification.

The Shell Game

On all MS-DOS systems, the default shell is called COMMAND.COM. It's responsible for the C:> prompt you



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probably recognize. Because it's the default, no entry is needed in CONFIG.SYS.

HP always has made an effort to protect the user from the operating system. On the HP 150 and the Vectra, the program that sits between the user and MS-DOS is called the Program Application Manager (PAM).

As shipped by HP, the standard CONFIG.SYS contains the line:

```
SHELL = pamcode.exe root
```

As MS-DOS loads, this line directs it to make PAMCODE.EXE the first program loaded into memory. The word *root* tells PAMCODE that it's loaded as the shell. This makes PAM, not the COMMAND program, the user shell. As you might expect, there are advantages and disadvantages of each method.

The primary advantage of loading PAM in your CONFIG.SYS file is that your system starts in PAM, and a novice user doesn't need to know MS-DOS. PAM, with its integral File Manager, provides most of the functions needed for a day-to-day PC user.

An additional advantage is that HP 150 users can easily migrate to the Vectra family of PCs with minimal training. HP now sells PAM as an application for non-Vectra PCs as well, so you can make PAM your standard shell on all of your PCs.

Figure 1 shows a simplified memory map of a system with PAMCODE specified as the SHELL in CONFIG.SYS. PAM (1) represents that portion of PAM that always will be in memory even when other applications are being executed. PAM (2) is the portion of PAM that is only in memory when PAM or File Manager is running (*Figure 1-b*).

The disadvantage of PAM is that it isn't the COMMAND shell and therefore not standard everywhere. You can't buy books to help you find your way through PAM. While HP manuals are excellent, they sometimes don't provide enough information.

In addition, some of the most popular PC programs are Terminate and Stay Resident or TSR programs. These pop-ups, like Borland's Sidekick, usually are executed from your AUTOEXEC.BAT file. However, AUTOEXEC.BAT is a file used by COMMAND.COM. With PAM loading from CONFIG.SYS, your TSRs never get loaded. Finally, even though HP does offer PAM for non-HP PCs, you won't find many IBM PCs using PAM.

FIGURE 3

```
CONFIG.SYS:

   FILES=99
   BUFFERS=20
   DEVICE=C:\SYS\ANSI.SYS
     DEVICE=C:\SYS\HPIB.SYS

AUTOEXEC.BAT:

      ECHO OFF
      CLS
      ECHO Loading MS-DOS
        from Drive C:
      PATH C:\BAT;C:\BIN;
      PROMPT $P$G
      PAMCODE
      ECHO Type PAM to return
        to PAM at any time.

PAM.BAT

      ECHO OFF
      CLS
      ECHO Loading PAM: Please
        stand by.
      PATH C:\BAT;C:\BIN;
      PAMCODE
      ECHO Type PAM to return
        to PAM at any time.
```

Fortunately, there's a compromise solution that solves the major disadvantages of PAM while maintaining compatibility with most TSRs and other start-up tasks. Rather than loading PAM in your CONFIG.SYS file, include it as the last line of your AUTOEXEC.BAT file. We'll return to this in a moment.

Still Loading

Before we were sidetracked by PAM, I was telling you about that start-up process. If your CONFIG.SYS file doesn't include the line specifying an alternate SHELL, MS-DOS reaches the end of the configuration file. When that happens, MS-DOS looks on the boot disc (either A: or C:) to locate and load the default shell, COMMAND.COM. Because MS-DOS doesn't look in any subdirec-

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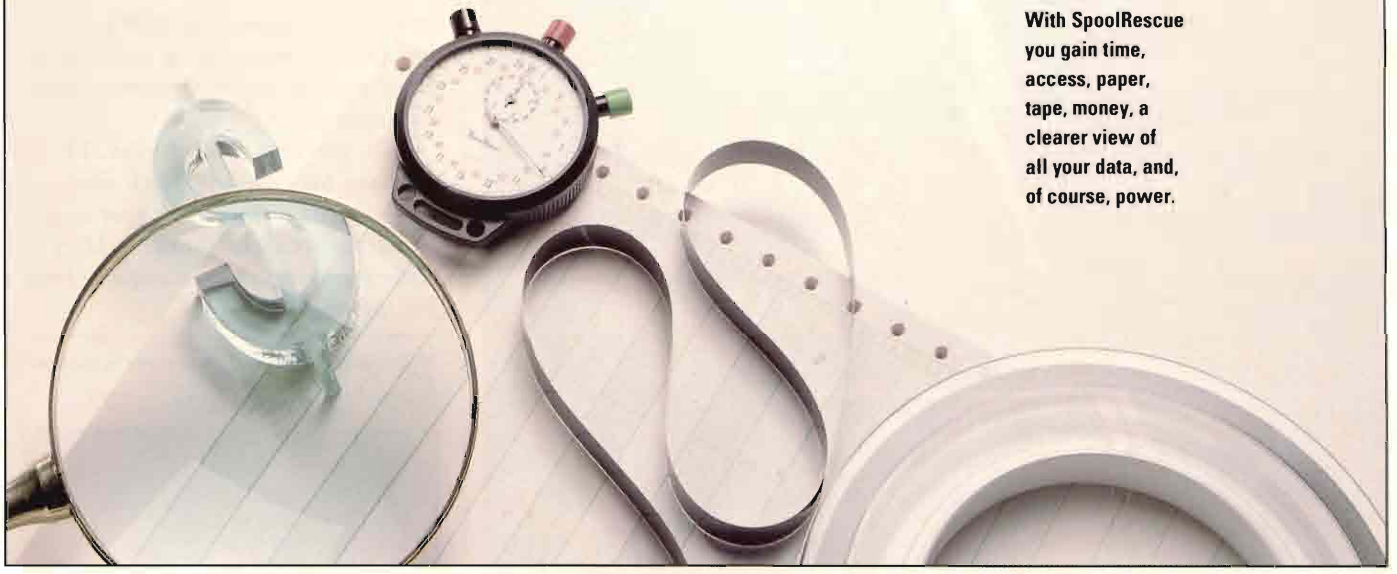

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tories, the COMMAND program must be in the root directory. If it isn't there, MS-DOS stops loading and you'll have to reboot from another disc that contains COMMAND.COM.

Once it's loaded, COMMAND takes control. The first thing it does is attempt to locate its start-up file called AUTOEXEC.BAT. This is an optional file that contains any operations that you want to occur every time you start your PC. Typically, a minimal AUTOEXEC sets a PATH and the MS-DOS PROMPT and possibly starts any TSRs or background programs. Some mouse drivers also can be loaded from AUTOEXEC.

Finally, when AUTOEXEC is finished, the system is up and running. *Figure 2-a* shows the memory map of a typical system with COMMAND.COM as the shell. COMMAND(1) represents the portion of the Command shell that remains in memory at all times. COMMAND(2) is the part of the program that's removed from memory when other applications execute. This minimizes the memory used by COMMAND.COM when the shell isn't in control (*Figure 2-b*).

If you want to load PAM from your AUTOEXEC.BAT, simply make PAMCODE the last line of your AUTOEXEC. I've listed a typical CONFIG.SYS and AUTOEXEC.BAT which, when used together, accomplishes this trick.

The third file shown in *Figure 3* helps you reload PAM whenever you want to after exiting to MS-DOS. I do this because few users remember that the name of the PAM program is PAMCODE. Remember, when PAM was loaded as the shell, there's no program "below" PAM so there's no "EXIT PAM" key.

The only visible difference in loading PAMCODE in AUTOEXEC.BAT is that you will see function key [f8] is defined as "Exit PAM": Pressing it will return you to MS-DOS.

FIGURE 4

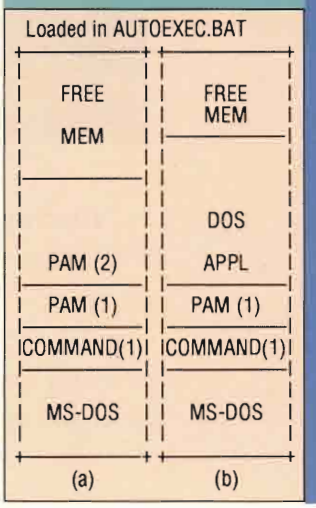

Figure 4 shows what the system looks like when COMMAND.COM is the default shell and PAM is loaded in the AUTOEXEC.BAT file. You can see (*Figure 4-b*) the cost of this method is the extra memory used by the PAM "stub," that portion of PAM that remains in memory. This amounts to about 4 KB, so in most cases it won't make a significant difference.

Note: The only place I've seen a significant difference in which method you use is when you install HP/Microsoft Windows/286. Because of some assumptions Windows Install makes, you may not load PAMCODE in CONFIG.SYS. However, this is only for the actual installation. Windows runs fine in either model.

In the next few months, I'll be covering MS-DOS and batch files and showing you how to make your system easier to use. Stay tuned. —*Miles B. Kehoe is an online support manager for Verity Inc., Mountain View, CA.*

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RDBMS

Fabian Pascal

Types Of Tables

We know that relational databases consist exclusively of R-Tables, which are characterized by unique rows, no intrinsic ordering and no repeating groups. R-Tables that contain the actual data (i.e., those that are physically stored on disc), are the most basic. Because their data is the basis for all operations that users apply to the database for informational purposes, they're called *base tables*. *Figure 1* shows the base tables of the PROJECT database.

If you recall, base tables don't have to be stored internally in table format. In fact, they never are. Designers of relational DBMSs are free to choose any storage format they deem suitable for performance reasons, such as sequential or B-tree files. What is important is that users and applications should never be exposed to them. Therefore, physical storage structures are managed transparently by a truly relational DBMS.

Derived Tables

We've also seen that the relational operations applicable to R-Tables act on one or more tables and always produce a table as a result. Similar to numeric operations, table operations can be *nested* arbitrarily. That is, any complicated multitable manipulation is simply a sequence of individual two-table operations, the immediate results of which can be reoperated upon until the final result is obtained.

This is, in fact, the principle by which relational DBMS optimizers operate on the data. They decide in what order to execute the individual steps and how to achieve best overall performance. Relieving users of this burden wouldn't have been possible without mathematical basis of relational theory.

When users don't know in advance the exact final result they need, they must be able to generate intermediate results and continue to operate on them until they get what they want. This can be achieved only if results of table operations are assigned to NAMED tables, to which the user can have the same access as that to any base table. Results from table operations are called *derived tables*, or sometimes *query tables*. *Figure 2* shows, for example, a table D11_EMPL resulting from a restrict operation applied to the EMPLOYEE table to answer the query, "Which employees are assigned to department D11?"

Derived tables also can be stored. In that case, they'll contain their own data. It's important to realize, however,

FIGURE 1

DEPT#	DNAME	MGR#	RDEPT
A00	COMPUTER SVCS DIV.	10	
D01	DEV. CENTER		A00
D11	MFG. SYSTEMS	60	D01
D21	ADM. SYSTEMS	70	D01
E01	SUPPORT SVCS	50	A00
E11	OPERATIONS	90	E01
E21	SOFTWARE SUPPORT	100	E01

The DEPT Table

PROJ#	PNAME	ERESP	STAFF
MA2110	PROGRAMMING	60	9.00
MA2111	PROGRAM DESIGN	220	2.00
MA2112	ROBOT DESIGN	150	3.00
MA2113	PROD CONT PROGS	160	3.00
OP1010	OPERATION	90	5.00
OP2010	SYSTEMS SUPPORT	100	1.00
AD3112	PERSONNEL PROG	250	1.00
AD3113	ACCOUNT PROG	270	2.00

The PROJECT Table

EMP#	ENAME	HIRED	SALARY	DEPT#
100	Spenser	6/19/80	26150	E21
150	Adamson	2/12/72	25280	D11
160	Pianka	10/11/77	22250	D11
250	Smith	10/30/69	19180	D21
260	Johnson	9/11/75	17250	D21
310	Setright	9/12/64	15900	E11

The EMPLOYEE Table

PROJ#	ACT#	EMP#	START	TIME
OP2010	10	100	1/ 1/82	1.00
MA2112	60	150	1/ 1/82	1.00
MA2112	180	150	7/15/82	1.00
MA2113	60	160	7/15/82	1.00
OP1010	130	310	1/ 1/82	1.00
AD3112	70	250	8/15/82	0.25
AD3112	180	250	8/15/82	0.50
AD3112	80	250	10/15/82	0.50
AD3112	60	250	1/ 1/83	1.00
AD3113	80	260	3/ 1/82	0.50
AD3113	180	260	4/15/82	1.00
AD3113	70	260	6/15/82	0.50

The ASSIGN Table

The PROJECT Database

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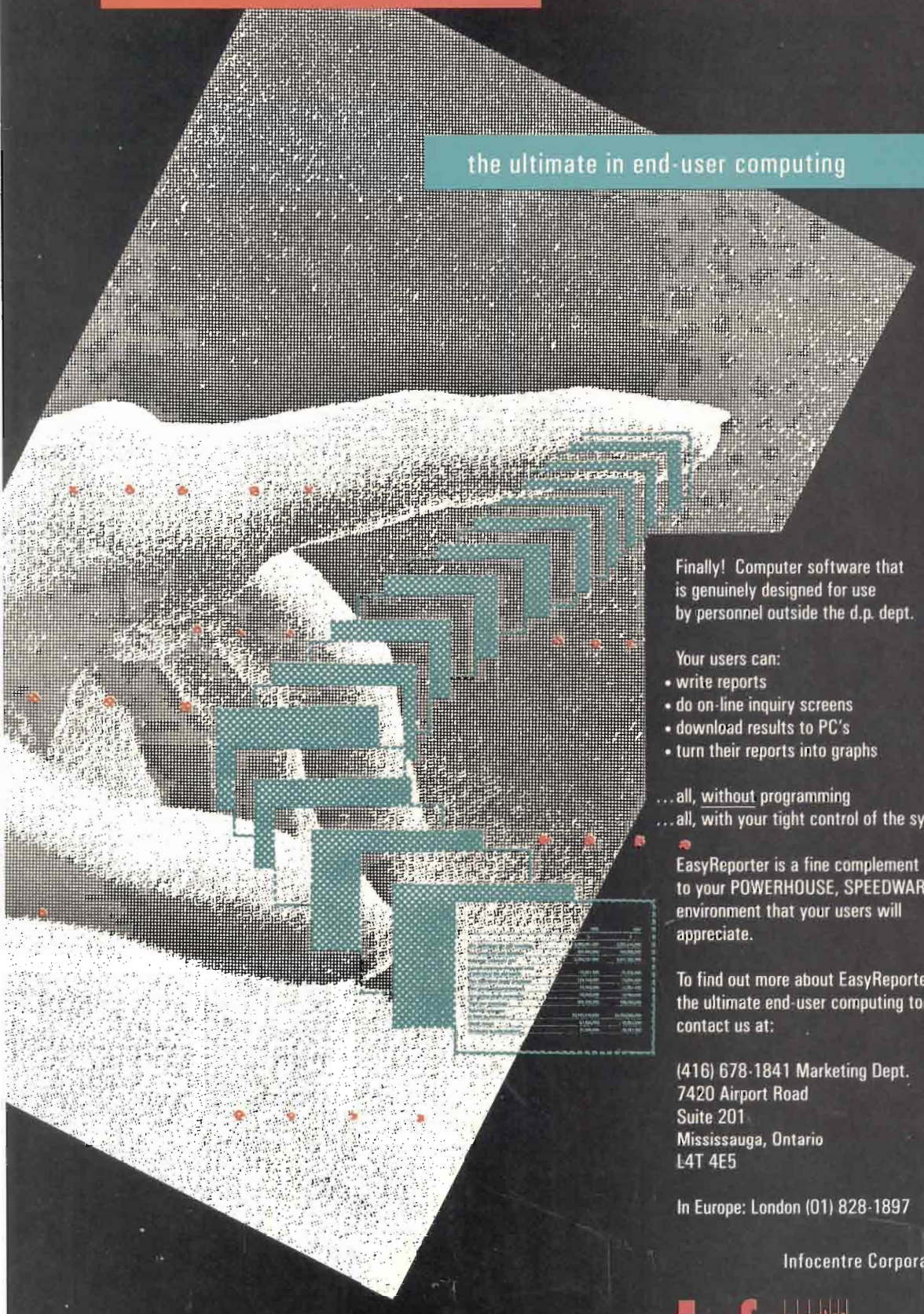

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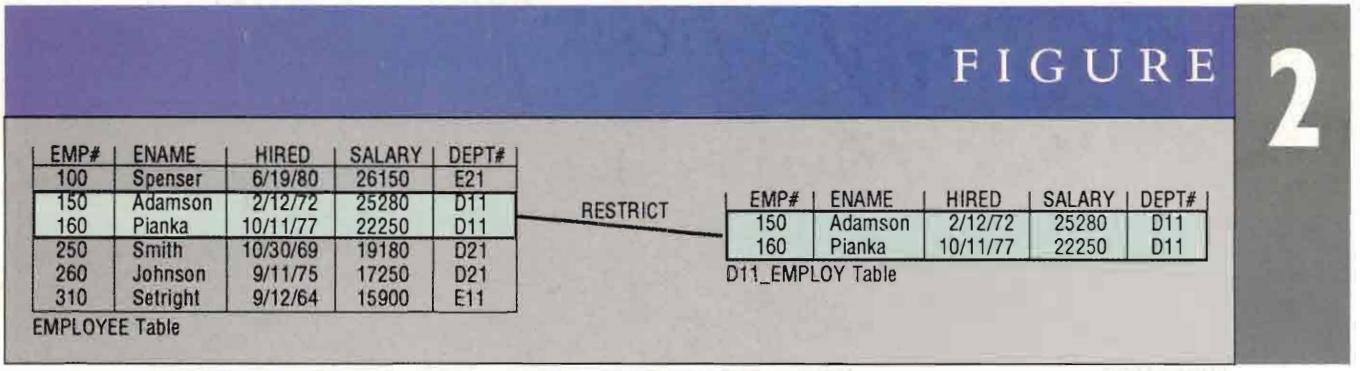
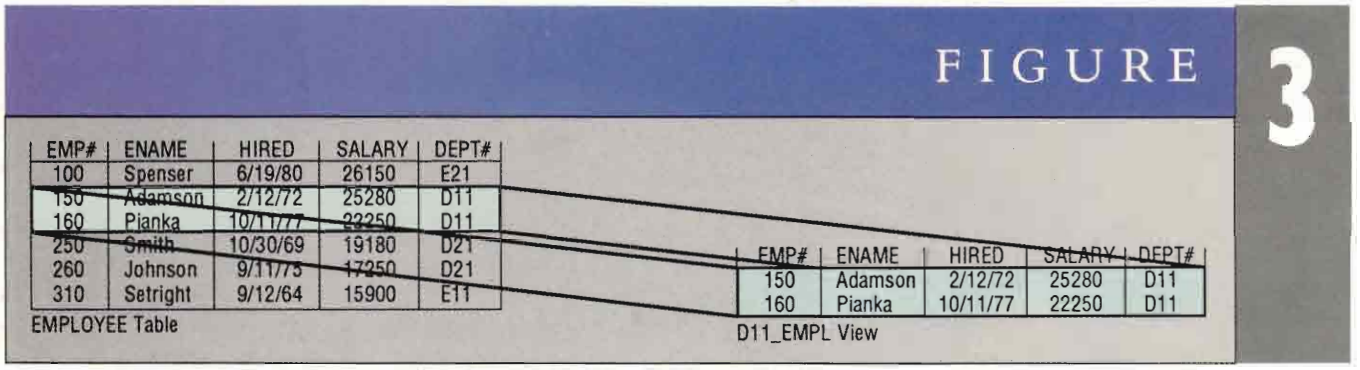


Derived (Query) Table



Single Table View

that stored intermediate tables, which may be needed only temporarily, occupy space on the disc and introduce data redundancy and maintenance burdens. For example, if the EMPLOYEE table is updated to reflect the hiring of two new employees in department D11, D11_EMPL no longer will be current if it's separately stored and will require a separate update. Moreover, users will have to explicitly drop such tables, when they're no longer necessary.

Before we discuss a solution to this problem, there's one type of derived table that's very useful to store. There are situations where it's necessary to preserve the version of a table at a particular point in time. For example, suppose certain reports need to be generated over time from the EMPLOYEE table as it was, say, the end of a month, without considering the various changes to it that were effected since that time. Such tables are called *snapshot tables*. They're cataloged in the database by the date and time of their creation and, because they're needed over a period of time and don't need to be updated, they can be stored separately without maintenance burdens.

Snapshot tables also are useful as query only views of data that can be downloaded from a host to the PC. Some DBMSs use them as backup versions for the database.

True Relational Assignment

How can the redundancy problem of stored derived tables be solved? One solution is for the DBMS to support *temporary tables*. Such tables would be generated by user operations and available to users, but would automatically disappear at the end of a database session. Temporary tables are appropriate for short-term needs arising from complicated operations on the data.

A long-term solution with some additional critical advantages are *virtual tables* usually called *views*. Think of views as windows into one or more table(s). These windows can be defined over whole tables, or over specific portions of tables (certain columns and rows). The table operations required to obtain the desired windows are cataloged in the database, and the DBMS simply executes them when the views are invoked (as just tables) by users.

The restrict operation needed to obtain D11_EMPL could be defined in the database as a view on EMPLOYEE, rather than as a stored or temporary table (see *Figure 3*).

An example of a multitable view is the operation (combining a project, restrict and join) to obtain information on employees assigned to 'D' department (including the name of their departments), which have employees assigned to them. The resulting view D_EMPL is shown in *Figure 4*.

Views don't store data (hence the term virtual), but rather reflect data stored in one or more base tables. But note that, because they're whole or parts of tables, they're also tables. Consequently, they can be manipulated like

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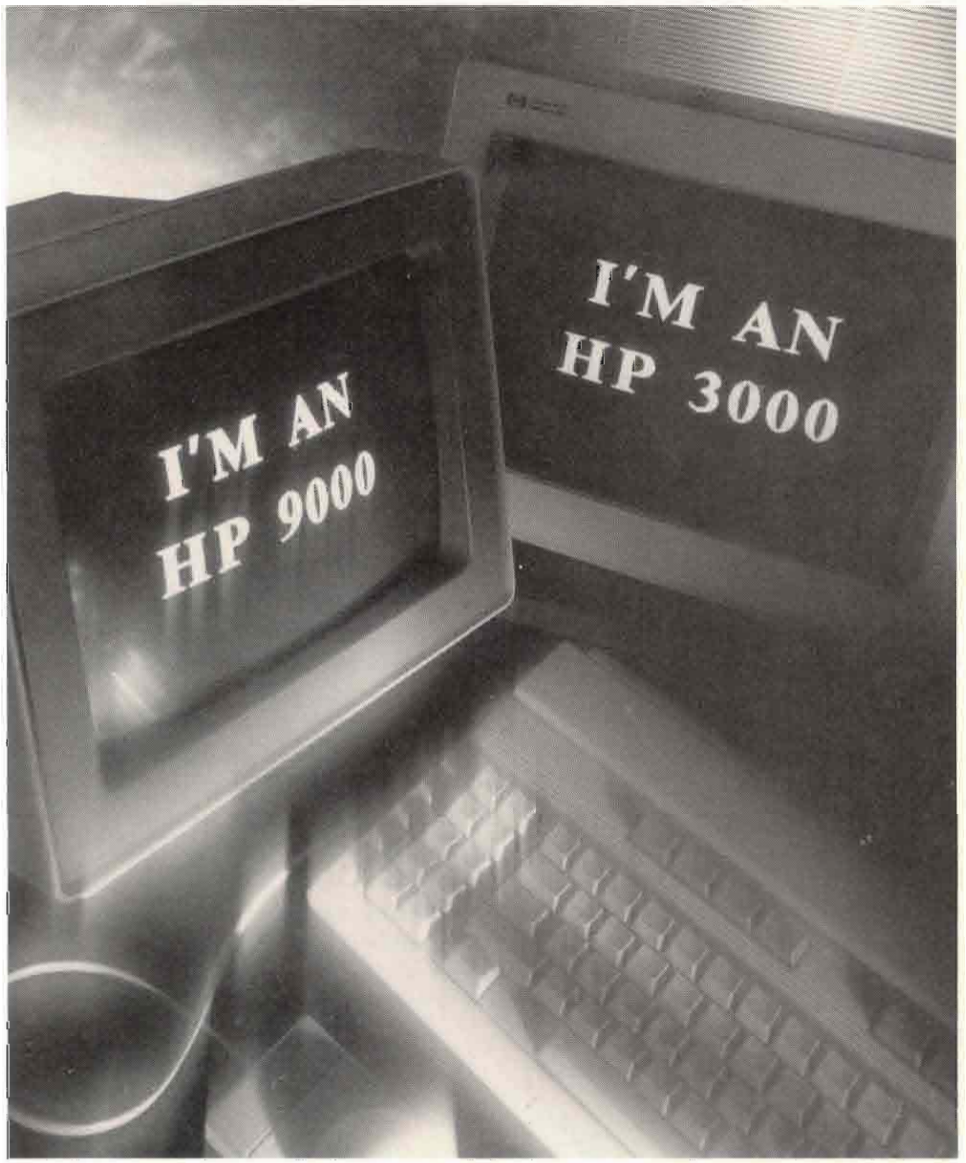

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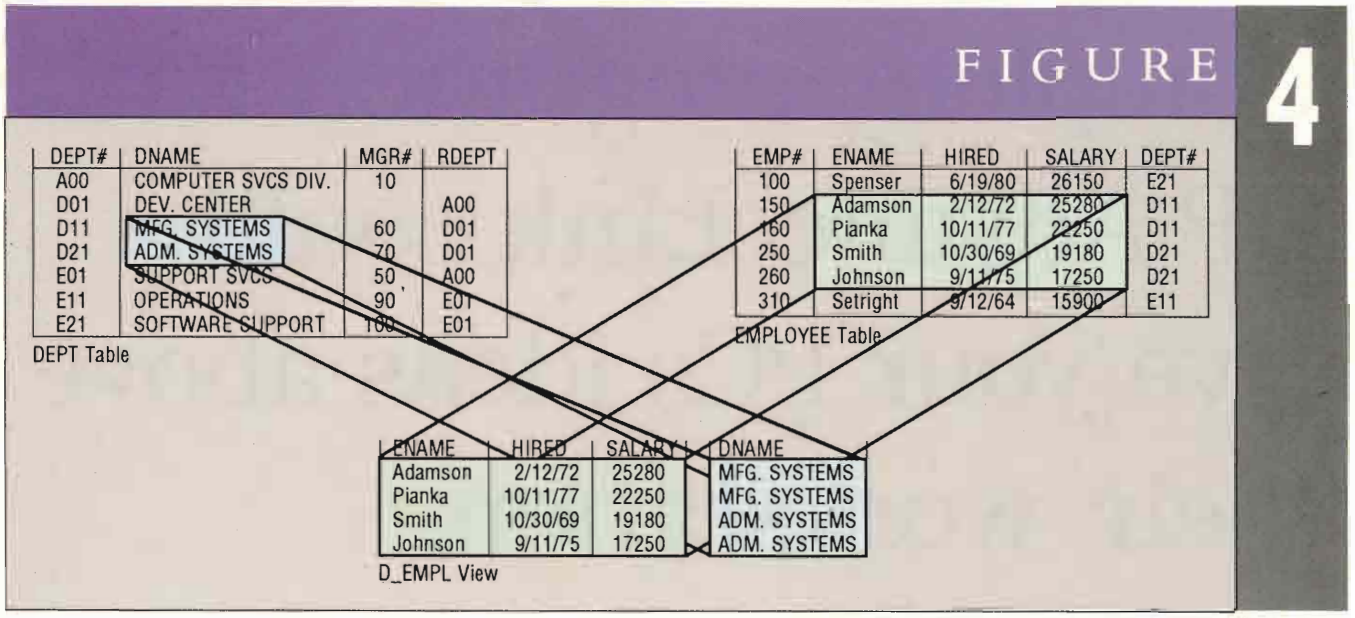

Two Table View

any stored table, but they save storage space and avoid redundancy. If the base tables over which a view is defined are updated, the view always will reflect those changes, which eliminates the need of separate updates. Thus, a row added to the EMPLOYEE table for a new D01 employee automatically will be reflected in the view in *Figure 4*.

If base tables are restructured so that there is loss of data, for example, if columns are dropped, views defined over those columns are automatically invalidated by a relational DBMS.

Besides saving space and eliminating redundancy and maintenance burdens, views offer other important benefits. They make the use of databases flexible. Different users can view the stored data in different ways, without any need to physically restructure the database. Multitable views let users see data in the format relevant to their needs while insulating them from the format in which the data happens to be stored in the database. The user working with the view in *Figure 4* sees a table and doesn't need to know that the data comes from two different stored tables.

Views also help with data security, because specific users can be assigned privileges to view only specific portions of the data. For example, a view on EMPLOYEE may exclude the SALARY column or certain rows if some users shouldn't see it.

The most critical contribution of views is as a mechanism insuring logical data independence, unique to relational databases. The critical concept of data independence will be explored thoroughly when we discuss the 12 rules of relational fidelity. For now, I'll just illustrate it with an example.

Assume that employee and department data originally was stored in one table called PERSONEL (i.e., storing all departmental data with each employee). Then suppose that, for various reasons, the table had to be split into two tables, DEPARTMENT and EMPLOYEE. In a nonrelational database, all queries and applications referring to the PERSONEL table would have to be modified to adjust for this physical split. With a relational DBMS, the two tables can be logically joined into a view called PERSONEL which can be accessed by existing queries and applications as if it were the original table, so no modifications are necessary. Thus, logical data independence means freedom to logically restructure the database without physical design application maintenance burdens.

Base tables can be updated "through" views that, as we shall see, also simplify table operations. In such cases, it's the data in the base table underlying the view that actually is being changed. Current RDBMSs allow only single table views to be updated, which is a product (not relational) limitation. Thus, logical independence is currently limited by the inability to update multitable views.

THERE ARE COMMERCIAL DBMSs whose current use of the term view has a completely different meaning. It's important not to confuse those views with relational views, because they don't offer the same practical benefits. In fact, let me make this warning a more general one: Beware of the indiscriminate use of relational terminology currently prevailing in the market. *—Fabian Pascal is a Washington, DC, microcomputer analyst, consultant and author specializing in relational database management and SQL, and is affiliated with Codd & Date Inc.*

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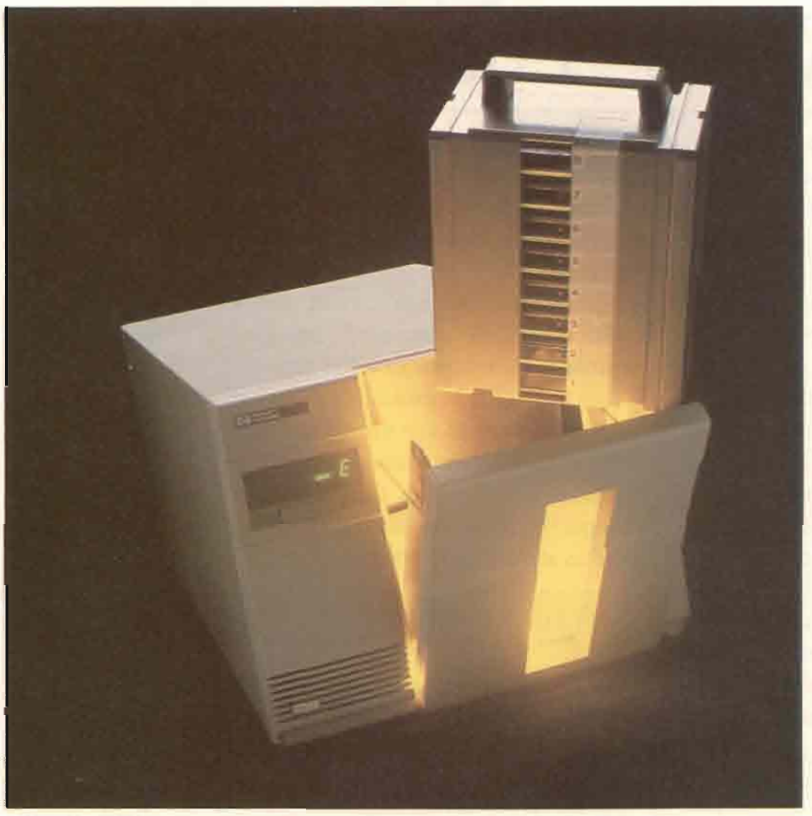

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HP-UX

Andy Feibus

Searching For Files With The C Shell

Searching for the file on which you want to perform some action is one of the slowest exercises you can execute on a computer. A good example is editing some document someone else created. If you don't know the exact name of the file, locating the file requires you to perform an *ls* on the directory where the file is supposed to be located. Once the file is located, you must execute the command on the file.

Instead, the C shell provides you with command completion. With this feature, you can use ^D (control-D) to list the options for completing a command and the ESC key to actually complete the command. Type the following:

```
29> more /etc/newconfig/Update_info?^D
```

The shell responds with a listing of the directory, similar to the following:

```
36217A 9260XA      HP-SBDL  RTIEX    Xwindows
92593A HP-GKS.3.0 RTIDEV   Xwindow x11windows
```

The shell then redisplays the part of the command you typed and waits for you to complete the command and press return. To view the file /etc/newconfig/Update_info/x11windows, enter:

```
29> more /etc/newconfig/Update_info/x
```

and press the ESC key and then the return key (once the shell completes the command for you). If the computer can't complete the command (for example, if you had entered **more /etc/newconfig/Update_info/X** and pressed ESC, more than one file matches and the shell won't select one for you), the shell completes as much of the command as possible and then beeps. At this point, the shell waits for you to furnish information to complete the command. Both ESC and ^D can be used multiple times for any command entered until the command is completed and you press RETURN.

If you often use certain options with a specific command, repeatedly entering these options each time you want to run the command (e.g., **ps -ef**), you may want to use the C shell aliasing feature. With aliasing, a short sequence of characters can represent a longer sequence. For example, to alias **ps -ef** to **st**, use the command:

```
30> alias st ps -ef
```

Once the alias is executed, any time the **st** is entered, the C shell interprets this to mean **ps -ef**. Some useful aliases:

```
31> alias h history
32> alias print 'pr -e6 \!* | lp'
33> alias stop kill -9
34> alias a alias
35> a rm 'mv \!* /tmp'
```

The first alias simplifies the **history** command to one character.

The second alias creates a **print** command to format and print any files passed as arguments to the command. For example, **print file** actually executes **pr -e6 file | lp**. The alias is enclosed in quotes to prevent the shell from interpreting the * in the command. The ! is preceded by a backslash to prevent the shell from interpreting the request as a history substitution. The argument !*, when used in an alias, represents all arguments (after the command) on the command line.

The third command creates a **stop** command to kill all programs specified as arguments to the command; e.g., **stop 8400** actually performs **kill -9 8400**. The !* isn't needed for this alias: The shell assumes that if !* isn't specified, all arguments subsequent to the alias are used automatically.

The fourth alias makes it easier to create any subsequent aliases.

The last alias causes the **rm** command to move files to the **/tmp** directory. This provides a primitive method for preventing you from unintentionally deleting files. To use the actual **rm** command once the alias is established, use either **\ rm** or **/bin/rm**. Any time a command argument is preceded by a backslash, the shell doesn't interpret the argument.

When the shell interprets a command for execution, each argument of the command is checked to see if the argument is an alias. If so, the argument is replaced by the contents of the alias. Define all aliases in your **.login** file.

To remove an alias, use the **unalias** command (e.g., **unalias st**). To view all aliases, use the **alias** command with no arguments. To view a specific alias, use the **alias** command with only the **alias** as the argument (e.g., **alias st**).

On the HP 9000 Series 800, and soon on the Series 300, is the concept of job control. A job is the execution of one or more commands that are started as a unit (e.g., **pr file | lp** is one job, although two processes are created to complete this task). A job can be in one of three states: foreground, background or suspended. Most jobs you start are performed in foreground: The shell doesn't permit you to enter another command until the current job completes.

To run a job in background, type **&** at the end of the commands. A background job continues to execute, although the shell permits you to enter other commands.

For example, to format and print a file in background, enter:

```
40> pr file | lp -s &
```

The shell responds with a line similar to the following:

```
[1] 1231 1232
41>
```

The number in the square brackets is the job number. The numbers after the job number are the process identification numbers for all commands executed as part of this job. In this example, the two commands **pr** and **lp** are executed as part of job 1. Because the job is executing in background, the shell immediately prompts for other commands to execute.

When a background job completes, a message similar to the following is displayed:

```
[1] Done        pr file | lp
```

If the background job abnormally terminates, the completion message indicates this:

```
[1] Exit 1      pr file | lp
```

Sometimes a long job accidentally can be started in foreground. The concept of job control permits you to suspend these jobs or change them to background jobs. To suspend the current job, type the current suspend character. To define this character as control-Z, enter the following command:

```
42> stty susp \^Z
```

where the ^ Z are the characters ^ and Z (and not control-Z). The **stty** command is documented in Section 1 of the *HP-UX Reference Manual*. Now, start the following job:

```
43> du / > /tmp/t1
```

To suspend this job, press control-Z (^Z). Immediately, the shell responds with:

```
Stopped
```

and the job is suspended. A suspended job is still present in the system: It just isn't being executed. To view all jobs outstanding for your shell, use the **jobs** command. To restart this command in background mode, use the command **bg**. The shell responds with:

```
[1] +du / > /tmp &
```

The + indicates that this job was the most recently executed task. **A -** indicates that the job was the second most recently executed task.

To execute this job back in foreground, use the command **fg**, and the shell responds with:

```
du / >/tmp
```

and waits for completion (you may use ^ Z to suspend the job again or break to abort it).

With C shell, the % is used to identify a job. For example, to change job number 4 to foreground, you'd enter:

```
52> %4
```

This is the same as entering the command **fg %4**. To change job number 5 from suspended state to background state, you'd enter either **%5 &** or **bg %5**. To abort job number 2, enter **kill -9 %2**.

Jobs also can be identified by the command the job executes. For example, to restart a suspended **du** job (assuming that only one **du** job is active within the shell), you could enter **%du**.

If you attempt to exit your shell while suspended **jobs** are pending, the shell will warn you that "There are stopped jobs." Use the **jobs** command to view these jobs. If you either run **jobs** or immediately try again to exit the shell, the shell doesn't warn you and all suspended jobs are aborted.

Next month, I'll fulfill my promise and provide some tips for **vi** users. *—Andy Fribus is a software engineer for Bradley Ward Inc., Atlanta, GA*

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yes 350 no 349

Continued from page 12.

cost $9,490 as a DN3500 workstation and $14,400 as a Model 360MH (or $16,010 before the reduction). Part of the reason for HP's system being more expensive is that the resolution on the HP monitor is 1,280 x 1,024 compared to 1,280 x 800 on the Apollo.

On the high end, a Model DN4500 workstation and HP's Model 370 CHX are comparable in configuration but not in cost. Apollo sells a DN4500 configured with two 19-inch diskless models, 8-plane color, 8 MBs of parity-checking RAM, 1,280 x 1,024 resolution and a 2D graphics accelerator for $29,990. The Model 370 CHX sells for $37,120 ($31,900 for the workstation and $5,220 for the 2D integer-based graphics accelerator). Part of the extra $7,000 can be considered a premium for HP's superior MIPS rating (8 MIPS versus 7 MIPS for the DN4500), but the Model 370 workstations are nevertheless good candidates for a set of price reductions that will bring them in line with the DN4500s.

What base of applications can HP expect to inherit from Apollo?

Strategic Alliances

HP and Apollo have more similarities in their hardware offering than they do in the type of partnerships they form with software vendors. Apollo was a pioneer in the workstation marketplace at a time when the Series 9000 machines were marketed primarily as instrument controllers, and many software developers wrote their applications on Apollo workstations. Despite the fact that more third-party software vendors used Apollo systems, HP has formed far more strategic alliances with VARs (HP uses the term VABs, value-added businesses). Art Hutchinson of International Data Corporation checked a database of over 5,000 value-added retailers and discovered that HP has approximately 20 times the number of strategic partnerships that Apollo has. Rebecca Hurst of VAR Business magazine confirms that Apollo's Partners program isn't as well developed as HP's, but adds that vendors who now run on Apollo but not HP will benefit from HP's program of

marketing and technical services if they become HP VABs.

Apollo has more OEM relationships than significant VAR relationships. The most notable of Apollo's OEM relationships is with Mentor Graphics, accounting for approximately 11 percent of its revenues. There also are OEM relationships with Auto-Trol, McDonnell-Douglas and Interleaf. But the number of vendors whose products run on Apollo workstations without having any strategic alliance far outnumbers those who have OEM relationships.

In the past, HP was slow to attract third party applications to its Motorola workstations because HP preferred to promote its own software products such as DesignCenter for EDA (Electronic Design Automation), ME-10 for 2D and ME-30 for 3D mechanical engineering and HP HILO for simulation and modeling. Recently, HP has formed partnerships with software vendors whose products compete with its own. For example, Unigraphics, a product from McDonnell Douglas Manufacturing and Engineering Systems that competes with HP's ME-30, was released in an HP version in 1988 and HP's sales force and workstation marketing groups have been working cooperatively with McDonnell Douglas' Unigraphics teams.

What base of applications can HP expect to inherit from Apollo? A glance at four important workstation application areas, EDA, Mechanical Engineering, CASE and Electronic Publishing will help to answer that question.

Electronic Design Automation

Mentor Graphics had an exclusive OEM relationship with Apollo. When Apollo's earnings began falling short of expectations last year, Mentor Graphics, the company with the largest share of the EDA market, went shopping for a second platform. According to Adam Cuhney, vice president of Kidder, Peabody and Company (a brokerage firm in San Francisco, CA) Mentor considered all the major workstation vendors. Cuhney believes that Mentor's preference for HP as a second platform

HP may soon form alliances with Cadence Design Systems and Racal-Redac Inc., two other EDA vendors whose products run on Apollo.

gave HP the impetus to pursue acquisition of Apollo. He attributes HP's winning favor over DEC and IBM to the corporation's strength in the Far East, a key market for chip design software. HP is unlikely to jeopardize their newly-created alliance with Mentor by discontinuing or withdrawing any of the Apollo models that are still used by many Mentor customers. Mentor probably will port to the HP Model 300 machines before the end of the year.

HP may soon form alliances with Cadence Design Systems and Racal-Redac Inc., two other EDA vendors whose products run on Apollo. Valid Logic, Mentor's largest competitor, however, is expected to forego an opportunity to develop an HP product line in defense of its alliances with Sun and DEC. Valid recently acquired Analog Design Tools, a company whose Analog Workbench product runs on HP and Apollo workstations. The HP version of Analog Workbench is the analog portion of HP's Design Center, but the Apollo version competes directly with Mentor's Analog Tools.

Mechanical Engineering

The acquisition of Apollo and its share of the Mechanical Design market coincides with HP's new willingness to promote third-party software that competes with its own ME-10 and ME-30 products. Joint marketing efforts with McDonnell Douglas were the first signs of the new policy. Apollo has an OEM relationship with McDonnell Douglas and a much larger share of Unigraphics'installed base of 8,000 seats by the end of 1988. As of January 1989, HP seats accounted for less than 15 percent of McDonnell's sales of Unigraphics to workstation customers.

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This year HP also announced relationships with SDRC (Structural Dynamics Research Corporation) and Swanson Analysis Systems, two other vendors whose software also runs on Apollo. Cadam, PDA, Cadence, Computervision and Auto-Trol have mechanical engineering products running on Apollo but not on HP workstations.

CASE

HP's Software Engineering Systems Division (Ft. Collins, CO) is working on alliances that will help position HP's Model 300 workstations as solid platforms for integrating CASE tools from many vendors. To date, however, HP has significantly fewer CASE products running on its workstations than Apollo does. Except for some embedded systems CASE tools, just about every CASE product that runs on an HP Model 300 workstation also runs on Apollo.

Many CASE products including Cadre's Teamwork were developed on an Apollo system. According to Iang Jeon, Apollo's product manager for CASE, 120 CASE vendors offer at least 200 applications that run on Apollo systems. Some companies that currently have products on Apollo's but not HP's 68030 platform include Index Technologies, I-Logix, Cincom Systems, Teledyne-Brown, Verilog and The Stepstone Corporation.

Electronic Publishing

There are currently no desktop publishing applications that run on HP's model 300 workstations although announcements are expected by early summer. Apparently HP's strategy had been to position its Intel-based workstations as the platform for desktop publishing applications. By contrast, Apollo's Motorola-based workstations have been a platform for electronic publishing, especially for technical publishing, as long as the industry has existed. Interleaf was originally written on an Apollo system and Frame Technology, Scribe and Context (a technical publishing subsidiary of Mentor Graphics) all have products that run on Apollo.

The DN3500 is marketed as a CASE and technical publishing workstation. These are two markets that hold growth potential for HP — expect to see more announcements of strategic alliances in these application areas before the acquisition is completed. In the EDA and mechanical engineering markets, HP's own software products are likely to lose market share when Apollo becomes part of HP. However, the company stands to gain hardware customers as they form alliances with the leading vendors in these fields. When Apollo and HP merge their Motorola families, increase the number of third-party applications that run on their platform and adjust their pricing, look out Sun! ■

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Continued from page 24.

Versatec Offers Laser Plotting Solution

Versatec has announced HP-GL emulation for its wide format laser plotter — a laser plotting solution for E-size drawings.

New capabilities enable emulation of HP's 7585/7586 series of pen plotters. Owners of HP 7585/7586 pen plotters can plug in a Versatec 8836 laser plotter with the new HP-GL code. Users can load the software into the 8836 plotter by diskette. No additional hardware changes or need for installation is required. The HP-GL option enables users to take advantage of CAD packages such as AutoCAD, VersaCAD, Micro CADAM and many others.

The 9936 plotter accepts HP-GL data via an RS 232C serial interface, Versatec Parallel Interface (VPI) or Centronics parallel interface. In addition to HP-GL pen plotter formats, such as Versatec Random format and CalComp 906/907, 960.

Versatec's 8836 laser plotter offers fast plotting speed and unattended operation. Drawing with the laser xerographic process at 400 points per-inch resolution, produces crisp, high-contrast output at a constant speed of one inch per second. A unique finishing process allows each drawing to be automatically cut, neatly rolled into a two-inch diameter roll, taped with re-usable tape and then stacked in an output bin eliminating the need for operator intervention.

Users receive maximum flexibility in configuring their system with Versatec's 8836 laser plotter. Users can choose to have the rasterization process performed on the 8836 plotting system with an embedded controller. With its embedded controller, the laser plotters supports pen plotter data formats at serial input speeds up to 38.4K Baud. Using an optional Versatec Raster Processing Machine (RPM) that accepts HP-GL and 906/907 formats the 8836 plotter can be connected to the IBM channel or ether net via a Versatec Pot Server (VPS) VPS delivers multi user capability with workstations or host CPUs networked through ethernet. Connectivity to workstation and platforms Apollo, DEC, IBM, HP and Sun.

For more information contact Versatec, Xerox Co., 2710 Walsh Ave., Santa Clara, CA 95051; (800) 538-6477 or in CA, (800) 341-6060.

Circle 376 on reader card

Tymlabs Corp. Supplies Backup Facilities

Tymlabs Corp. has announced Version 2.4 of BackPack/V, BackPack/XL and Micro BackPack, its high-speed and unattended system backup facilities for the HP 3000.

Version 2.4 includes the following features: new keywords that store and retrieve the date of last full backup to automate file selection for partial backup, enhanced write error recovery for all tape drives, a way to estimate disc space needed for unattended backup, fully unattended backup to serial disc, improved performance when restoring tapes and more.

For more information contact Tymlabs Corp., 811 Barton Springs Rd., Austin, TX 78704; (512) 478-0611.

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Report Writing

Simple and detailed reports are easy to create. The unique painting facility allows users to draw the report layout directly on the screen. VISIMAGE PC provides all the functions of a powerful report writer, simply designed for the end user.

PC/HP3000 Access

VISIMAGE PC includes a new communication package designed by Walker Richer and Quinn that allows you to access HP3000 data using any PC network. Users have access to IMAGE databases, KSAM, MPE and SD files. VISIMAGE comes complete with interfaces to OMNIDEX, DICTIONARY/3000 and POWERHOUSE dictionary. Sophisticated features allow the DP department to retain total control over security, confidentiality and system resource usage.

On-line Tutorial

VISIMAGE PC's ease of use is enhanced by a tutorial mode for novice users. Pop-up windows guide the users through each step. Very quickly you will become an expert at reporting and downloading data.

Downloading

Your HP3000 data can be automatically downloaded to the PC. All the major PC formats are supported, making your data available to spreadsheets, word processing and other productivity tools (e.g. LOTUS 1-2-3, DBASE III, etc.).

Windows

VISIMAGE PC combines the power of VISIMAGE with the flexibility of a window environment. Pull-down menus and pop-up windows give the user easy access to timely information. Use the mouse to design the layout of your report or "click" the items you want to select. VISIMAGE PC runs on all IBM compatibles, using MS-DOS or OS/2, with a basic configuration.

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Peripherals Reveals Tape Cleaner/Rewinder

Peripherals announced a microprcessor-based controlled portable computer tape cleaner/rewinder that features a scratch resistant case weighing less than 26 pounds. Its microprocessor self testing motion control allows detection of missing BOT and EOT. Standard equipment includes fail-safe brakes, quick release hub, antiskew packer arm and a special 200 IPS Archival Wind for tapes being put in storage. Normal speed is 350 IPS; 3.5 minutes for a 2400 ft. reel.

Two other models are available on a table top model and one which is rack mountable for the military.

For further information contact Peripherals, 1363 Logan Ave., Costa Mesa, CA 92626 (714) 540-4925, (408) 995-5384, (800) 468-6888.

Circle 390 on reader card

StarJet/3000 Utilizes WYSIWYG Interface

Appic has announced version 3.00 of StarJet/3000, the electronic form management program for LaserJet printers connected to an HP 3000 Classic or Spectrum. Version 3.00 supports most internal fonts for both the LaserJet IID and LaserJet 2000 as well as cartridge fonts.

The PC-based design module allows you to use grids and templates to help create forms with its WYSIWYG interface. A new module located on the HP 3000 allows you to capture the first page of your reports which, once downloaded onto a PC, can be used as a template. Forms then can be created by drawing boxes and lines, or by adding text around your actual data.

A companion program PrintJet allows you to format 4GL reports or any flat file output. PrintJet can use StarJet forms and it also gives you the possibility to change fonts for each field defined in the report.

Contact Appic USA Inc., 3600 N. Hills Dr. Suite 131, Austin, TX 78731; (512) 346-0962.

Circle 389 on reader card

NEC Presents GraphicSmart CAD/CAM Projector

GraphicSmart, a high-resolution projector for CAD/CAM applications, is available from NEC Professional Systems Division.

GraphicSmart (model GP-3000) is a multiple frequency projector (15 to 55 KHz) for use with PC based CAD/CAM systems and workstations. It can display high-resolution computer graphics running on IBM, PC, AT, XT and PS/2 computers, IBM-compatibles and Apple Mac II. The GP-3000 can be used with most personal computer color graphics boards, including CGA, EGA, enhanced EGA, PGC, MCGA, VGA, 8514A graphics adaptor, Apple Mac II and Super VGA.

NEC's GraphicSmart CAD/CAM projector.

GraphicSmart can be used in a variety of applications such as CAD/CAM for electrical, mechanical and civil engineering; architectural drafting presentations; business graphics; medical imaging cartography; planing surface transportation routes for highways, buses, subways and trains; military command operatons and training support service.

For more information contact NEC Professional Systems Division, 1255 Michael Dr., Wood Dale, IL 60191; (312) 860-9500.

Circle 387 on reader card

FaxMate Sends Documents On Letterhead

FaxMate, the HP-3000 based fax product from Message Transport Systems, now sends documents on corporate letterhead.

FaxMate's new letterhead feature lets the manager use the FaxMate interface as a scanner and load the letterhead onto the HP 3000. Once the letterhead has been loaded, it can be referenced by users or can be automatically included on every fax.

There is no limit to the number of different letterhead files. Each user could have a separate default letterhead.

FaxMate also has been enhanced to provide an optional cover page on every document sent. The manager or user can create a cover page template that will be loaded automatically. Keywords can be imbedded to insert default fileds. The cover page also can be sent after being merged with the letterhead file.

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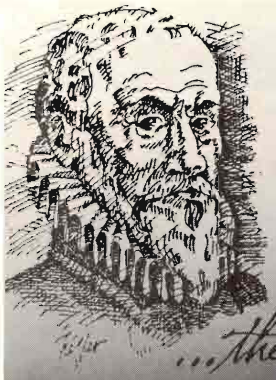

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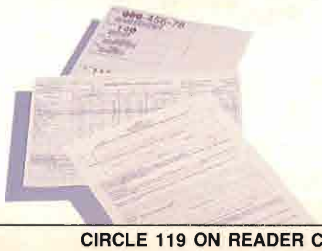

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ment using an HP 3000 editor, HP Desk Manager or FaxMate's internal editor.

Text and graphic images can be merged in the same document. Images can be scanned in using a PC scanner (HP ScanJet) or the FaxMate interface hardware. FaxMate tracks every document sent and tells the user which documents are delivered and which are not because of busy or bad fax numbers.

FaxMate is now available for both classic and Series 900 HP 3000 systems.

Contact Message Transport Systems, 1787 East Fort Union Blvd., Suite 101, Salt Lake City, UT 84121; (801) 943-9934; (800) 548-5701.

Circle 375 on reader card

Personalized Software Announces WordPerfect 5.0

Personalized Software Inc. has announced versions of WordPerfect 5.0 customized to the HP Portable Plus and HP 150 Touchscreen computers. WordPerfect 4.2 also is available.

Either version includes complete IBM PC 3 11.1 inch disc version of WordPerfect 5.0, users manual, and a proprietary IBM PC emulator program that allows WordPerfect to run on an HP computer. The portable plus version of the emulator is called PlusPerfect.

For more information contact Personalized Software Inc., P.O. Box 869, Fairfield, IA 52556; (515) 472-6330.

Circle 382 on reader card

Hardware Macro System Available From Mextel

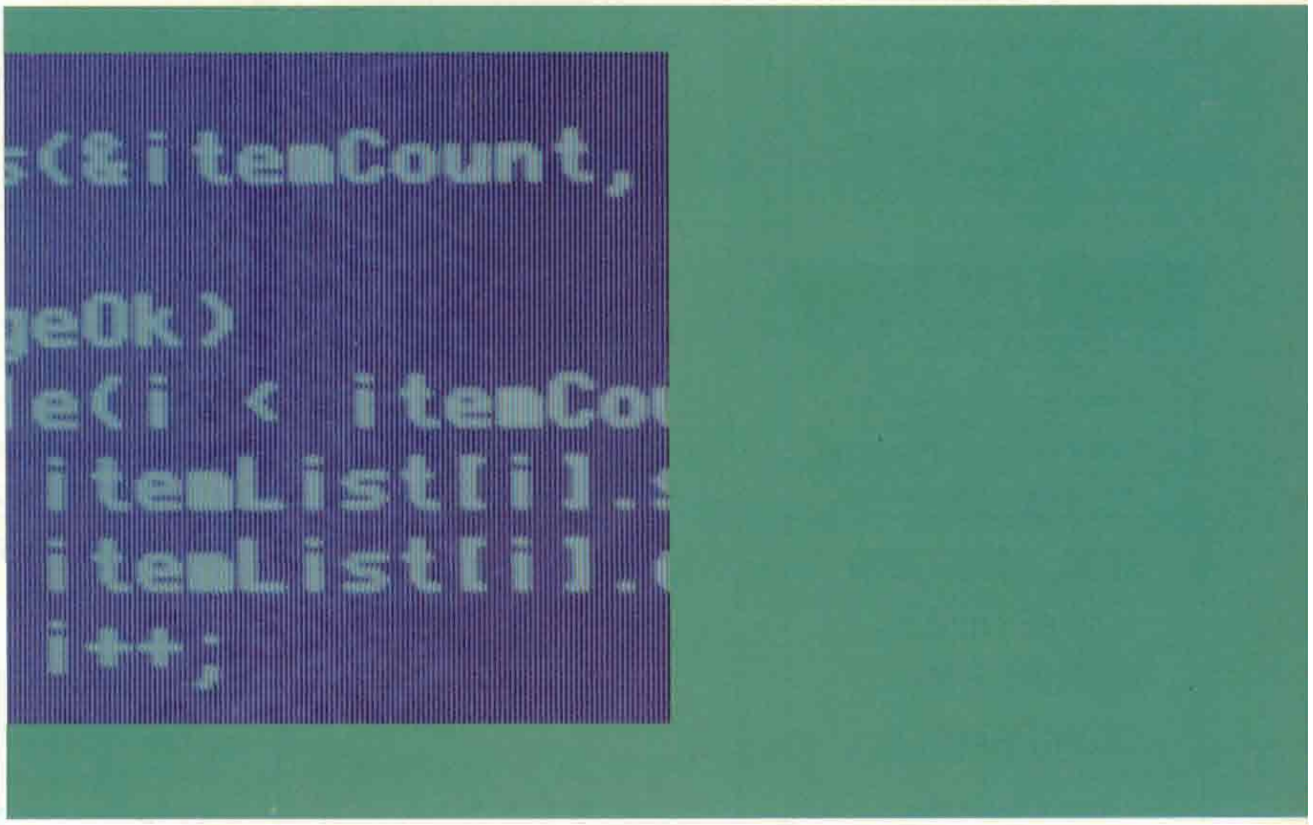
Designed to deliver often overburdened RAM in PC's used in CAD/CAM desktop publishing and other intensive business applications, two AutoKey hardware products provide nonvolatile storage of macros outside the personal conputer's own memory system. The AutoKey 20/20 has a keyboard attachment that provides up to 400 programmable keys with total storage of 8,000 keystrokes. It plugs in series with any PC/AT/XT or PS/2 keyboard and is completely compatible with all operating systems and application software. A keyboard overlay is provided as a user aid.

A smaller capacity system, the AutoKey 40 operates the same way as its big brother but is designed for smaller macro requirements. It stores 2,000 keystrokes for a total of 40 different macros in its own nonvolatile RAM.

Contact Mextel Inc., 159 Beeline Dr., Bensenville, IL 60106; (312) 595-4146,

Circle 397 on reader card

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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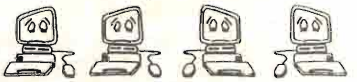

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[CALENDAR]

[JUNE]

21-24: "The Consultant as a Professional" is the theme for the Independent Computer Consultants Association's annual conference at the Catamaran Resort Hotel in San Diego, CA. For more information call 1-800-GET-ICCA or write ICCA, 933 Gardenview Office Pkwy, St. Louis, MO 63141.

[JULY]

9-12: HP Computer User's Conference and Exhibition in Brighton, England. The theme is "Signposting the Nineties" and is hosted by the HP 3000 Users Group and the HP Desktop Users Group. Contact Lesley Brandwood, 07356 2998 or the HPCUA, at The Twenty One Building, 21 Pinner Rd., Harrow, Middlesex HA5 2QR; 01-427-5100.

11-14: The 1989 Institute in Computer Science is sponsoring a course, "Writing Better Computer Software Documentation for Users" at the University of California, Santa Clara. For more information call (408) 429-4535.

11-14: SPSS is sponsoring the session, "SPSS/PC+: Introductory and Advanced Topics" in Chicago, IL. Contact the SPSS Training Department at (312) 329-2400.

13-14, 24-25: Symantec Corp. is holding a workshop for Time Line Version 3.0 users in San Fransisco, CA. Cost $400. Contact Training and Consulting Division, (415) 898-1919.

[AUGUST]

4-5: The Oregon Regional Users Group, ORERUG is holding its annual meeting at the Newport Hotel, Newport, OR. This year's topic is "Future Strategies." Contact Lois Anderson, (503) 683-5700.

10-11: The Southern Regional Users Group, SERUG, is holding a two-day meeting and vendor show at the Hyatt-Regency in Savannah, GA. Meeting fee $40 per day. Contact Tom Brightwell, 2381 High Forest Court, Atlanta, GA 30136; (404) 729-1903.

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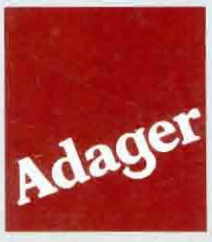

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