HP Professional

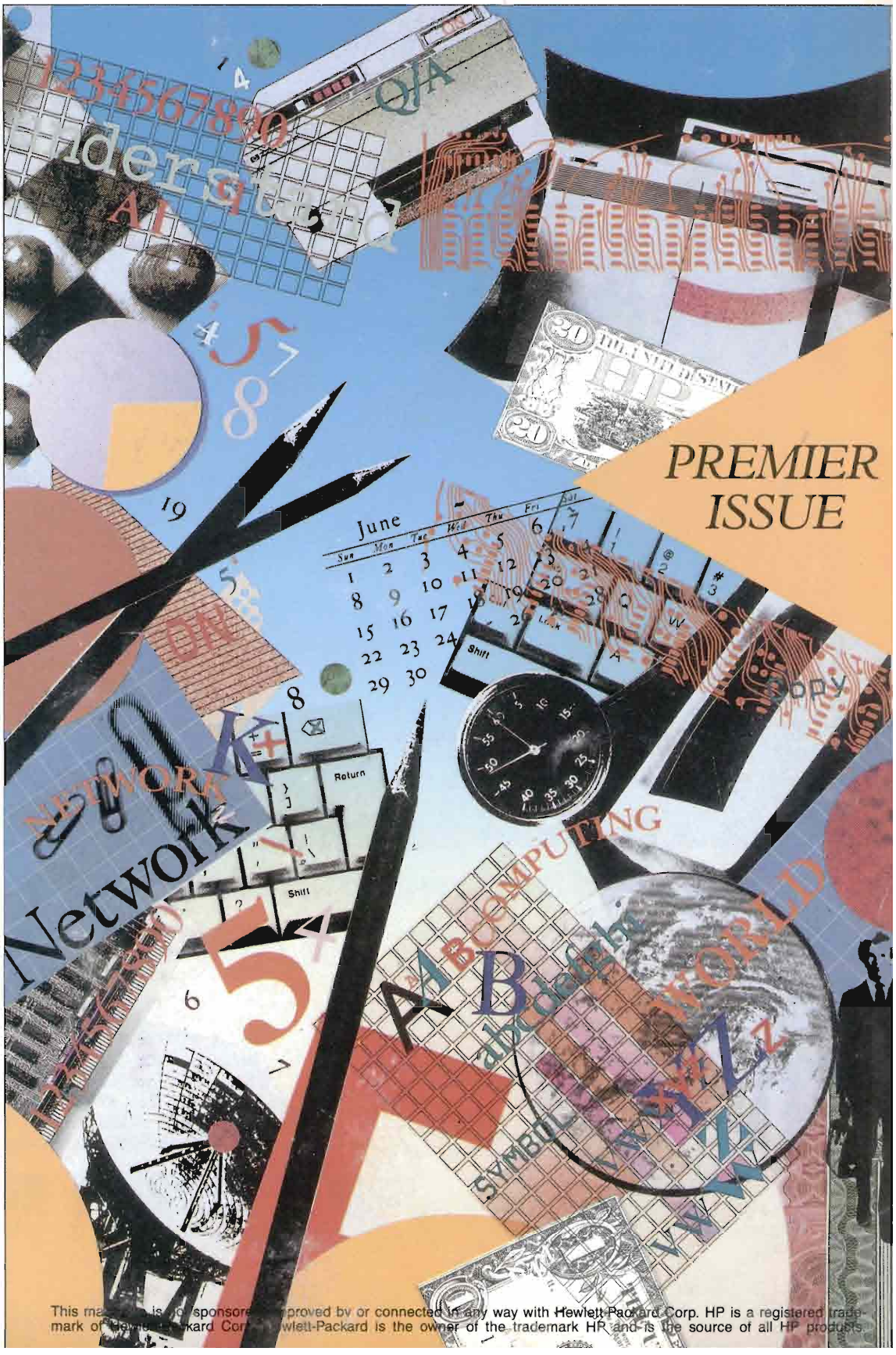
THE MAGAZINE FOR THE BUSINESS & PRACTICE OF HEWLETT-PACKARD COMPUTING

MAY 1987 ■ VOL. 1, NO. 1

- Manage Your 3000 System Effectively
- 4GLs Make Life Better, Not Simpler
- SPL Sails To C Port

FOCUS

HP Strikes Dominant Desktop Publis



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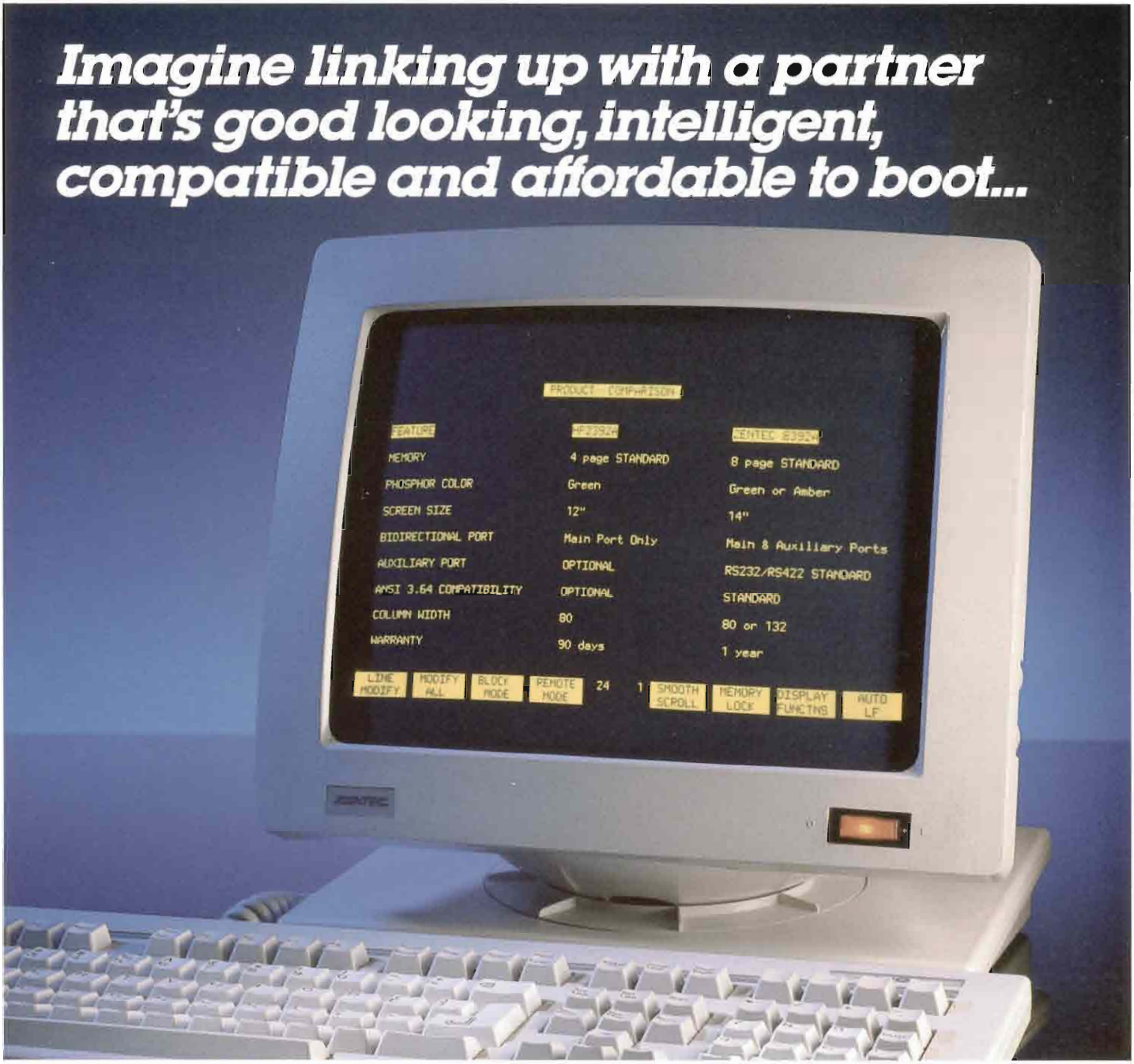

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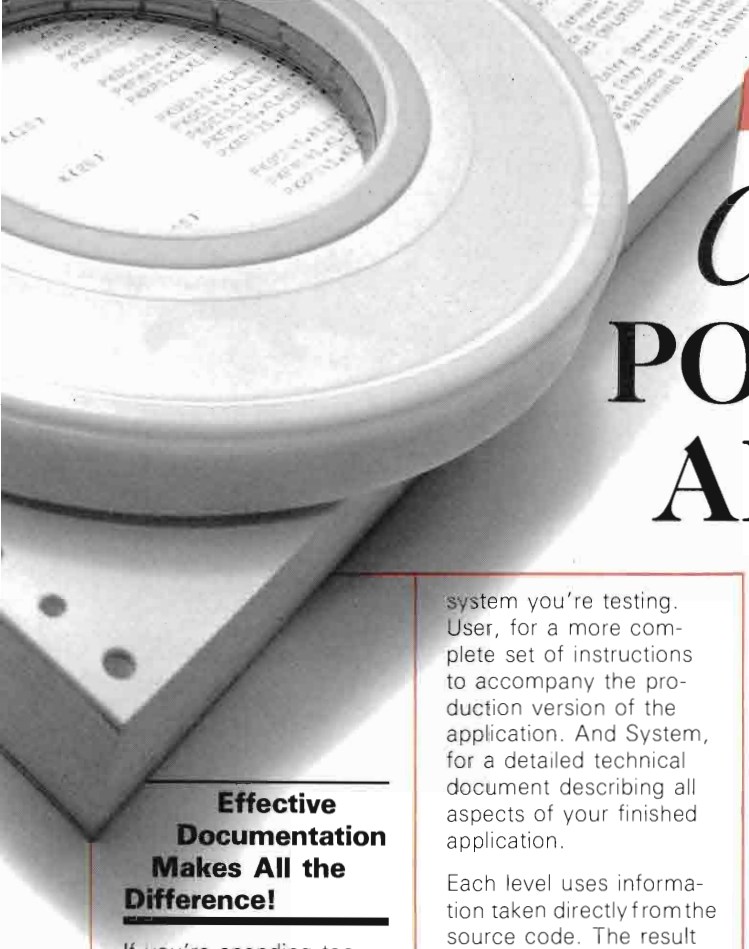

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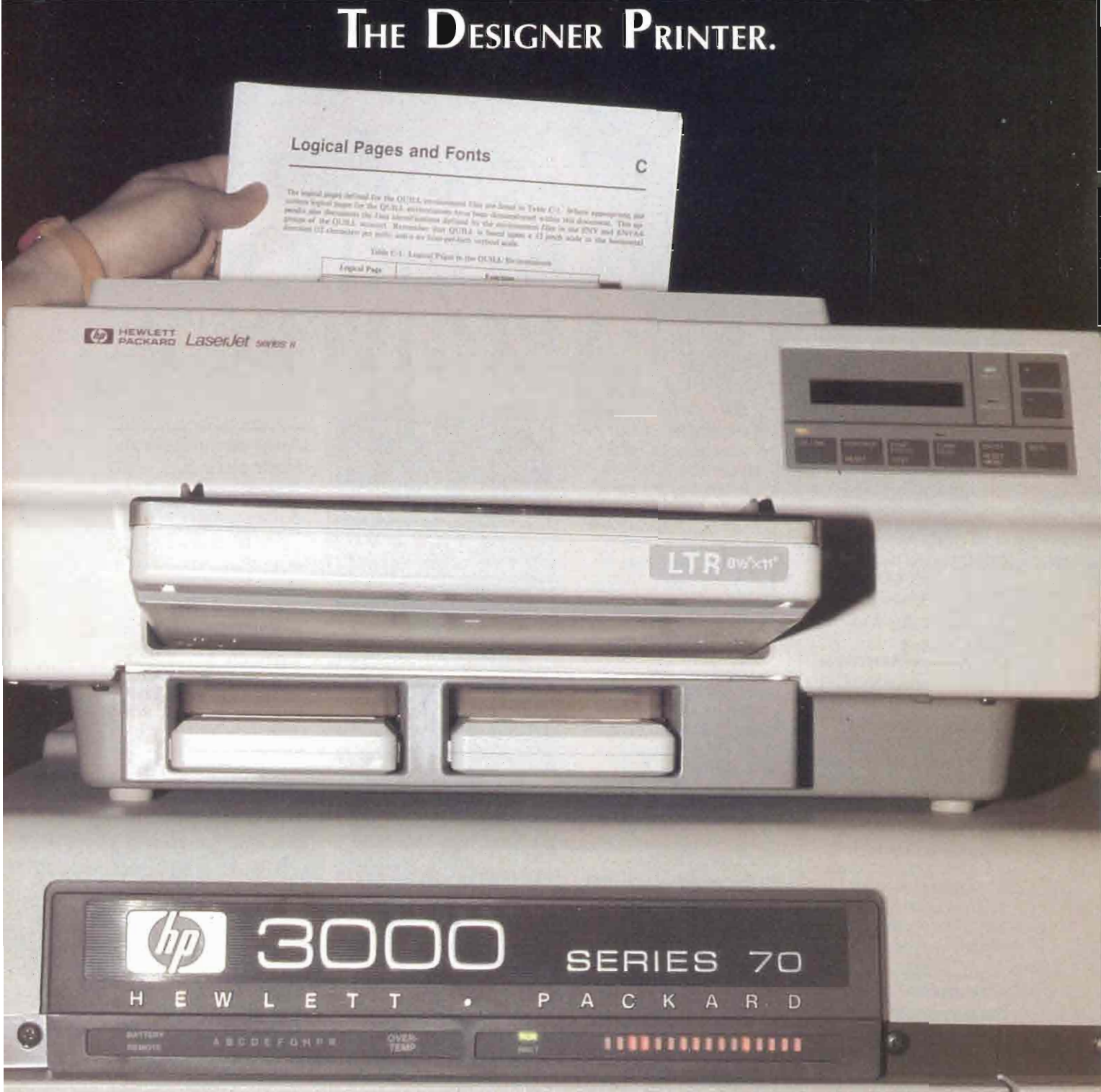

TDP and the LaserJet with PSP/Plus.

If you use TDP, you probably fall into one of two classes: you either have a laser printer, or you want one. If you already have a laser printer, you're probably used to producing high-quality illustrated documents at a whim. If you don't, you're probably working with a daisy-wheel printer regarded by its users as a faithful but aging pet spaniel.

PSP/Plus and the LaserJet can provide you with all the benefits of laser printing at about a quarter the price of the HP2688: full graphics capability, up to 31 fonts in a document, forms, borders, logos — in fact, almost everything that TDP can make a big laser printer do. It works with popular "front end" processors, too, as well as the TDP Mailer facility. In fact, with PSP/Plus, the LaserJet can be used with *your own applications and with HP software:* HPDraw, DSG, HPEasyChart, HPWord, IDS and IFS all work with the LaserJet, thanks to PSP/Plus.

So if you want to replace the aging daisy-wheel printer, or get to all the power that TDP *really* has, or just want to avoid walking four blocks to the data center's HP2680, try a LaserJet: with PSP/Plus, the LaserJet has joined the HP3000 family.

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COVER

The colorful collage on this month's cover was created by Boston-based artist Karen Watson.

Portions of the collage illustrate articles throughout this premier issue, and will be used in future issues to enhance our focus on Hewlett-Packard business and technology.

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HP Professional

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BPA Membership applied for 4/87.

Smoot Point

The U.S. position in the recently imposed trade tariffs on certain Japanese export computer and electronics products is disingenuous at best. The official line goes something like this: "We're forced to take this serious action to prove to the Japanese that we won't be economically pushed around anymore." But on the other hand, don't take it *too* seriously, because we're really doing it to keep Congress from enacting its own tariff or embargo.

It may be too little too late for the semiconductor industry, but should it have been done at all? The last time the U.S. decided to "level its playing field" was via the Smoot-Hawley Tariff Act, which may not have caused the Great Depression, but it certainly broadened and deepened it.

More recently, witness the result of the temporary (now six years worth of temporary) "voluntary" limiting of Japanese car imports, urged upon them to avoid stiff quotas in reaction to the beached-whale spectacle of the U.S. auto industry.

Instead of saving the U.S. auto industry, we now have a practically U.S.-sponsored cartel of Japanese car makers both importing directly and operating under wide-ranging variations on the joint-venture theme with American manufacturers that reduces "Made in the U.S.A." to nothing but rock'n roll. Japan's benefit by limiting exports to the U.S. is increased demand, which results in higher sticker prices and profits.

Japan does impose serious barriers to U.S. imports. However, it's misinformed to suggest that we don't tacitly embrace similar policies, both in terms of import quotas and tariffs and export subsidies. Today, we demand "voluntary" restraints from foreign steel producers, subsidize agricultural exports, restrict sugar quotas, impose lumber and textile import tariffs, and threaten our Common Market friends.

It appears that we want to exploit cheap offshore manufacturing when it suits our purposes. When the new CEO of a small, nearly bankrupt U.S. manufacturer of digitizers decisively moves to "save" his company by firing most of the manufacturing division employees and moving all production to Korea, it's considered astute management.

U.S. companies like Tandy import virtually all their computers from laptops to PC clones from Japan. What makes the Japanese-owned Toshiba or NEC computers (both affected by the new trade tariff) more odious to the U.S. than American-owned but Japanese-manufactured Tandy products (NEC makes the Tandy laptop)? Why is one undermining the free market and the other not?

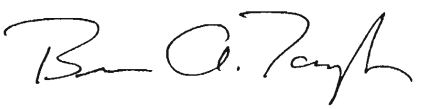
We would do more to "level the playing field" if we took a substantial whack at the national debt and deficit rather than doubling the price of Black & Decker drills. We probably could've accomplished more if we hadn't kicked American industry in the shins by removing the investment tax credit.

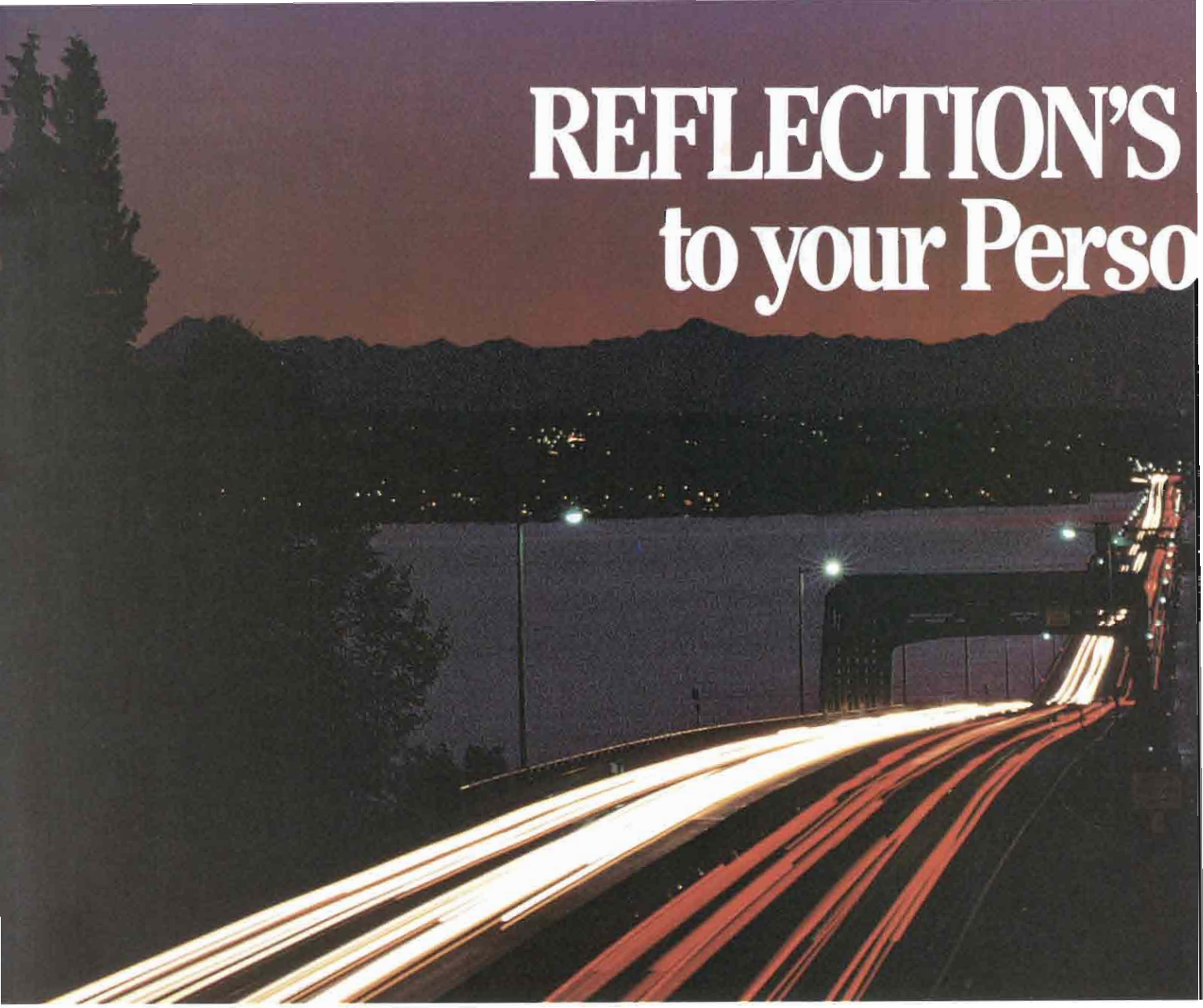
If what we're really concerned about is the macro impact on our national economy of the bilateral trade deficit we have with Japan, we have other solutions. Protectionism is an anachronism in the complex fabric of the world's economy.

What would many manufacturers do if cut off from their off-shore suppliers? Or cut off from exporting or manufacturing and selling outside of the U.S.? After all, Ford Motor Company's overseas ventures are largely responsible for its current resurgence.

Likewise, Hewlett-Packard's overseas computer sales were its fastest-growing and most successful component last year. Does HP have much to lose in trade wars where retaliatory measures are taken by governments of its foreign supplier nations? One of its currently most important products, the LaserJet, employs a Japanese-built laser engine.

The Japanese aren't "right" in their current trade practices, but then, neither are we. Leveling the playing field shouldn't be only a euphemism for unwarranted protectionist policies. Perhaps the "fixes" at home are too difficult politically, but I suspect, as Pogo once said, "We have seen the enemy, and he is us!"





The leading HP terminal emulation software joins the leading data extraction utility to make downloading of data from the HP 3000 to PC based spreadsheets and databases easier than ever.

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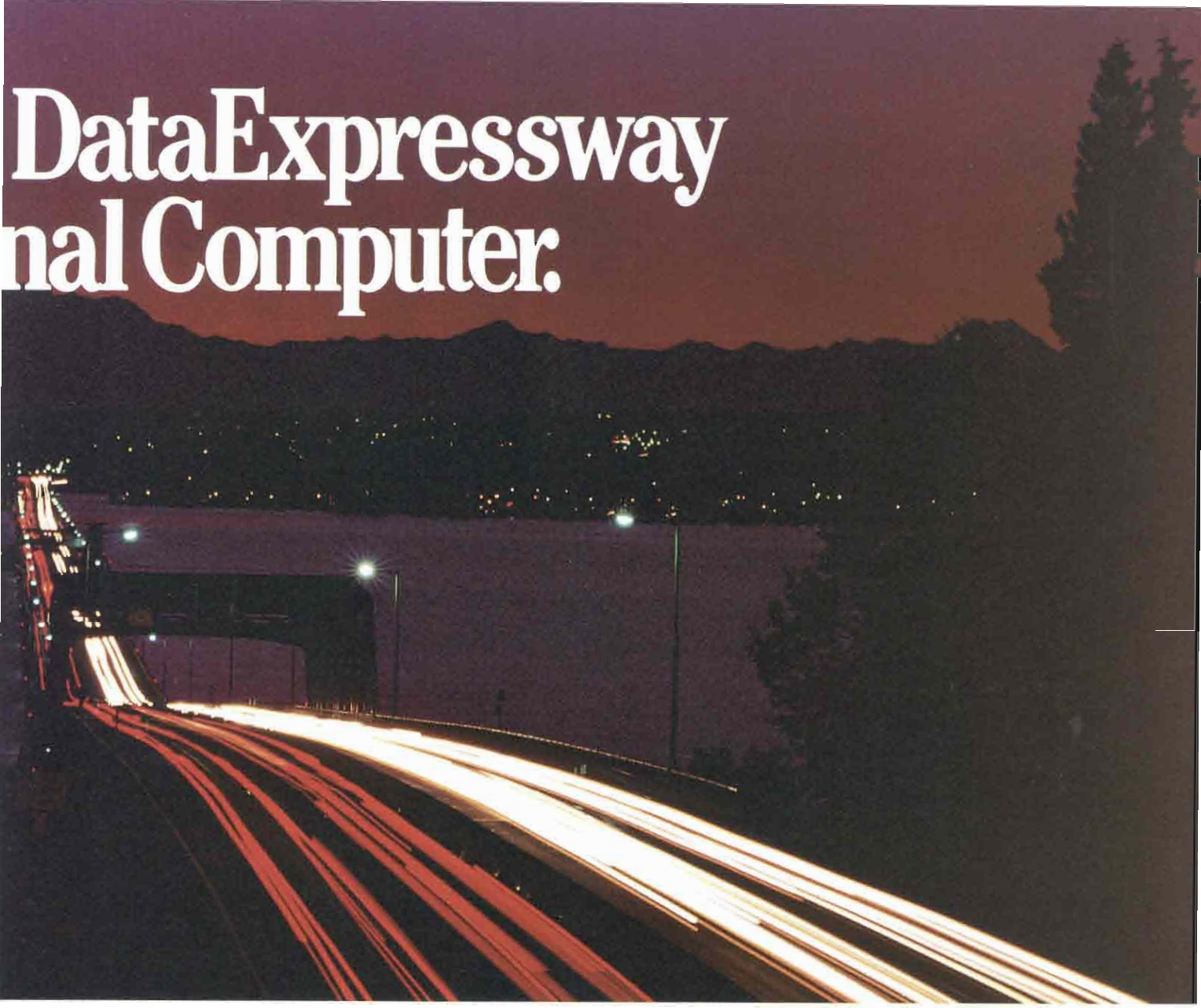

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NEWS & TRENDS

High-Quality Scanners And Facsimiles

They're In Your's (And HP's) Future

As this issue goes to press, Hewlett-Packard is about to reveal its product and marketing strategy for desktop publishing for the near term. Unlike in most of the computing market sectors where HP competes, the company is in a clearly potent leadership position in desktop publishing. And as long as everyone agrees that there's such a beast at all, HP is a factor to be reckoned with. Some 300,000-plus LaserJets at work around the world tend to ensure that.

Part of that strategy will involve a key new product offering and its future iterations — the desktop scanner. A recently published study by *microPublishing Report* (Redondo Beach, CA) says that the desktop scanner business will pass the $1 billion dollar mark by 1990. **THE LEADER** in that business is currently Canon, the OEM supplier to Hewlett-Packard for both the LaserJet printer series and the new ScanJet engines. Canon supplies several second-tier vendors such as Taxan and Princeton Graphics (there are a couple more). At the moment, it doesn't supply Apple with scanner technology.

Therefore, at least until Canon also powers Apple scanner products, it's a good bet that HP can lay claim to a relatively large chunk of the scanner market — which is really a subset of office automation and desktop publishing, two broadly defined applications zones into which HP has remarkable penetration based on its Canon-powered LaserJet series.

OTHER SCANNER makers include Ricoh (who probably is the number two supplier of the moment for scanners) Dest, Microtek Lab, Panasonic, Sharp and Hitachi.

But for now, HP is in the driver's seat from both a present and future market share standpoint and a technology perspective. ScanJet is plowing new turf that rapidly will expand the market.

In understanding HP's position, it's important to understand another factor often ignored in this headlong rush to get desktop publishing software and peripherals in the hands of ever greater numbers of PC users: Who most needs desktop publishing functionality? Where will the greatest application leverage occur? Is it the fly-tying enthusiast who wants to spread his message of joy to a thousand or so ardent fellow fishermen?

PROBABLY NOT. Instead, it's the industrial and commercial corporate user with the need to churn out endless reports and documentation, resulting from an MIS database, to intended readers who vary in their quality expectations from the low-end of the weekly company chat sheet to the annual report to shareholders.

Who has the advantage in this market position? Computer makers who have, on the one hand, a large installed base of corporate or departmental minicomputers and, on the other hand, have desktop workstations and laser printers.

You can do the necessary arithmetic with fewer fingers than most of us have on one hand to figure out how many skaters there are on that pond. And HP certainly is one of those two or three fingers, and clearly the biggest.

That would tend to explain HP's seemingly disproportionate interest in this whole market area. It also explains why companies like Walker, Richer & Quinn and Tymlabs are offering HP terminal emulators for the Macintosh. HP's one weakness is in its PC or Vectra display systems for WYSIWYG text and graphics merging and manipulation.

THE MAC HAS requisite graphics display, but it doesn't represent a formidable enough networked PC-to-mini commercial installed base.

Therefore, the Mac's just right for the fly-tyers' newsletter publisher, but less right for where the real desktop publishing needs are.

Back to technology for a sec. Delivering real gray-scale values (as opposed to the inherent optical lie of the so-called dithering effect) and being able to manipulate images without a corresponding deleterious effect on resolution have been the hang-ups, to date, for scanner technology and, therefore, desktop market expansion.

HP resolves that in an evolutionary way, because it's able to pass gray-scale information about each pixel to the host computer. Each and every pixel can be given a value from zero to 15 as a four-bit binary number.

That allows the host to do the mathematics that result in a simulation of gray.

Continued on p. 14.

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DESKTOP PUBLISHING

Bruce A. Taylor

Reversing Earlier Page-Description Decision

HP Now Will Support DDL And PostScript

On April 28 in New York, HP reversed an earlier decision on its support of a high-level document description language and announced that it would provide support for both DDL and PostScript in addition to its own PCL (printer command language).

To the world of desktop publishing, this is good news. HP will offer users support for both available page description languages. How, when and how much are yet to be determined.

In mid-1986, computer-aided publishing vendors, users and analysts were surprised by HP's announcement that of the two high-level page description languages available — Document Description Language (DDL) from Imagen and Postscript from Aldus — the company would support the former with its Vectra Publisher system. It had been assumed the company would choose the more popular of the two, and the one that IBM most likely would (and, as it turns out, indeed will) support.

HP had hoped that by announcing its support of DDL, it could press its considerable strategic advantage of its market-dominating installed base of laser printers (400,000 now, say HP sources) and its AT-compatible turnkey desktop publishing solution. On April 28, even before it had an implementation of DDL ready for market, the company quietly slipped in the announcement of its new gambit during a day-long media briefing on HP's technology and market strategy for desktop publishing.

According to Steve Simpson, marketing manager for HP's office printers, the decision was "a reflection of market reality that a lot of users had requested PostScript."

According to HP officials, DDL and PostScript support most likely will be offered two ways: one, as an add-in controller card for the computer, the other as an on-board controller option for the LaserJet printer.

Bob Puette, general manager of HP's personal computer business unit, said the trade-offs in determining which option to use would be one of performance versus integration. If the implementation of the page descriptor is in the host PC, it provides the "potential for higher performance, but the trade-off is that it limits the sharing of the printer."

The company took the defensive action in order to better protect the current market lead for its LaserJet series of products and better the chances of its new scanner and bundled system in the wake of IBM's recent announcements.

HP will continue to support PCL, its original printer driver language that has become a de facto standard. PCL has limited functionality for higher-level desktop publishing tasks.

Senior vice president of HP's Business Systems Sector, Doug Chance, predicted a "shake-out" in the laser printer industry which is now crowded with 16 vendors. "We expect a significant change," he said, "with growth of laser printer sales slowing to 14% a year." But he said that he believes desktop publishing systems where there's the added value of software and peripherals such as scanners could grow at an annual rate of up to 60%.

The HP briefing themes were clearly standards and integration. Throughout the day, HP officials stressed that the growth in desktop publishing will not be by the virtue of standalone workstation systems, but by networking, communication and connection with multiple information sources and data processing vendors and systems.

As part of that overall philosophy, HP also announced that in its implementation of the MicroSoft Windows user interface, an object management facility is being added. Chuck Jepson, director of office marketing, said the interface, which runs underneath MS Windows, would "allow the user to name any document by his own personal convention regardless of the data, and the system has to provide that identifier, regardless of the source."

The HP spokesmen said the company will be adding to its product lines in the near future. Bob Puette said users could expect to see a new computer model from HP based on the Intel 80386 32-bit processor and MicroSoft's OS/2, as well as additions and enhancements to its desktop publishing system, including higher-resolution graphics display subsystems for true what-you-see-is-what-you-get functionality and color graphics output probably from thermal ink-jet printers as an enhancement to laser-printed documents.

While HP's avowed strategy is to target the general office user of desktop publishing systems, officials acknowledged on-going discussions with vertical market vendors to the high-end of applications of computer-aided publishing. Integrated office systems and information management are slices of the data processing market that HP says will grow by a magnitude of 10 by the year 1990 — and that document publishing will be part of that growth trend.

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Or you can create a sophisticated combination of text and graphics. With additional plug-in memory, you can also produce full-page 300 dpi graphics, like our Nuts form shown below. To do this, we used HP's new ScanJet desktop scanner, Microsoft Windows and Pagemaker® from Aldus.

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The result is that a publishing program like Aldus *PageMaker* or a sophisticated page description language can handle and know what to do with a gray-scale image in terms of manipulation — enlargement, reduction, cropping.

ScanJet is also an advance over its competitors for another reason — it can do dithering as well, but with a feature that allows it to scale photographs before dithering (important to newsletter publishers or those using a scanner and laser printer for page dummying and proofing before going to a phototype- and image-setter). The feature acts sort of like the optical scanner used with the reduction capability of a photocopy machine.

Other scanners force the user to dither at full scale, so that when the image is manipulated at the next stage, the dithering that faked a gray-scale result at full scale gets distorted and significantly reduces the resolution. What starts at 300 dots per inch quickly can deteriorate to 60 or 75 dpi.

STRANGELY ENOUGH, that's not even the big news on the scanner front. While the HP/Canon scanner now can do a realistic 16 scales of gray, what users are awaiting, says *microPublishing Report* publisher James Cavuoto, is 256 gray levels. And he says that's about a month away from being a real product. Datacopy will have a Ricoh-engine scanner within the month — soon to be followed by Microtek.

With 256 gray scales, desktop publishing is a clear competitive reality to commercial publishing methods. For newsletter publishers, this now means so-called publication quality and true page-makeup capabilities. For "professional publishers" using PC-based systems, this means that images grabbed via a desktop scanner can be output to the laser printer in a fashion that broadens the definition of what-you-see-is-what-you-get to include quality.

For professional publishers who still require higher than 300 dpi for commercial printed pages, including in-house technical documentation, annual reports, etc. intended for an out-of-house or stockholder-level readership, it means dummying and proofing at a much higher quality and precision value that results in time- and money-savings in the image and phototypesetting stage.

So, what's the next desktop imaging wave to catch? By 1990, image facsimile will become more important than image scanning as a spur to sales, asserts Cavuoto and co-authors David Pope and Barbara Robertson. As scanner products improve, so will facsimile products.

VIDEOTEX and other on-line information services have failed to meet the glowing projections of two or three years ago (Videotex, in fact, in the U.S. at least, is commercially dead), because the intended user public ultimately revolted from getting its information either scrolled by on a monitor or printed out to more visually boring hardcopy. Where Videotex lives, it lives as an extension of corporate electronic mail. General Foods has such an enhanced on-line management information system that includes graphics.

According to laser and electronic imaging industry-watcher Jim Cavuoto, we're one step from having facsimile machines that will render quality on the receiving end that equals the quality on the sending end.

For instance, an image scanned in at 300 dpi will be transmitted at 9600 bps to a remote site and printed out at the same resolution with none of the obnoxious paper and chemical problems of current commercial faxes. Likewise, an image — to include page images of a newsletter or other communication with merged text and graphics — may be sent at high data transmission rates from its point of origin on your display to a laser printer at a remote site using a fax network.

So, interoffice, intercompany communications soon may never go to hardcopy until they reach their destinations.

YOUR OFFICE WILL leave its laser printer on overnight, and, when you arrive in the morning . . . voila! . . . the five copies of the company quarterly report intended for your staff will be waiting. And the promise of really timely (within the hour) information in a form that engenders readership will be upon us.

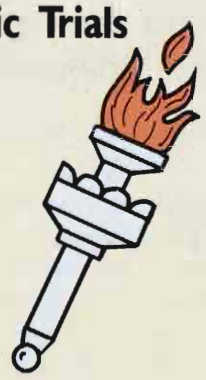
Hewlett-Packard's part in that will be challenged, but this time it's on their home ice.

—BAT

The new ScanJet scanner from HP.

Speedware Wins Olympic Trials

Infocentre To Provide 4GL



When the more than 3000 top amateur athletes meet and compete in the US Olympic Festival, July 13-26, in Raleigh, NC, it'll take a lot more than guys with whistles around their necks and clipboards in hand to keep things operating smoothly and the information flowing.

During the long winter months while future Olympians have been training, North Carolina Amateur Sports association (NCAS) data processing manager Vern Bullock has been working against the clock, as well, to create a large-scale athletic event management information system using a fourth-generation language (4GL) running on a Hewlett-Packard donated 3000 series 70 computer.

Infocentre (Toronto, ON) is the provider of the 4GL applications development software — its Speedware and Micro Speedware products — which Bullock says meets his requirement for an "easy piece of software that would allow volunteer applications developers a way to quickly and easily [write programs].

"With Speedware, we'll be developing a large-scale media system to serve the 1500 members of the international press who are expected to [cover the events]." The system will include results tracking, scoring, statistics, biographical information on the athletes, vehicle tracking, transportation scheduling, event tracking and inventory control.

Enter 944 on reader card

HP Signs Worldwide License With Holland House

Grants HP Worldwide Use Of Unispool

HP has signed an agreement with Holland House (Beeville, TX), an international company, that grants HP an unlimited license for the worldwide use of Unispool in the HP internal information system environment.

Unispool is a 3000 network spooling software package. It allows users to spool output to any printing device in their network.

Holland House provides solutions to the problems of supporting sophisticated data communications in an HP 3000 environment by developing network management products.

Enter 945 on reader card

Gould To Market HCR C Optimizer

Operates On Gould PowerNode

HCR Corporation (Toronto, Canada) has delivered to Gould Inc., Computer Systems Division (Fort Lauderdale, FL), an optimizing version of the compiler for the C programming language. It operates on the Gould PowerNode under UTX/32, Gould's version of the UNIX operating system. Gould, in turn, will remarket the compiler to its customers.

The compiler enhancements are based on HCR's Portable Code Optimizer (PCO) which allows C to produce faster code. This boosts performance for programs written in that language. HCR integrated PCO into Gould's existing C compiler and tuned the optimizer for higher performance on the Gould PowerNode hardware. On other manufacturer's architectures, PCO is also available for FORTRAN.

HCR is a software development company with a strong emphasis on UNIX systems. It works and sells to large corporations and specialist-type firms around the world.

INFO 87 To Host Most Mainframe Companies In History

To Be Held At Jacob Javits Convention Center

INFO, the largest event devoted to information systems for business, will host the broadest array of equipment and systems in its history when it opens in New York in September.

Mainframe suppliers and telecommunications companies will increase their participation in the 14th annual Information Management Exposition and Conference, INFO 87, at the Javits Convention Center, September 29—October 2.

Amdahl and Storage Technology will join such industry stalwarts as IBM, Hewlett-Packard, NCR, Honeywell and UNISYS in demonstrating their products. Among the software vendors serving mainframe users are ADR, Candle, Cincom, Computer Associates, Cullinet, Information Builders, Martin Marietta, Oracle, SAS Institute and Software AG.

Data communications suppliers also will be exhibiting, including Bell Atlantic, ITT, Motorola and Universal Data Systems.

In the area of minis, INFO will include exhibits from AT&T, CPT, Digital Equipment, Harris-Lanier, Hewlett-Packard, NCR,

Honeywell, IBM, Nixdorf, Prime, UNISYS, Wang Laboratories and others.

INFO's coverage of the PC market also has expanded.

The conference, which traditionally has drawn the largest audience at any information systems event, will be substantially enlarged in 1987 and is expected to include individual groups of sessions for executives concerned with the information needs of specific industries, such as manufacturing, banking and finance.

"INFO has consolidated its position as the prime event for Fortune 1000 DP/MIS executives, because it is the only place where they can find PCs, minis and mainframes together with the software, local area networks and security systems needed for a complete system," said Frank Fazio, the show manager. "But INFO retains its broad appeal for small business as well, because information management is now recognized as a central function of any size business."

Further information can be obtained by writing or calling Show Manager, INFO 87, 999 Summer Street, Stanford, CT 06905; (203) 964-0000.

The Instruction Set To Distribute HP's X/OPEN for UNIX

To Provide Training, Support On NLS

The Instruction Set (London) will distribute worldwide the HP implementation of the X/OPEN internationalization interface known as the native language system (NLS).

As technical consultant to X/OPEN in the preparation of the Developer's Guide To Portability, The Instruction Set was involved in the work on internationalization. It will provide training, consulting assistance and support on NLS, as well as distribute source code directly to European customers. Associate companies Interactive Systems Corporation and Lachman Associates will distribute in the U.S.

The Instruction Set is Europe's leading information technology transfer company specializing in system software. Services include education, technical consulting, support and technology licensing. It is the official European UNIX System V support agent for both Intel and Motorola and co-developed the System V implementation of Sun's Network File System (NFS) with Lachman Associates.

Enter 949 on reader card

WIS Formed As Independent Business

Planning 50/50 Sales Split

Weyerhaeuser Company (Tacoma, WA) has formed Weyerhaeuser Information Systems (WIS) as an independent business.

WIS, Weyerhaeuser's information systems staff organization for over 25 years, was formed for two primary reasons, according to Frank Guthrie, WIS general manager. First, WIS has a broad line of information systems and services that are proving to be marketable both in the Puget Sound area and in selected national markets.

Second, as an independent business, WIS will help Weyerhaeuser Company make its own use of information systems more cost efficient, thus improving profitability.

"While Weyerhaeuser is currently WIS's largest client, 10% to 15% of our revenues will come from outside sales this year," Guthrie said. "We plan to have a 50/50 sales split between Weyerhaeuser sales and local and national third-party clients within three to five years."

WIS products and services include computer services, professional development seminars, disaster recovery services, telecommunications services, applications software and consulting in a variety of other areas including micro, mini and mainframe computers.

WIS's computer services include access to a library of business application programs; program conversion services; product selection, training and maintenance services; distributed computing services; and access to WIS's wide variety of IBM, Honeywell and Digital mainframe computer systems.

Some of WIS's current clients include State of Washington/Department of Transportation, Airborne Express, Richmond School District, Crown- Zellerbach, Simpson Timber, Safeway and Washington Education School Districts.

On a national level, WIS is marketing its disaster recovery services and several software programs. Disaster recovery services help companies who rely heavily on uninterrupted data processing, such as financial institutions, to continue functioning smoothly in the event of a catastrophe.

Each of WIS's first three application software products was designed for Weyerhaeuser and is now being used extensively by the company. WorkSmart is a maintenance management system that helps companies control maintenance costs by keeping track of equipment maintenance histories and parts inventories. It runs on Hewlett-Packard, IBM and DEC minicomputers.

CompTrack and Excellerate run on IBM computers.

Enter 948 on reader card

Davis Computer Acquires Philadelphia Consultant

Data-Tek Provides HP Services

Davis Computer Systems, (Philadelphia, PA) data processing consultants, has completed the acquisition of Data-Tek, a Philadelphia-based Hewlett-Packard software and services organization.

Davis Computer Systems provides consulting and software services to industries and institutions in the Delaware Valley.

Enter 950 on reader card

Ellinor To Distribute Personal Touch Screens

Two-Year Agreement Signed

Ellinor Peripherals Ltd. (Reading, England) and Personal Touch Corporation (San Jose, CA) have signed an exclusive two-year, $4 million European distribution agreement.

Ellinor's sister company in the Sintrom PLC Group, Perex Ltd., will assemble the Personal Touch membrane touch screens and interface electronics into the European line of 10-, 14-, and 20-inch Sony monitors for Ellinor's distribution to VARs, OEMs and system integrators.

The Sintrom PLC Group represents numerous peripherals manufacturers including 3M, Control Data, Hewlett-Packard, Houston Instruments, Data Products, Epson, Polaroid, Kennedy and Conner Peripherals.

Ellinor has been distributing the Personal Touch line of touch screen components, touch screen monitors, add-on touch screen peripherals and touch screen software development tools since November 1985 and is Personal Touch Corp.'s largest distributor.

Enter 951 on reader card

HP Recommends NRC Fusion

Provides Vectra, 9000 Link

Network Research Corporation (NRC, Washington, DC) has announced a joint marketing agreement with Hewlett-Packard in which HP recommends NRC's Fusion Network Software to its customers requiring a network link between the HP Vectra and the HP 9000 systems.

HP recommends Fusion Network Software MS-DOS TCP/IP (Transmission Control Protocol/Internet Protocol) to provide a solution for connecting HP Vectras, IBM-AT compatibles, to the large HP 9000 UNIX-based systems.

Enter 953 on reader card

HP Certifies Vitalink's TransLAN

Connects Ethernet/IEEE 802.3 LANs

Vitalink Communications (Mountain View, CA) and Hewlett-Packard have completed a joint certification testing of Vitalink's TransLAN II bridge and HP's 3000 business systems. The certification establishes TransLAN II's ability to connect remote IEEE 802.3 (Ethernet) LANs that contain HP 3000 minicomputers.

TransLAN is a hardware and software system that transparently connects Ethernet/IEEE 802.3 LANs via terrestrial lines, satellites or both to form wide-area networks. LANs connected using TransLAN bridges appear to any LAN station as a single wide-area network. In addition, TransLAN learns the network configuration to make multiple changes easy to manage.

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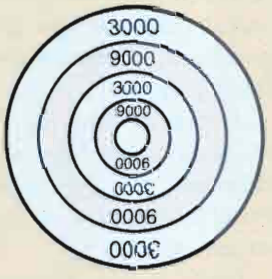
Pilot Markets Solutions With HP

To Target 3000, 9000 HP-UX



Pilot Systems, Inc. (Milwaukee, WI), a vertical software developer and distributor, has signed a software supplier agreement with Hewlett-Packard to market its software solutions on HP 3000 and HP 9000 HP-UX computers.

Targeting manufacturing, job shop and distribution markets, Pilot expects to sell between 50 and 60 HP-based solutions during 1987. Hardware offerings will range between $30,000 for an entry-level solution up to $300,000 for larger application requirements.

Entry-level software prices begin at $8,000 for a job shop solution, $10,000 for distribution and $20,000 for manufacturing, with ranges to $100,000 for a full MRPII implementation.

Pilot Software is a set of fully integrated, on-line, interactive, real-time systems that provide financial, distribution, value added distribution, manufacturing and job shop solutions.

Enter 954 on reader card

INDUSTRY WATCH

Carl Marbach

An Analogy and Spectrum's Promise

HP And The History Of DEC

The parallels are many between Digital Equipment Corporation and Hewlett-Packard. Both Companies have made their marks in the minicomputer field with superior scientific, technical and commercial computer systems. It might be said that they compete for mid-range systems purchasing dollars that elude IBM. It's predictable that HP, DEC and IBM will be THE big three in the 90s.

Today, HP is amidst a fundamental change in its computing philosophy moving from multiple architectures (HP 3000s, 9000s, 1000s, etc.) towards a single reduced instruction set computer (RISC) architecture. What this change is and what it'll mean to the large current installed customer base as well as to future, new HP customers is worth reflecting upon.

A look at what happened in the DEC world when it moved to a new architecture, the VAX, may show us some of the things we can expect in the next few years.

In 1977, DEC announced a new processor called the VAX 11/780. There's much in a name. VAX stands for Virtual Address eXtended. This name was chosen because the VAX was a move from the PDP-11's 16-bit architecture to the 32-bit architecture used in the VAX. The 32 bits allowed extended addressing of up to four gigabytes of physical or virtual memory. The extended architecture also included a very "rich" instruction set with many scientific and commercial functions rendered into the language of the VAX CPU.

The "11" in VAX 11/780 indicated some kind of souped up PDP-11. It wasn't.

In fact, a VAX running in PDP-11 emulation mode and executing PDP-11 instructions was no faster than the high-end PDP 11/70. In many cases it was actually slower. (Is this beginning to sound like familiar territory, based on recent news reports regarding series 90/HP Image throughput?)

The key here was *running PDP-11 code on a VAX was a mistake.* In order to take advantage of VAX features and capabilities, the architecture had to be taken into consideration and used.

Some things a VAX did poorly. In the original implementation of the VMS (virtual memory system) OS, terminal handling was abysmal.

The first VAXs were saturated when supporting as few as 32 terminals, while the older PDP-11s supported more than twice that amount. Later releases of the OS fixed this problem.

The lesson here is that initial releases of operating systems will reveal problems that the engineers in the laboratory didn't address properly.

Early reports on the Spectrum is that operating software, particularly in the performance area, has been one of the chief reasons for delays. We can and should expect some deficiencies in early versions of the operating system.

The VAX 11/780 was the *only* VAX processor for two years. And just three models appeared in the VAX's first four years. When the architecture was defined, it took DEC some time to fully implement the range of hardware available today. Once the ball got rolling, it really picked up speed. Hardly three months goes by now without another new VAX announcement.

Part of the early VAX hardware problems were with the complexity of the VAX CPU and its complex instruction set. Making a new processor was time consuming and expensive. One of the benefits of RISC technology is that it should be less expensive and take less time to develop new CPUs in the Spectrum line.

VMS was also improved significantly in the early years. The software almost always lags behind the hardware. Hardware for clustering (DEC's method of tightly coupling CPUs) was available before full software support that allowed full functionality from the cluster.

We expect that full Spectrum functionality won't be available immediately either and that each new release of the operating system will bring enhancements that will begin to fulfill the promise of the new architecture. By understanding what *can* be done, we can predict what will be done by the software engineers.

Spectrum

Spectrum computers will fit the same mold as the early VAX series. Hewlett-Packard calls the current Spectrum models the HP 3000 series 930 and series 950. Like the "11" in the first DEC VAX, the "3000" in the first of the new class of machines is a misnomer. While it'll execute HP 3000 code, it does so in *emulation mode.* If you (and packaged software developers) don't use its *native mode* and its advanced features, you won't reap the promise of Spectrum.

SPL will work on the 930 and 950, but it'll generate 3000 code inside the machine, and thus it'll be a poor performer. Software Research Northwest has a Spectrum compiler for SPL that will generate native Spectrum code resulting in more performance. But even this won't fulfill the full value of the new line.

To take advantage of the new architecture and its capabilities will require enhancements to SPL. Full implementa-

tion power of the Spectrum in a language will require either PASCAL/XL or C/XL and others not yet announced.

Major software suppliers rooted in SPL are translating their products to the C language so that the native compiler on the Spectrum can create efficient machine code for execution speed. Just changing languages won't do everything, programming constructs and design must be re-thought to take advantage of new features.

To the user, and that means anyone except the hardware designers and production people at HP, RISC architecture shouldn't mean anything.

Reducing the *internal* instruction set means that HP can design and build a smaller, cheaper and faster CPU that utilizes only the instructions that are executed most often in a traditional machine.

Optimizing compilers, the key to RISC performance, will make maximum use of the large register repertoire in the CPU as well as its pipelining abilities. Even though a RISC subroutine may be needed to get the effect of a complex instruction set computer (CISC) instruction, the RISC subroutine will usually be faster because of its speed and simplicity.

Utilizing RISC, HP should be able to improve and expand the Spectrum product line faster than DEC was able to in the late '70s. RISC architecture will make the initial design, R&D and "getting into silicon" much more affordable up front.

What is the Spectrum/Precision Architecture (HP-PA) promise for the future? As in the case of the DEC VAX, Spectrum is a true 32-bit machine able to directly address large amounts of program and data. In fact, the Spectrum can use a whopping 48 bits to address more than 200 *trillion* bytes.

The ability to *directly* address large amounts of data and to have large programs means that users will never have to overlay again, and that internal data structures can be very large. But the real payoff is that operating system engineers can provide us with a working environment that far exceeds what they could build into earlier generation computers.

These fine engineers can finally build us an environment in which they can build the extensions of the future unhindered by address constraints. This will take time.

While the hardware folks are turning out *smallerfastercheaper* CPU products we'll still be waiting for much needed software enhancements. But they'll come.

The series 950's CPU is the first to exploit both the RISC architecture and HP's new NMOSIII VLSI chip which can process 6.7 million instructions per seconds.

Unifying The Architecture

Spectrum will be more than just a 930 and 950. The DEC VAX line now scales up from a tabletop VAX (about half the size of a standard IBM PC with the same performance and more memory than the 1977 VAX 11/780) to a room-size cluster of VAX 8800s yielding more than 200 times the CPU performance. The Spectrum line will in time span the same price/performance range. Small Spectrums will sit on desktops and large groups will invade the high end turf owned by IBM.

HP 9000 models will be transformed into variants of the Spectrum line, each doing what it does best, but using a common hardware architecture. The HP 1000 user won't be offered an HP-PA version of the 1000, but an applicable 9000-type computer, instead. Everything at DEC is now done on a VAX; small, single-user VAXs for CAD/CAM, larger one- or two-user VAXs for process control. Medium-sized VAXs run shop floors, large clusters are performing corporate data processing.

Inside DEC's large Postscript laser printer, two MICROVAX computers do all the work.

In a unified architecture, everything talks to everything, similar hardware is available for all the members and programmers make use of all the differing functionality available. Too much communication today really means "translation" to another dialect. That problem doesn't exist when all the processors speak the same language.

DEC used to have a 36-bit computer line fathered by the PDP-10 (nee PDP-6) which was one of the first true time-sharing computers. The end of this fine line of computers was announced in the early 80s and was met with loud howls and cries.

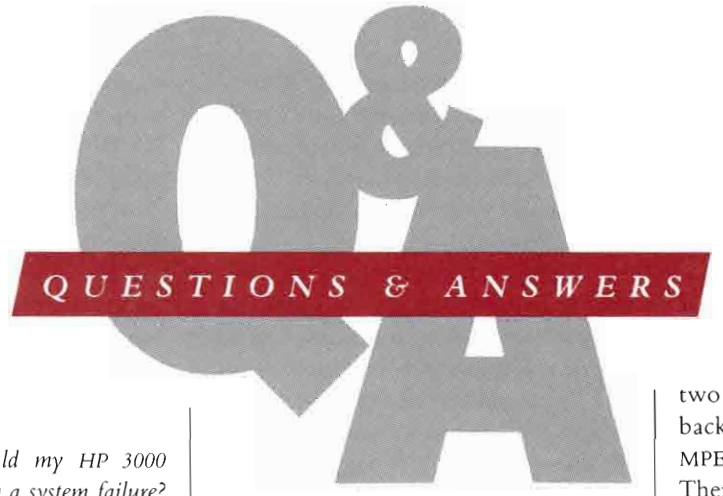
But DEC simply couldn't pursue two differing architectures, one 36-bit and the other 32-bit. By directing the company towards a single VAX-centered, 32-bit architecture it was able to bring all its forces to bear on the single system with the resulting outstanding systems of today. By focusing its effort on the Spectrum, HP will be able to concentrate all its resources *on* the new computer line.

But the facts are that disparate computers that don't speak the same language and can't communicate won't form the system of the future. Remember, that message isn't lost on IBM either; it *will* be there. HP *needs* to move in this direction for all of us.

DEC has demonstrated that this is the way to go. It's clearly the success story of the mid-80s, not only in the financial pages, but also in its growing installed base. By moving to Spectrum, HP is committing itself to the future.

IBM is still telling the world that it'll conquer its problems with the 9370, a 1960's architecture. In reality, only a new unified system can bring IBM into the world of the 1990s as a leader in the field it has dominated for so long. Look for a major introduction of such a system from IBM in the next 12 to 24 months with delivery yet another 12 to 24 months away. Using another company's phrase, "HP has it now."

With IBM three to four years away from a solution, DEC and HP will have a window of opportunity to exploit the unified architecture that each has brought to market. Don't think about the new Spectrum computers as a continuation of the 3000 series. It's a new machine and, more importantly, it *is* the future of HP computing. ■



SYSTEM DOWN

QUESTION: *How should my HP 3000 system be started following a system failure?*
ANSWER: The startup method required to ensure that a valid operating environment is restored is determined by the cause of the system failure. Since the failure cause isn't always known, a general startup procedure can be used to satisfy most cases. Refer to the *System Operation and Resource Management* manual (P/N 32033-90005) for more specific system recovery procedures.

Many system failures are caused by exceptional conditions that merely confuse MPE to the point where it determines that a system failure would be the safest thing to do. In most cases, no permanent damage will be incurred by MPE, therefore, the system only needs to be restarted to resume operation.

On the other end of the spectrum are the failures that are caused by or result in hardware or software that's permanently affected by physical damage or random alteration of data on disks. The following are some suggestions for a standard startup procedure:

Always attempt a WARMSTART. If this works, save your print files by using the SPOOK program with the PURGE option. You can save spooled JOB streams by using the contributed program JSPOOK (available through INTEREX).

Next, ABORT all JOBS from the system to ensure that no input spoolfiles exist.

Then SHUTDOWN the system and COOLSTART it. This will bring into memory a new set of most system tables as well as cause several integrity checks to be performed.

Note that the only way to refresh all of MPE on your system is to RELOAD it. WARMSTART, COOLSTART, COLDSTART and RELOAD progressively replace more of what MPE uses to run the machine. Only a RELOAD onto newly formatted disks replaces everything.

Editor's note: This is the first part of a continuing column of questions and answers concerning all aspects of Hewlett-Packard computer operation and application. In this issue, Jim Dowling presents some of the more commonly asked questions that he encounters as manager of computer services for Bose Corporation and technical director of Volz Associates.

In the future, he'll enlist the help of many Hewlett-Packard users, employees and consultants to answer many of your questions.

Send your questions to Q & A, HP PROFESSIONAL, P. O. Box 445, Spring House, PA 19477.

RECOVERY

QUESTION: *Can you recommend a system backup regimen that will ensure a good basis for system failure recovery?*
ANSWER: Hewlett-Packard provides for system backup in the form of the SYSDUMP subsystem which consists of two parts: SYSDUMP program code backs up and allows modification of MPE; STORE provides for file backup. There are four segments to your system backup task: MPE, Files, I/O Configuration and Directory.

SYSDUMP can be instructed to back up various combinations of these at various times to provide several levels of system backup. Two run-time options control which segments are to be written to tape.

The Filesets parameter controls Directory and Files as follows: Providing a fileset of @.@.@ causes the entire file and account directory as well as user files to be considered for backup to tape. A fileset of "CARRIAGE RETURN" (Null Response) causes no directory or user files to be written.

The Dump Date parameter instructs the STORE phase of SYSDUMP to qualify the subset of files that will be backed up to include only those that have changed since the date provided. The possibilities are:

— A null response causes no files to qualify by skipping the directory altogether;
— A future date causes no files to qualify, but does include a directory and file label search;
— A past or current date causes a partial backup following a directory and file label search.

The following procedure uses these two parameters to provide multi-level backup protection:

Weekly:

SYSDUMP with @.@.@ and 12/31/99. This creates a single tape backup of MPE, I/O Configuration and

IGNORANCE IS NOT BLISS.

There you sit, with programming tools that haven't changed in more than a decade.

And you think everything's wonderful?

It's not wonderful. Because there's something better out there. And if you don't switch, you'll keep on wasting time until it all comes down on your head.

Something better is the SPEEDEDIT® full-screen, loaded-with-utilities, character-mode editor. To learn all about it, you should call us at (714) 859-4428. But for your immediate edification, you should know at least some of its advanced functions.

Starting with the editing keys on your terminal. With SPEEDEDIT, you actually get to use them. So you can do things like insert or delete lines with simple keystrokes instead of complicated control sequences.

While you're doing things like that, you're looking at a full screen of text. Making changes simply by moving the cursor to the desired line and modifying it. Concentrating on what you're doing rather than on the mechanics of getting it done. And you *will* be getting it done.

With SPEEDEDIT, you can text a 25,000-line file in 10 seconds flat, instead of the 6 minutes it's probably taking you now. And in your spare time, choose from more than 150 other capabilities including group editing, compiler syntax error trapping, background compiling, math, electronic mail, tickler files, scheduling, spelling correction, sorting, and numerous search-and-replace functions. And, yes, SPEEDEDIT covers every current HP terminal and many non-HP terminals.

While it also covers your you-know-what.

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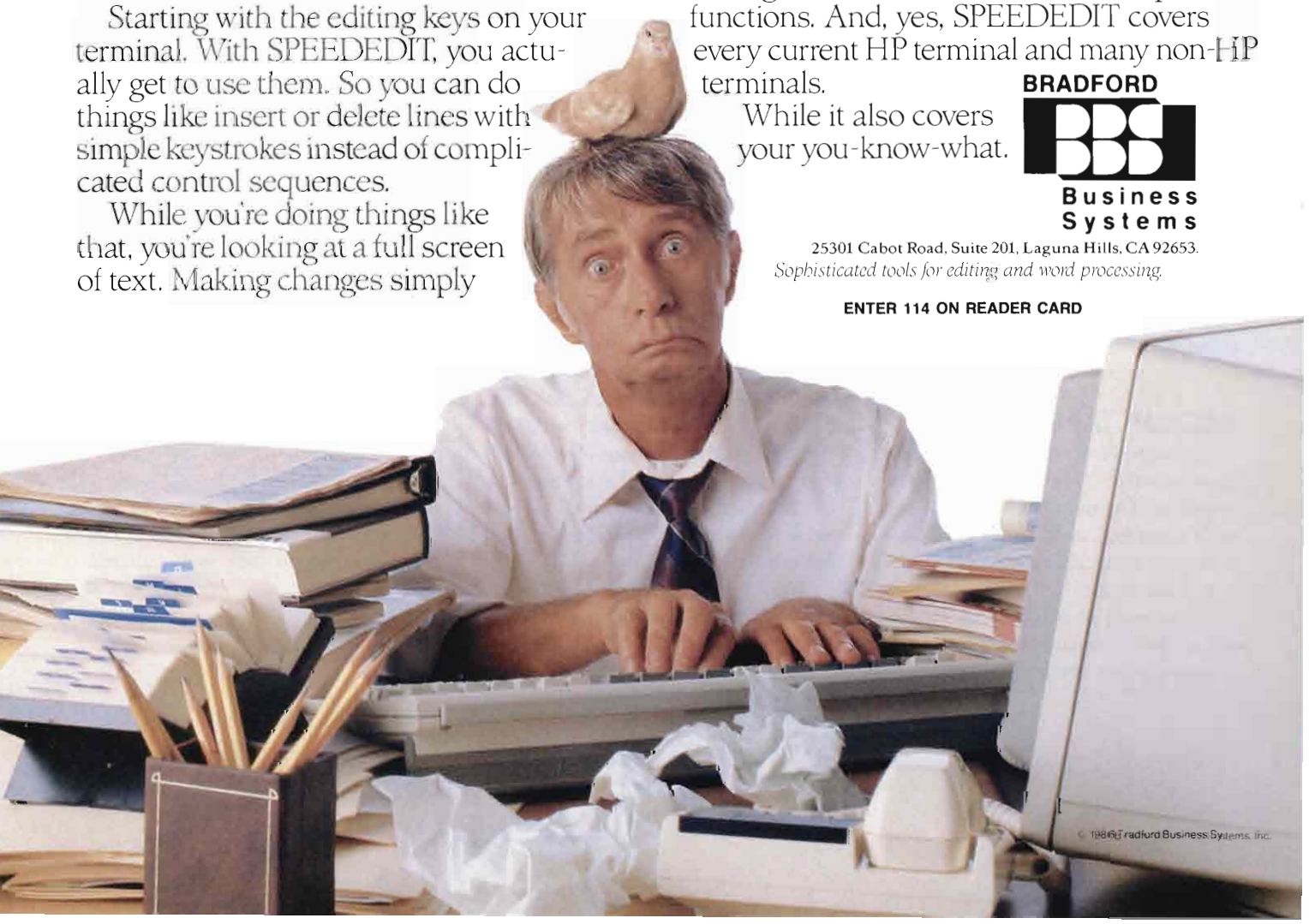

the System Directory. Refer to this as a Future Dump.

SYSDUMP with @.@.@ and 1/1/1. This creates a multi-tape backup as above with the addition of all user files. Refer to this as a Fulldump. Don't use 0/0/0 or just 0, because this tells SYSDUMP not to scan file labels.

SYSDUMP with @.@.@ and use the date of the last weekly Fulldump. This creates a multi-tape backup as above, but only includes files that were changed in the past week. Call this a Datedump.

Daily:

SYSDUMP with @.@.@ and use the date of the last weekly Fulldump (a Datedump).

As Required:

Whenever you change MPE or I/O configuration, use SYSDUMP with null response to fileset and dumpdate. This will save only the MPE and I/O changes. Call this a Carriage Return Dump.

Whenever you change the accounting structure, use SYSDUMP with @.@.@ and 12/31/99 to save the accounting structure to tape (a Future dump).

Any of these tapes or tape sets can be used to COLD LOAD your system to recover MPE and the I/O configuration.

Fulldump and Future Dump tapes and tape sets can be used to recover MPE, I/O Configuration and the system directory.

Fulldump and Datedump tapes can be used to recover MPE, I/O configuration, the system directory and all or some user files.

BACKUP TAPES

QUESTION: *How can I tell if my backup tapes are valid?*

ANSWER: The only test is to RELOAD from them and see if it works. This is a bit risky at best, but any other method is less assuring.

I generally recommend that following a system backup, use the tapes to restore the files using the KEEP option of RESTORE. This at least will validate the tapes for readability and verify that the file labels on the tape match those on the disks. Note that this method does not validate the contents of the files nor the MPE portion of the tapes.

SPOOLED PRINT FILES

QUESTION: *How can I get rid of Spooled print files without the tedious work of repeated DELETESPOOLFILE commands?*

ANSWER: I've heard it suggested that a SHUTDOWN and COOLSTART will do the trick, and indeed it will, but this method produces a nasty side effect. Due to the way Spoolfiles are created and kept track of, the space they occupied won't be returned to the disk free space tables and therefore will become lost disk space.

Another procedure is to use SPOOK to copy the Spoolfiles to tape and delete them as they go by using the DELETE option of the OUTPUT command. This method has the desirable side effect of holding a copy offline just in case it's needed later.

RELOAD

QUESTION: *How often should I RELOAD my system completely?*

ANSWER: The trite answer is, "Only when absolutely necessary."

A Fulldump and RELOAD is a total commitment process. You're betting on dozens of things being exactly right, therefore, only RELOAD when necessary. The VINIT subsystem command CONDENSE will compact disk free space, and a COOLSTART with the "Recover Lost Disk Space" option will reconstruct the system free space tables.

If a RELOAD is necessary, I recommend the following procedure (see above for details):

Perform three independent backups: Datedump, Fulldump and Future Date Dump.

RESTORE from all tapes to ensure readability. Use different tape drives if available.

Using the Fulldump tape(s), LOAD the machine using the ACCOUNTS option. When the system is up and running, RESTORE all files using the OLDDATE option. Also on the RESTORE, route the RESTORE listing to a printer so that errors won't be lost by issuing the file equation FILE SYSLIST;DEV=LP.

By using the ACCOUNTS option, you can get the system up and route the listings rather than wait until the last reel of the Fulldump to find out that it's bad. The Datedump provides a fallback to that tape set plus the one from the previous Fulldump. The Future Date Dump tape provides a fallback to the directory on the Fulldump set.

I/O CONFIGURATION

QUESTION: *Is there any difference between the I/O Configuration process during system startup and the one that's used in SYSDUMP?*

ANSWER: I could go into great detail describing the pitfalls of using both methods, but instead I'll simply offer a recommended solution to the traps that lie in your path when altering I/O configurations.

Begin with a backup. A Carriage Return Dump is fine. Then use SYSDUMP to create a COLD Load tape (Carriage Return Dump) with the desired changes on it. Shutdown and COLD Load from the tape with the altered configuration. If the COLD Load fails, COLD Load from the unaltered tape.

The serious problems that generally arise during I/O configuration changes will prevent you from getting the machine started. Having a good backup is very important, but not always sufficient.

If you're adding disk drives, be sure to be prepared for a RELOAD. It's not worth the risk to rush such a drastic operation. ■

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NEW PRODUCTS

New ScanJet, LaserJets Debut

Hewlett-Packard now presents the next generation of electronic publishing products.

The company has begun shipping three key products, two laser printers and a scanner. All three are based on hardware made by Canon, the Japanese copier giant that supplied the engines for the earlier standard-setting LaserJets.

The HP LaserJet II replaces the original LaserJet and LaserJet Plus. Like its predecessors, the II prints at eight pages per minute with a resolution of 300 dots per inch (dpi). But the new Canon-supplied engine has a number of enhancements, including the ability to add up to 4 MB of memory using special HP memory boards.

The new model is 30% lighter than the original LaserJet and it holds twice as much paper, 200 sheets. The paper path delivers pages face down in the proper order, thus eliminating the previous need to manually reorder pages.

The user controls font selection via a 16-character front-panel display that lets a user control font selection, interface, document format, number of copies, and other parameters. The printer also has two font-cartridge slots so that twice as many fonts can be on line without downloading.

The new printer is compatible with the existing LaserJet Plus and all software developed for that printer, according to HP.

The LaserJet II costs $2495, a significant reduction from the $3995 price of the LaserJet Plus. A 1-MB memory board costs $495; 2-MB is $995, and the 4-MB option sells for $1995. Replacement toner cartridges, which last for about 4000 pages, cost $115.

Enter 947 on reader card

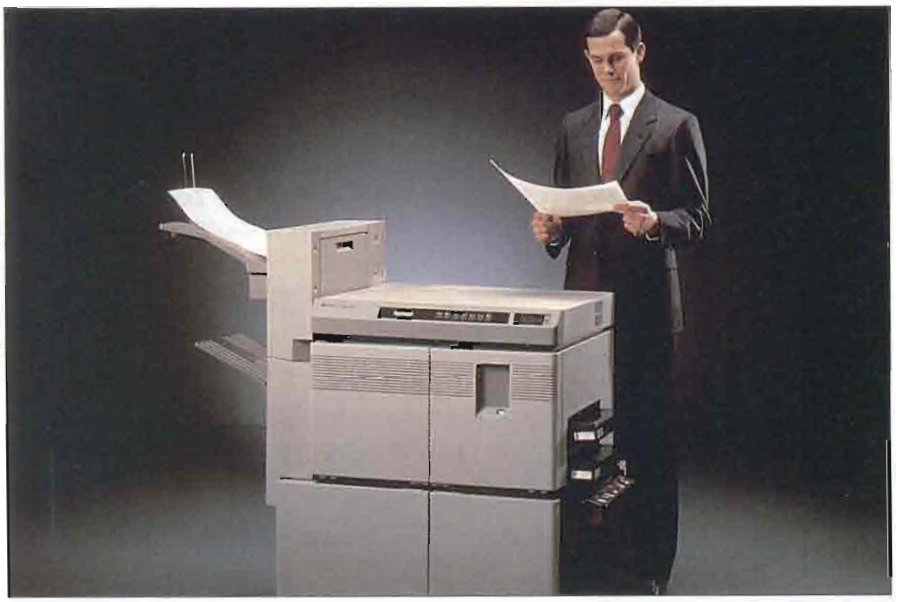
THE SECOND PRINTER is the LaserJet 2000. Based on the Canon LBP-20 engine, it has a rated speed of 20 pages per minute at 300 dpi.

The 2000 is intended for use with networked PCs, departmental systems, and minicomputers. In addition to its faster speed, several unique forms-handling capabilities have been added to the new printer. Two 250-sheet input trays are standard. A third bin, holding 2000 sheets, is an option. The printer can handle 11- by 17-inch paper. A duplexing option allows users to print both sides of a page.

The LaserJet 2000 features 1.5 MB of RAM and 34 fonts. Like the II, this printer supports memory upgrades — up to 5.5 MB — downloaded fonts, and the PCL language for compatibility with existing software. It can support up to three different cartridge fonts. The rated print volume for the printer is up to 70,000 pages per month.

The price of the standard LaserJet 2000 is $20,000. An upgraded model with the 2000-sheet bin costs $21,500, while the duplexing option brings the price tag to $25,000; 1-MB memory modules are available for $750.

Enter 946 on reader card



The HP LaserJet 2000.

THE HP SCANJET is the company's first desktop scanner offering. It's a monochrome, flatbed unit based on the Canon CS-220, with input resolution of 300 dpi.

The ScanJet will accommodate forms of up to 8.5 by 11 inches. An optional document feeder holds up to 20 pages for scanning multi-page documents. Images can be manipulated, including reducing and enlarging, with no loss of image quality.

It supports three types of image data formats: Binary (black/white) format is appropriate for scanning text or line art. Dithered format simulates halftone photographs on a 300-dpi laser printer. Gray scale format is required to produce professional-quality photographic halftones for publishing applications. The ScanJet can discern 16 shades of gray.

A powerful software program accompanies the scanner. The HP *Scanning Gallery* can run under Microsoft *Windows* or MS-DOS. It already supports a number of publishing programs such as *PageMaker*, Harvard *Professional Publisher*, and *Spellbinder Desktop Publisher.*

A bi-directional parallel interface card is used to transfer image data from the scanner to an IBM XT, AT, or compatible computer.

The price of the scanner alone is $1500, plus $95 for the interface card and *Scanning Gallery* software. *—James Cavuoto, micro-Publishing Report, Redondo Beach, California.*

Enter 900 on reader card

DraftMaster Replaces 758X Drafting-Plotters

HP's revision of its 758X drafting-plotter line has resulted in DraftMaster, an eight-pen plotter family featuring 50% higher throughput and as much as 30% lower prices.

The new family consists of HP DraftMaster I single-sheet feed and HP DraftMaster II roll feed, and HP DraftPro personal-computer drafting plotter, which was introduced in August 1986.

Many factors contribute to the faster throughput of these plotters such as smooth-curve generator, bi-directional plotting, pen-sorting algorithm, a 5.7g diagonal acceleration and a 10MHz MC68000 microprocessor that processes short vectors up to 250% faster than previous plotters.

The data transmission rate has been stepped up from 9600 bps to 19.2K bps via an RS-232C interface.

The plotters are priced as follows: DraftMaster I, Model 7595, is $9900; DraftMaster II, Model 7596, is $5400. DraftMaster I owners can upgrade to the DraftMaster II for $2500.

Enter 901 on reader card

The faster, lower priced DraftMaster plotters replace the HP 758X series.

Extended Has Interface For LaserJet II

Extended Systems' (Boise, ID) latest addition to its ShareSpool printer sharing product family, the EI-2001, is specifically intended for use with HP's LaserJet series II.

The EI-2001 provides transparent sharing and spooling for users of up to three personal computers.

At the heart of the ShareSpool is a 256-KB RAM buffer. Data from each of the three computers flows into the buffer and is collected into individual jobs.

The LaserJet series II ShareSpool retails for $500. Fifty-foot cables with RS-121 and mod-jack adapters are available in packages of one, two or three and are priced at $60, $115 and $160 respectively.

Enter 903 on reader card

GNU Introduces Custom Font Cartridges

A selection of 200 fonts is now available from GNU Business Information Systems (Ramsey, NJ) to users of the LaserJet, LaserJet Plus and LaserJet Series II printers.

Users previously have been limited to the standard set of 26 cartridges available from HP. Now with the font selections available from GNU, they're provided greater flexibility in formatting documents produced with word processing, desktop publishing, spreadsheets or other software.

GNU custom cartridges are priced from $200 for custom cartridges loaded with up to four standard fonts. Additional fonts can be loaded at $45 per font. Prices for customizing standard symbol sets (character layout) are quoted on an individual basis.

Enter 904 on reader card

LaserFeeder Expands HP Paper-Handling

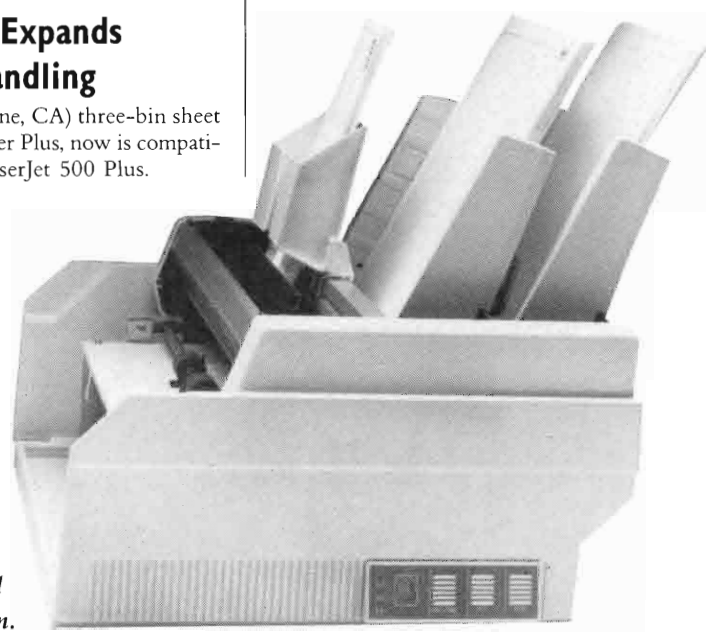
BDT Products' (Irvine, CA) three-bin sheet feeder, the LaserFeeder Plus, now is compatible with the HP LaserJet 500 Plus.

This combination provides four input bins for feeding four paper types into the printer — offering a total capacity of nearly 1000 sheets — and one envelope bin capable of feeding approximately 40 standard size envelopes.

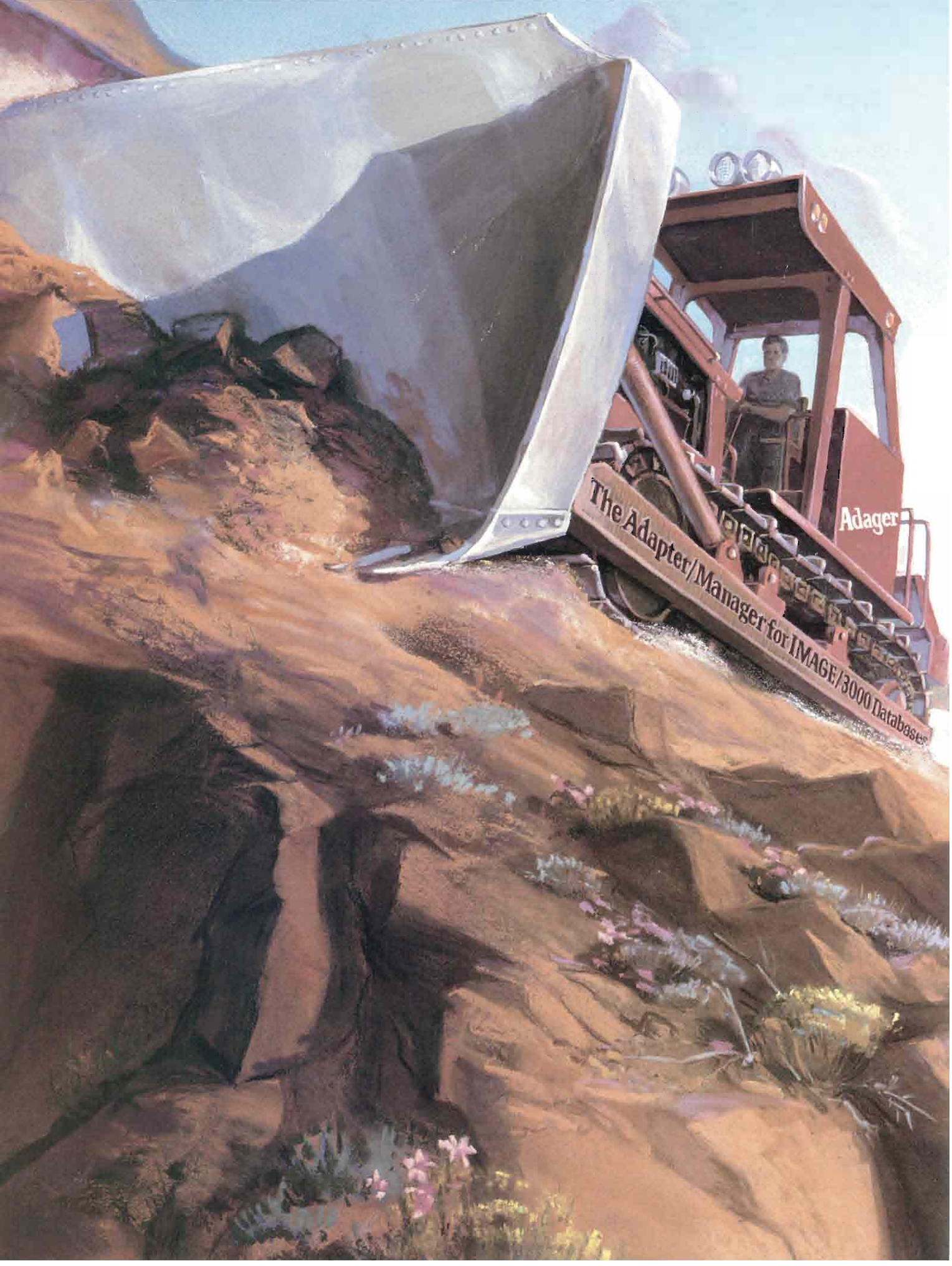
The LaserFeeder Plus retails for $1795.

Enter 902 on reader card

Continued on page 86.



The BDT automatic LaserFeeder features dual paper bins and an envelope bin.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HP Moves To Dominate Electronic Publishing

[BY JAMES CAVUOTO]

Hewlett-Packard, long a dominant force in the scientific and engineering segments of the computer market, has found lucrative potential in a more general applications area, desktop publishing.

Desktop publishing refers to the use of microcomputer hardware and software to produce published pages. A desktop publishing user can accomplish, to varying degrees of success, most, if not all, stages of the traditional publishing process, including:

- *Text editing*
- *Typesetting*
- *Hyphenation and justification*
- *Text and graphics integration*
- *Page design and layout*
- *Document reproduction and distribution*

HP first became involved with desktop publishing in 1984 when it introduced the LaserJet printer, the first laser printer available for under $5000. It quickly became popular among general office users of personal computers. The speed and print quality of the LaserJet, as well as the relatively quiet operation, made it an immediately viable alternative to dot-matrix and daisywheel printers then on the market.

When it became clear that many users wanted more than

just daisywheel emulation for their word processing programs, the company introduced an upgrade called the LaserJet Plus. The new printer increased the amount of memory available for imaging graphics on the page. It also enabled users to download a variety of type fonts to the printer for use with publishing-oriented programs, which were just beginning to become popular.

To date, HP has sold over 300,000 LaserJet printers, giving the company a 45 to 50 percent share of the low-speed laser printer market. Over 4,000 dealers worldwide sell and service the printer.

Earlier this year HP introduced two additions to the LaserJet family, the LaserJet II and the LaserJet 2000. The former is a lower-cost, heavier-duty, more expandable version of the LaserJet Plus, based on a new print engine from Canon. The latter product is a high-volume, 20-page-per-minute printer with significant forms-handling improvements. This product, costing in the neighborhood of $20,000, is targeted particularly at multiuser and networked environments.

HP views the desktop publishing marketplace as a hierarchy of office printing applications, with general word processing needs forming the base of the pyramid and professional typesetting representing the apex. In between are sophisticated word processing, merged text and graphics, and page-composition applications. As one ascends the pyramid, the number of potential users decreases and the typographic and graphic complexity of pages increases. For example, an HP survey found that 91 percent of LaserJet users output letters with the product, 76 percent produce short memos, and only 18 percent create documents with merged text and graphics.

> . . . the professional segment's needs include very high-resolution output . . .

THE DESIRED ATTRIBUTES of the general word processing segment, according to HP, include variable-pitch printing and boldfacing.

Sophisticated word processing requires access to multiple fonts and point sizes, line drawings, proportional spacing and evenly aligned margins. Merged text and graphics applications include business forms and printing of logos and signatures.

Page composition requirements are sophisticated typographic controls, downloaded fonts, high-resolution graphics, multi-column pages and document pagination. Finally, the professional segment's needs include very high-resolution output, photographic halftones and gray-scale images.

When it introduced the LaserJet, HP devised a command

[An Overview Of DDL]

Hewlett-Packard now supports the Document Description Language (DDL) from Imagen Corp., Santa Clara, California, in its newest laser printers. The first announced product in this area is the LaserJet Publisher Kit, an add-on enhancement to existing LaserJet printers. This hardware enhancement consists of an interface board that resides in the host computer and connects to the "video" engine of the LaserJet, bypassing the original printer's PCL controller. The board includes 2 MB of memory, as well as an implementation of DDL in ROM.

The Publisher Kit — and DDL — is intended for more sophisticated graphics and typography than the standard LaserJet is capable of. For example, DDL can scale fonts to nearly any desired point size without loss of quality. It also can rotate or scale graphic images, capabilities not present in PCL.

HP offers several reasons why it selected DDL as its page description language over other available languages — most notably *PostScript* from Adobe Systems, El Segundo, California, and *Interpress* from Xerox Corp. According to Douglas Carnahan, general manager of HP's Boise, Idaho, Division, "DDL offers the most flexible, efficient and high-performance solution for present and future markets." While *PostScript* and *Interpress* view documents as a collection of individual pages, DDL describes a document as a seamless whole, the company contends. Each document description contains two sections: a collection of images and a set of rules for placing those images on the page. As a result, it is easy to change the overall format of an entire publication just by changing some command codes.

Another attractive aspect of DDL is its ability to preserve, or "cache" a composite image so that it quickly can be reconstructed when necessary. And DDL can represent pages using both ASCII and binary data. The former is useful during program development; the latter is important for speeding throughput in commercial applications.

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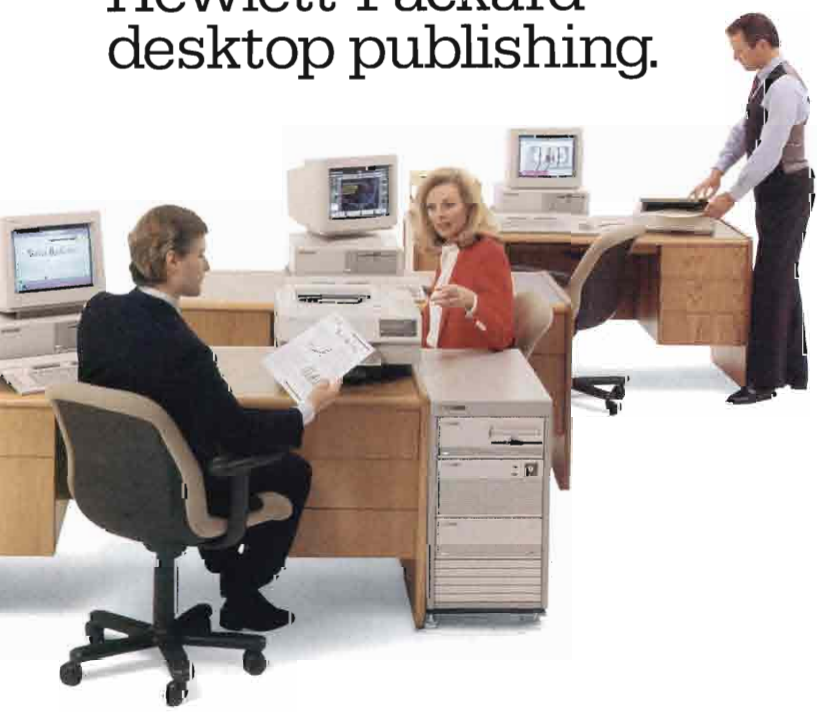

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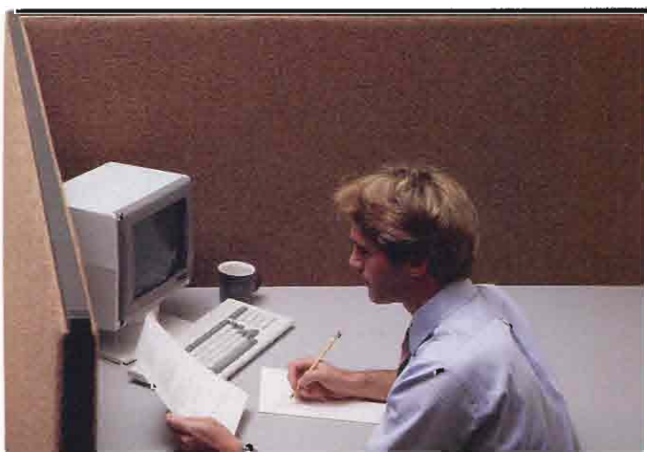


ENTER 123 ON READER CARD

set called the printer-control language (PCL) to control the output of fonts and graphics on the page. Many software developers now have written programs that support PCL, enabling users to produce output on the LaserJet.

While PCL lacks the graphics and typographic capabilities of other laser printers, such as the Apple LaserWriter, HP believes that the relatively simple and low-cost language is sufficient for most users' needs — particularly those at the lower levels of the HP pyramid.

To service the more sophisticated users, however, HP has now adopted a powerful page-description language called DDL, developed by Imagen Corp., Santa Clara, California (see "An Overview Of DDL," page 30).

The HP-GL (Graphics Loop) language used by HP in its plotter products isn't used by the LaserJet line of printers. HP-GL is oriented more toward vector (line) graphics for computer-aided design and business graphics applications. Desktop publishing, on the other hand, normally uses raster-oriented or bit-mapped graphics to represent images on a page. Also, the quality and variety of fonts available with HP-GL are insufficient for most publishing applications.

HP plans to integrate its desktop publishing products into its overall office-systems environment, the Personal Productivity Center. According to the company, this includes communications to HP 3000s, local area networks and printers.

The HP Vectra Publisher PC is the company's entry into the "turnkey" publishing system arena. The objective is to provide all components necessary for a complete publishing system from a single vendor. In this way, the user doesn't need to worry about incompatibility among different hardware, software and interface products from competing vendors. Also, installation and training should be much simpler, HP reasons, since all the pieces were designed to work together.

The cost of the system is between $6000 and $7000, not including the printer. The specific components of the system are:

- *HP Vectra PC*
- *Aldus* PageMaker *software*
- *Microsoft* Windows *graphics software*
- *An HP LaserJet series printer*

The Vectra PC features an 8-MHz, 80286 processor with 640K of RAM, an internal 1.2-MB floppy disk, an internal 20-MB hard disk with controller, a serial/parallel I/O card, either a monochrome or an enhanced graphic adapter (EGA) display system and an HP digitizer mouse.

The *Windows* software, supplied by Microsoft Corp., Bellevue, Washington, provides a graphics-oriented operating environment to personal computer users, much the same as that provided by the Apple Macintosh computer and Xerox

[The New Canon SX Engine]

The heart of the new Hewlett-Packard LaserJet II printer is a print "engine" manufactured by Canon called the LBP-SX. The SX engine has the rather formidable task of replacing the very successful Canon LBP-CX engine.

It was the CX that almost single-handedly launched the desktop publishing revolution when it was first released in 1983. The engine was available to OEMs for under $1000, which made it possible for the first low-cost end-user printers to enter the market in 1984 and 1985.

Both Hewlett-Packard and Apple Computer used the CX in their popular laser printers, and a long line of other manufacturers, including Corona Data Systems, QMS, Itek and others followed.

Though the CX was popular and inexpensive, it had a number of shortcomings in terms of duty cycle and forms-handling that competitors such as Ricoh and Hitachi targeted when they introduced their printers. The SX solves many of these problems.

The new printer features an input paper tray that holds 200 sheets — double that of the CX. The output bin can hold 100 pages, five times the CX's capability. The new printer uses a new paper path that permits documents to be delivered face down, in normal sequence, thus addressing one of the most often-heard criticisms of CX printers. The new engine also can handle heavier paper stocks — up to 35-pound when manually fed — than its predecessor.

The SX is more durable and about 30 percent lighter than the CX. The toner cartridge used in the new engine lasts for about 4000 pages, compared to 3000 for the CX's cartridge. The price of the cartridge will remain the same.

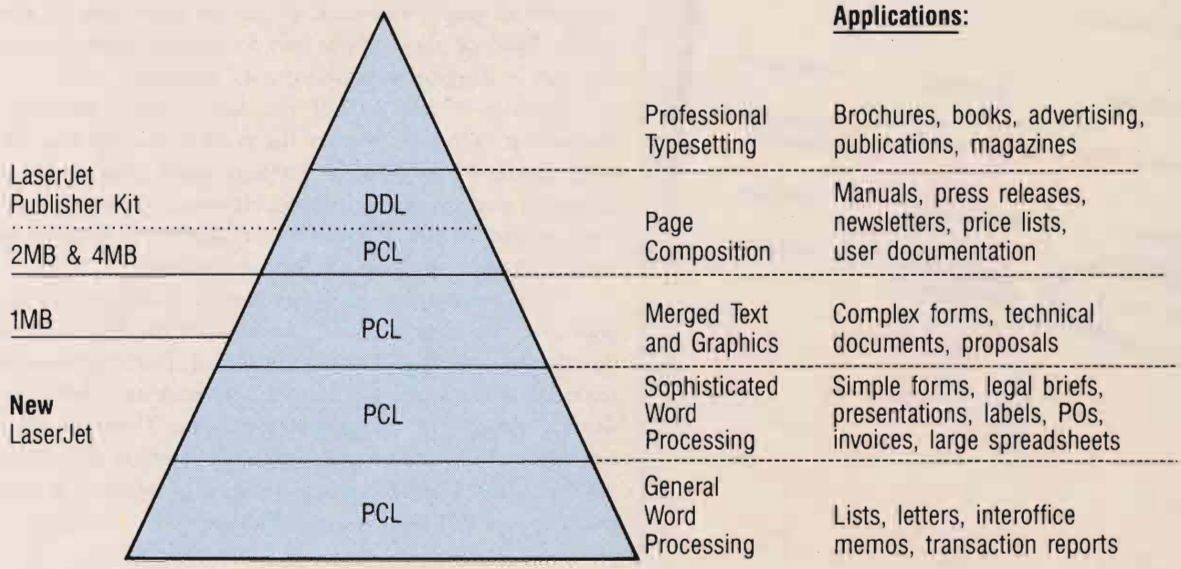
Finally, the best improvement in the SX engine is its lower cost. Although Canon doesn't release its OEM price schedules to the public, the fact that the LaserJet II is about $1000 cheaper than the LaserJet Plus leads us to believe that the volume price of the SX is about 30 percent less than the CX OEM price. —*JC*

Comparison Chart

	CX	SX
Input tray	100 sheets	200 sheets
Output tray	20 sheets	100 sheets
Paper stock max.	24 lb.	35 lb.
Cartridge life	3000 pgs.	4000 pgs.
Correct order	No	Yes

FIGURE I

Hierarchy of Publishing



Hewlett-Packard views the desktop publishing market as a hierarchy of office printing applications, with general word processing forming the base and professional typesetting at the apex.

Star workstation. *Windows* rapidly is becoming the accepted standard for PC operating environments, and a number of hardware and software manufacturers have announced products that work under windows. These include object-and pixel-oriented graphics programs, word processors and several other types of software. Hardware devices that work with *Windows* include digitizer mice, graphics displays, plotters, dot-matrix printers and laser printers.

The *PageMaker* software bundled with the system, which runs under *Windows*, is provided by Aldus Corp., Seattle, Washington. This is an enhanced version of the very popular *PageMaker* program that has become the leading desktop publishing program available for the Apple Macintosh computer. The enhanced *PageMaker* supports documents of up to 128 pages. It allows the user to import text files from a number of popular word processing programs, including *WordStar*, Microsoft *Word*, *XyWrite*, *WordPerfect*, *MultiMate* and *Windows Write*, as well as standard ASCII and DCA format text files. Users also can import graphic images from programs such as *PC Paintbrush*, *Windows Paint*, *AutoCAD*, and *Lotus 1-2- 3*. Scanned images can be brought in as well.

PageMaker allows a user to view a page at one of several scales, ranging from a reduced view that presents a mock-up of the entire page on screen, to a zoom view that presents a readable and editable view of one portion of the page. Text and graphics are displayed in a what-you-see-is-what-you-get fashion — the actual type fonts in the proper size are represented on screen. The user "flows" text from one column or page to the next by pointing with the mouse and clicking where text should begin on the page.

Continuations of text files can be placed anywhere in the document; the individual blocks of text are "threaded" so that changes or deletions in one block will cause the appropriate changes to be made in ensuing blocks.

Although not originally part of the Vectra Publisher PC system, a newly introduced scanner from the company, ScanJet, promises to figure prominently in the company's desktop publishing plans. Desktop scanners represent a very high-

growth product segment within the desktop publishing industry. In a study recently published in *microPublishing Report*, sales of scanners for desktop publishing applications will reach $1.1 billion by 1990.

The HP ScanJet scanner comes with powerful image capture and manipulation software that runs under Microsoft *Windows*. As a result, images brought in with the ScanJet can be incorporated into any application that runs under *Windows* — including *PageMaker* — as well as other programs supporting different graphics formats. The ability to incorporate good-quality halftone photographs into documents has been a missing link in desktop publishing until recently.

Because it was one of the first vendors of desktop publishing hardware to enter the market, and because of its large installed base of users, HP is in good shape to capture a sizeable portion of the market. However, the company has serious competition. Apple, for one, also has done extremely well marketing desktop publishing systems.

That company's LaserWriter printer has a distinct advantage over the LaserJet family because of the *PostScript* page description language that is built into it. *PostScript* is widely regarded as the highest-quality output standard available today for typography and graphics imaging. There already are a number of laser printers and phototypesetters that support *PostScript*, and at least as many publishing software packages that support PCL also support *PostScript*.

BESIDES APPLE, Xerox Corp. currently is targeting the desktop publishing market as a means of bringing corporate users into the company's family of electronic publishing, networking and reprographic products. Xerox markets the *Ventura Publisher* software for the IBM PC and AT computers. This software has many performance advantages over the *PageMaker* package marketed by HP — particularly for producing lengthy and complex technical documents. Xerox also markets personal computers, low- and high-volume laser printers and advanced workstations that could pose a threat to HP's position.

Finally, IBM soon will enter the electronic publishing market with powerful workstation and next-generation PC-based publishing systems. IBM has a range of laser printers and scanners that could cut into HP's current market share.

However, if HP is right in its pyramid scheme for publishing users, the numbers already may be there for the company to develop and keep a strong electronic publishing market share. *—Jim Cavuoto is publisher of* microPublishing Report, *a newsletter devoted to desktop publishing, and author of two books,* Laser Print It! *(Addison-Wesley) and* Inside Xerox Ventura Publisher *(Micro Publishing). microPublishing Report, 2004 Curtis Avenue, #A, Redondo Beach, CA 90278; (213) 376-5724.*

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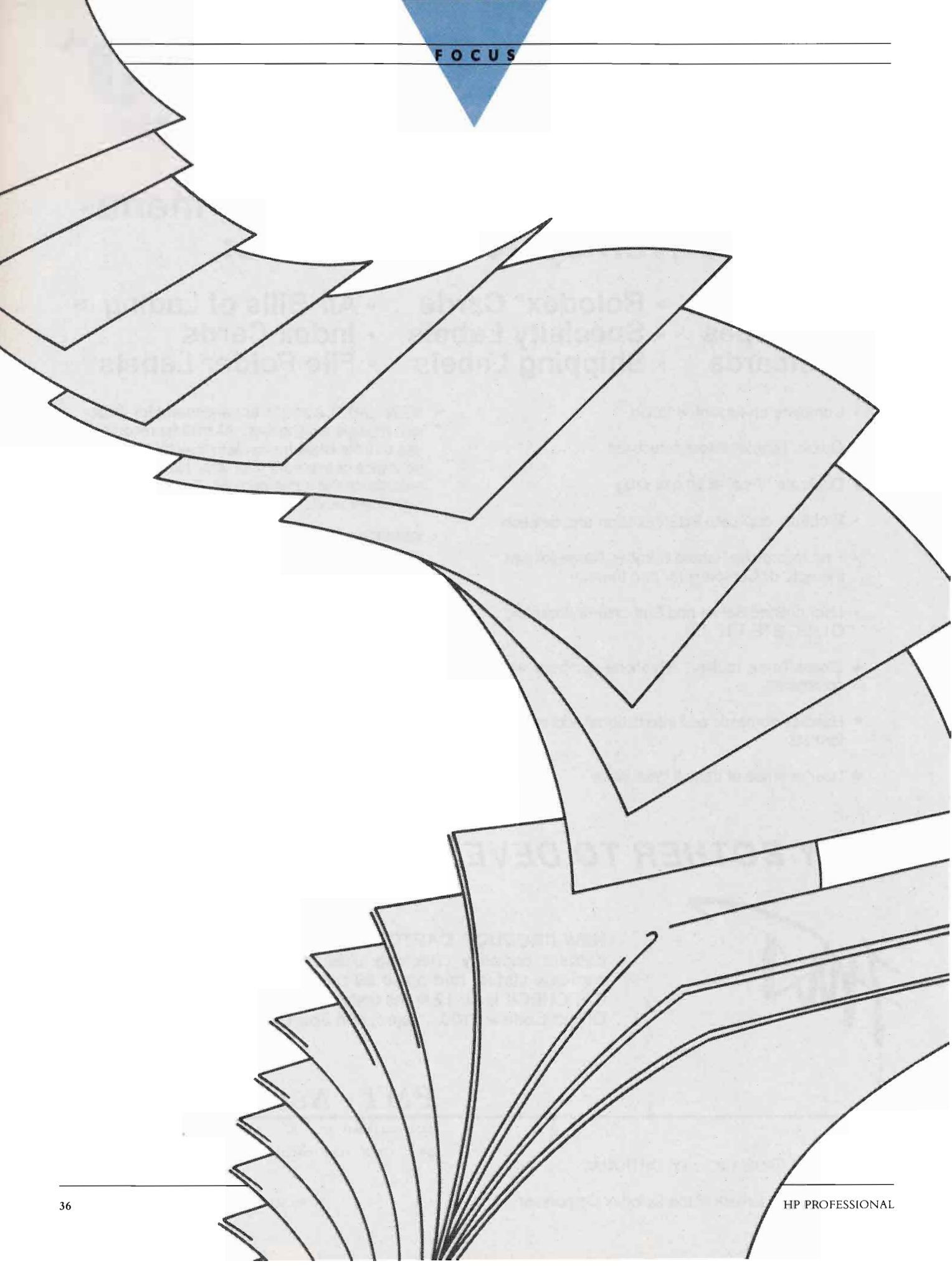


A Major Alternative With Brute Strength — But What About Service?

Xerox vs. LaserJet Plus

[By Don Person]

HEWLETT-PACKARD practically dominates the small laser printer business, but it doesn't own it.

While Toshiba and other offshore firms are pushing their way onto the scene, there's little evidence that they will achieve the level of cross-pollination that the Canon-HP unified subassembly enjoys. Don't write off the USA. On our own continent, both IBM and Xerox are breaking into the potentially lucrative electronic publishing business.

I've been lucky enough to get a thorough look at a major alternative to HP-Canon laser print technology as embodied in the Xerox 4045.

The Xerox 4045 is as close to an office utility machine as I've ever seen: a high-quality laser printer and convenience copier in one chassis. It's ready-made for the small office or desktop publishing — just add software.

THE ELECTRONIC PUBLISHING environment is a new idea that lends fresh immediacy to an old problem. In a nutshell, it can save steps and time in the production of small to moderate volume printed matter. A several-page pamphlet can be written, printed and ready for mailing in a single business day. My tests showed that the 4045 can output over 500 pages per hour. This translates into the very real possibility that you could write a two-page newsletter in the morning while your old standby computer grinds out dot-matrix mailing labels, then in the afternoon run 1,000 copies and be ready to mail the same day. This is the kind of small-scale publishing that laser printers can do best, and Xerox is hoping to cash in.

Xerox is ready to move on two fronts at the same time with the concept of the "office cluster." Here's why: The 4045 has a "sharing device" available as a $1400 option. While third parties have made similar units for the LaserJet, this is special. It allows relatively smooth use of the printer by four different computers and keeps the use of the integrated copier isolated from the print cycle. Effectively, four printers for the price of one. The 4045 kicks out a control sheet between each print job and controls queuing while providing spooling simultaneously. Talk about a slick juggling act! My tests showed that it can sustain an output rate of 11 pages per minute (better than the published 10 ppm spec), so nobody is likely to wait too long for his job.

There are other good reasons to consider electronic publishing in your business situation. For example, small production runs of user manuals, particularly in instances where customization and frequent changes are needed, can be quite cost effective versus the time, energy and cost of a conventional print run. With the ability to merge graphics and quickly change copy, an increasing number of small specialty companies are adopting this technology in lieu of offset printing. Flexibility is the key, and here Xerox has plenty to brag about.

When I first used the original Laser-Jet, I made three suggestions to HP:

- *Add a convenience copier.*
- *Make multiuser sharing part of the device.*
- *Add an "inverse collator" to make multipage printouts end up in the correct order.*

Of these, only the last ever was taken seriously, and that took two years to accomplish. The HP solution was to add a weird-looking inverted tray that catches the papers upside down, provided it is elevated far enough from surrounding objects. What the laser printer industry needs is a standard feature for formatters that breaks up a document into pages and stores the file backwards so that multiple prints come out in the correct order. Anyone care to run with it?

HP has said that sharing is not desirable since its research showed it could create conflicts in the office, and adding a copier is not technologically possible. Apparently, HP forgot to pass these notions along to Xerox.

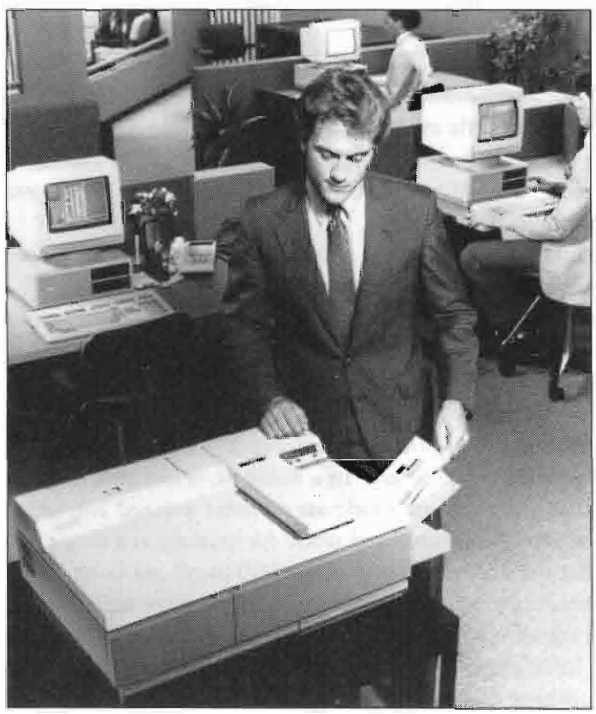
The Canon/HP printer uses a laser beam to discharge a photosensitive drum. Where the laser strikes, charge is dissipated. In the Xerox unit, the laser controls charge application. Thus, the laser is played over the entire surface and the characters are the dark spots. Since this is exactly what's done with an ordinary copier, the convenience attachment was simple to add. You can't get there at all with the Canon engine.

One minor flaw in the photocopier option did come to light. Almost everyone knows about the problems of copying light blue. To this, the 4045 adds a new dimension. The yellow-orange wavelength of the laser light source makes most shades of red, yellow, orange and brown difficult to print. Documents should be black on white, or there will be a large degradation in copy quality. Not so surprisingly, blue and green tones reproduce better than on most other units. You win some, you lose some. In this instance, the 4045 is just different.

Another surprise was that the Laser-Jet can make a finer line, even though both units have the same resolution specification (300 dots per inch). A one-bit-wide line on the 4045 may not print reliably; on the LaserJet, you just barely can tell it's there, but it's consistently visible. The 4045 line may show some tearing. Mine did.

At about the same time that HP's research said sharing was a bad idea, darned if Xerox didn't do research that said sharing and integration of a copier were useful and the most commonly requested improvements. I guess the two firms used different researchers. Xerox took longer to get to market, but then it isn't tied to Canon's apron strings.

IN CONCEPT AND PERFORMANCE, the 4045 is practically the dream office device. The paper tray has more than 2-½ times the capacity of the standard LaserJet, and a single toner powder refill produces over 6,000 pages. There are two solid reservoir refills per container with a little left over. This side of the cost to run is vastly superior to the $90 cost of a 2,000-3,000-page cartridge for the LaserJet. This baby is meant for high volume work. There is a separate container of developer solution inside but it needs attention only after every 45,000 copies, or after about 80 hours of continuous printing.



For the price of $5395, you get two fonts and two emulation modes. Add the 384K RAM expander and the share box for a total of $7785. Extra fonts beyond the two internal ones mean extra pense, of course.

On the upscale end of things, the 4045 responds to the 2700-II command set used by the company's BIG high-volume units. To insure that micros would be connected happily, a second complete emulation of the Diablo 630 is provided. Because the Diablo set probably is the most widely available of any printer command set for integration with popular word processors, it can gain quick acceptance. This is an area where the LaserJet has the most catching up to do, as HP tries to gain converts for its unique Printer Command Language (PCL). The marriage of the Diablo 630 to popular word processors is so commonplace that I see this choice as exceedingly wise on Xerox's part.

> Because of the price tag, the 4045 almost cries out to be bundled by third parties in the VAR business.

On a point-by-point comparison, the 4045 is better than or equal to the LaserJet Plus and is a visibly rugged performer with a superior range of options, such as your choice of serial, parallel, coaxial or Xerox's own, the same 300 by 300 DPI spec and full graphics merge, and downloadable fonts. You name it, it's there. Improvements? Try full, beautiful output and quality proportional spacing. There's also switch- selectable personality and default memory. At power-on, it prints a test sheet with a neat little graphics map of the condition of the set-up switch card, too, just to confirm that it's doing what you want. For extra bells and whistles, there's also:

- *Simplified operator panel.*
- *"No Fault" job queuing.*
- *Forms-merge with rules and shading.*
- *An electronic "bell."*

Other noteworthy details:

Unlike every LaserJet I've ever used, the 4045 doesn't create a hail storm of RFI/EMI and power line garbage.

It's extremely quiet. A dual fan arrangement is used for cooling. In the standby mode, a barely audible whisper of air flow is the only indication that the unit is on. During the printing cycle, a more robust blower kicks in until your job is done.

It offers a *fast* warmup. My unit was ready to go in about eight seconds. You don't appreciate how nice this is unless you've used a Canon-based printer.

I have the impression that there isn't much in the way of dedicated software for the 4045, now a year and a half since its introduction. The 4045 finds itself in much the same boat as the LaserJet three years ago. It takes time to get good software ready or adapted to new equipment, and Xerox is no different than any other manufacturer when it comes to promotion. Ready or not, the hardware always comes before the bulge of software needed to make it soar. Because of the price tag, the 4045 almost cries out to be bundled by third parties in the VAR business. Whether Xerox will form so-called strategic alliances with third-party people in an even-handed way remains to be seen.

Fairness and openness in conveying architectural details of the machine could make or break it in the end. The company's past gives me little hope that it will take this route.

While I've given the appearance that the 4045 can be less expensive to operate than the LaserJet, there is a dark cloud in the sky: service.

Item: The service manual is not for sale. Period. This highlights an uncomfortable aspect of Xerox's attitude that it may never outgrow. Xerox sells you something, then acts like it's only leased or on loan. Reminds me of the good old phone company.

Item: Service charges. The yearly contract for a 4045, with copier, share box and RAM expander costs $860. No service contract? That'll be a $60 minimum call fee, plus $75 per hour, plus parts. Are you a gambler? When you add these figures to the cost per printed page, it doesn't take long to chip away at those toner savings.

Item: User penalties. *WHAT?* I was afraid of this. In the bad old days, all the Xerox units I ever saw had this little page-counter in the door where the machine kept track and you paid a penalty if you used the machine more than Xerox allows. Guess what else is in the 4045: a counter! Turns out that after 7500 copies per six-month interval, you owe the service man 2.2 cents per page extra as a heavy-user penalty. Xerox says it's a 7500-page allowance. You will overrun the "allowance" by simply using the unit for eight minutes each day of a standard five-day work week. This is an embarrassing and onerous burden to put on the back of a purchaser who thinks he's bought a high-volume workhorse.

This doesn't detract from the superb functionality of the 4045, but it does introduce another cost factor. Let's say that you'll crank out 50,000 pages in six months. That's about 84 hours of opera-

Xerox 4050 Laser CP
Xerox Corporation
Xerox Centre
101 Continental Blvd.
El Segundo, CA 90245

Base price: $4995.

If your primary concern is throughput or production rate per unit time, then the 4045 might have to be your printer.

tion, or about 45 minutes of steady use per business day. Here are my calculations of operating expense for that volume of work.

50 percent of the service policy, $860 ÷ 2 =	*$430.00*
100 reams of paper @ $3.50/ream =	*350.00*
eight containers of toner @ $90.00 =	*720.00*
copy over allowance: 42,500 X .022 =	*935.00*
total =	*$2535.00*

This means a cost of 4.87 cents per page. If you pay anything for electricity, five cents looks like a reasonable estimate. Suddenly, the 4045 costs the same to run as a Canon-based printer, yet its purchase price is almost triple. Whoops, I forgot to add the developer solution recharge, so add some more to the cost.

This doesn't detract from the speed benefit or other great features of the machine, but it reduces the competitive advantage when you add in the "up-front" cost. It also greatly narrows any purported economic edge when comparing cost per page to run.

There's nothing like "hands on" experience with a device of this kind, and I have nothing but praise after poking around in the deepest recesses of the machine (and pushing it pretty hard). It's very well built and looks like it should be serviceable, if only I could have a manual.

Getting down to throughput, it's the Xerox engine versus the Canon. If your primary concern is throughput or production rate per unit time, then the 4045 might have to be your printer. Extra points also have to go to the 4045, because it has what it takes to be a dream office printer or an electronic publisher's gem. But looking beyond the brute strength of the 4045, I see more parity with the LaserJet Plus. —*Don Person is an engineer and independent consultant based in Albany, NY.*

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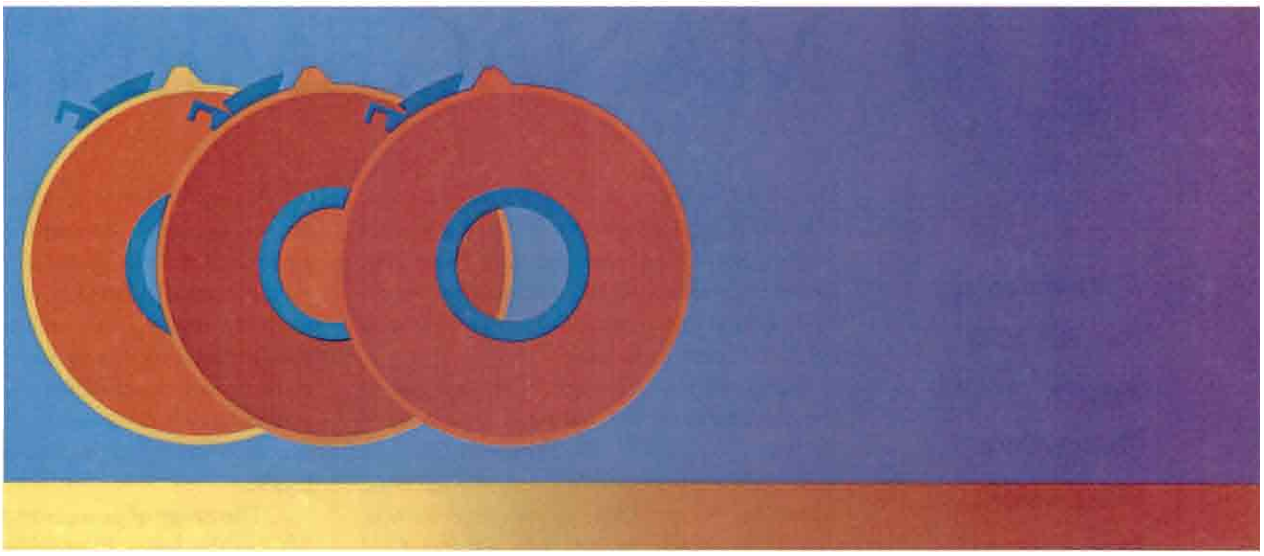

BackPack is a high-speed replacement for SYSDUMP, STORE, and RESTORE. Using sophisticated data compression techniques, fast file access, and parallel processing, BackPack cuts backup time by up to 50% or more.

Since BackPack reduces the amount of tape you use by half and eliminates separate backup of databases, it improves performance on any model tape drive, including cartridge tape and streaming models.

Running under both MPE IV and MPE V, BackPack provides state-of-the-art operator convenience with tape validation, tape error recovery, and powerfail recovery. And BackPack places its restore module at the front of every tapeset so files can be restored on any HP 3000.

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DATA CENTER MANAGEMENT

A Methodology For HP 3000 System Performance Management, Part I.

3000

James F. Dowling

When I first learned that a new HP magazine was to be published, I thought it might be fun to write a topical story or two now and then. I was quite pleased when the magazine's editors offered me the opportunity to write a continuing series of articles on HP 3000 system performance.

This subject was the topic of the first paper I ever presented to the HP 3000 user community in San Jose, CA, back in 1980. Then, with four years of HP 3000 experience, I was one of the old-timers expounding on the virtues of code segmentation, choosing the optimum blocking factor, unbuffered and multi-record input/output (I/O), lost disk space and the failings of HP's DEL screen formatter.

Working with every model of HP 3000 that's been delivered (hope no 930s sneak out before this is published) and most versions of MPE, I've learned a lot in the past 11 years. Along the way, I've accumulated a tremendous amount of data, some no longer applicable, some merely trivia, but hopefully most of it useful.

This series will review each aspect of system performance management and document a complete program representing a collection of concepts taken from 11 years' experience as a programmer, data center manager, performance consultant, trainer and student.

Although it's unlikely that any one site ever would implement the entire program, you may find the concepts and methods useful. Part 1 introduces some basic concepts of performance management and offers some personal viewpoints regarding the world of the performance manager. —JFD

Hewlett-Packard provides us with one of the more robust and self-managing operating systems in the minicomputer industry. The HP 3000 Multi-Programming Executive (MPE) schedules, monitors and controls processing to optimize throughput for transaction processing tasks while simultaneously supporting program development, batch processing and communications subsystem management.

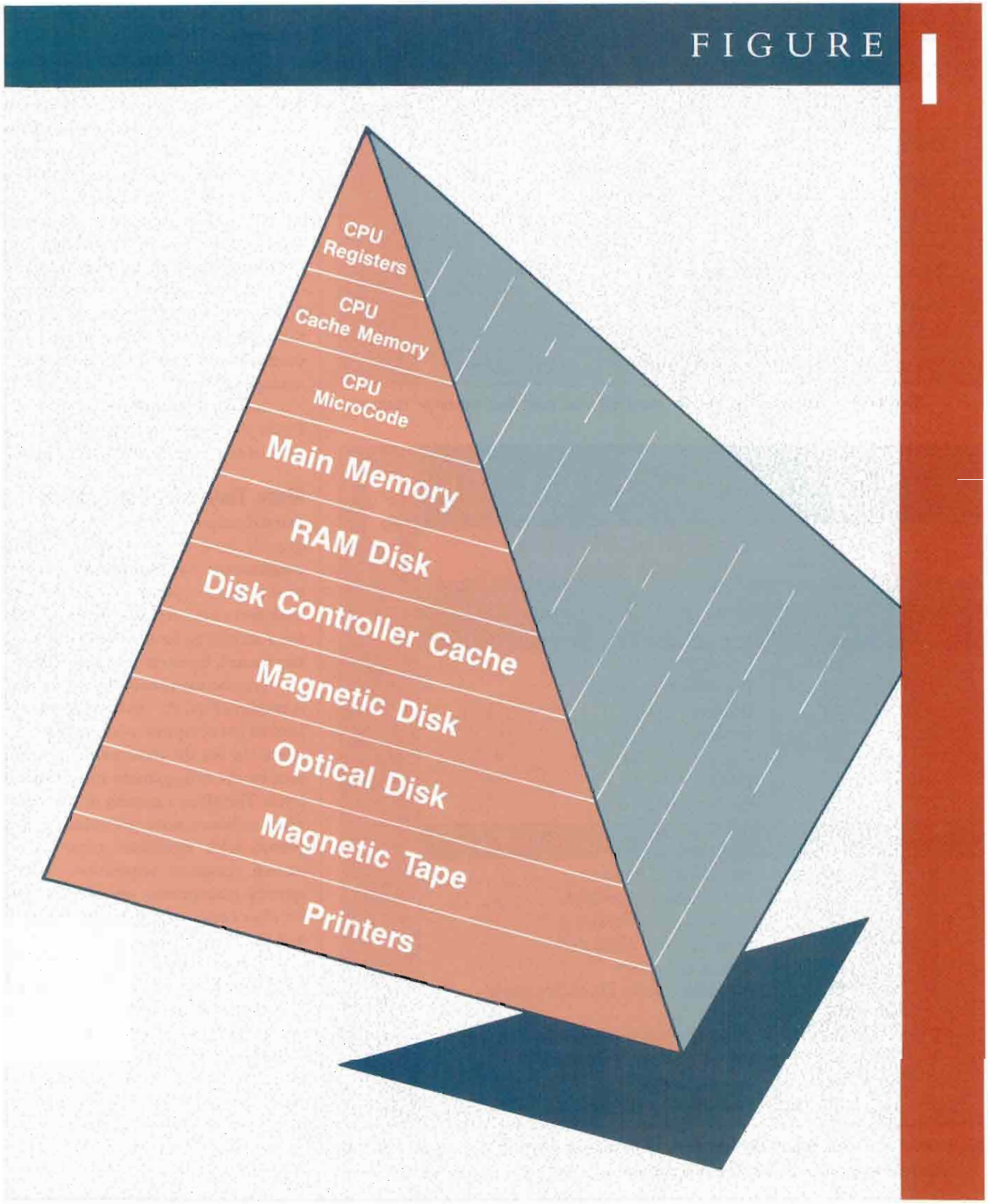
Using an intricate blend of scheduling queues, priorities and memory resource management, MPE allows and/or pre-empts access to the central processor, disk I/O and main memory resources to maintain a responsive transaction processing environment. When resources are matched adequately to demands, performance is considered to be "good"; when demands exceed resources, performance degrades.

The range of processors from the Micro-3000 to the Series 70 provides various capacities of critical processing resources used by MPE to satisfy processing demands. Those critical resources are the Central Processor Unit (CPU), Main Memory (MEM), Disk Online Storage (DISK), Tape Offline Storage (TAPE), Printers (PRINT) and Terminal Handling (TERM).

These components often are formed into a pyramid-shaped hierarchy (*figure 1*) with relatively slow printers at the base of the pyramid, working upward through magnetic tape drives, disk drives and main memory to CPU cache, and reaching the fastest components, CPU registers, at the pinnacle.

This pyramid shows not only the increase in speed as you move up the structure, but also the relative availability of each resource which is (not coincidentally) inversely proportional to its cost.

Performance management is the active process of monitoring the consumption of these resources and projecting future demands for each in a given environment. A successful performance program addresses the system's environment and the specific hardware and software set. One site may demand 100%



The storage heirarchy which, moving from base to top, indicates the relative availability of each resource which is inversely proportional to cost.

FIGURE 2

Equipment Inventory		
Equipment	Disk Subsystem	System Printer
Capacity	1.2 Gbytes	7,000 Pages/Day
Duty Cycle	100%	50%
Minimum Time Between Failures	20,000 Hours	1,000 Hours
Maximum Time to Repair	6 Hours	12 Hours
Throughput	60 (1 KByte) Xfers/Sec.	32 Pages/Minute

Two inventories detailing system resources and uses that consume resources.

FIGURE 3

Application Inventory		
Pass #1		
Rank	Category	System
1	BC	Payroll
2	BC	Salesman Commissions
3	BC	Customer Orders
4	BC	Invoicing
5	BC	Accounts Payable
6	DC	EMAIL
7	DC	General Ledger
Pass #2		
1	BC	Payroll Time Collection
2	BC	Payroll Check Generation
3	BC	Salesman Commissions
4	BC	Shipping Order Generation
5	BC	Invoice Generation
6	BC	Accounts Payable Check Generation
7	DC	EMAIL
8	BC	Customer Orders (Remaining Portions)
8	BC	Payroll (Remaining Portions)
9	DC	General Ledger
10	BC	Accounts Payable (Remaining Portions)

Experience over time refines the inventory of processing applications. To get a desired result, several intermediate inventories over a period of time may be necessary.

system availability while another may accept only 80%.

Some sites place high importance on online systems; others on batch processing or heavy print loads. Whatever the emphasis, a set of performance standards must be established, measurement tools must be acquired, and reporting formats must be determined.

Before delving into technical performance analysis, let's inspect each of the system resources and establish capacity, duty cycle, minimum time between failure, maximum time to repair and throughput specifications. These will determine requirements for performance management.

To help with establishing priorities, I offer the following socio-political aspects of system performance perceptions.

More Than I/Os Per Second

Printed output from the system is a frequently used measurement of system performance. You say terminal response time is more important? Well, let's step back from the precipice of the obvious for a second to look at the computing service as a business support resource.

Transaction processing serves (and is employed by) the clerk/administrative level of the company, whereas batch reports are, for the most part, all that is seen by the management and executive levels. Therefore, a missing or late report often indicates poor performance to a person with significant control over system resources acquisition. Subsequently, management priorities must be set after considering both the resource and the client.

Terminal users perform all sorts of transactions ranging from a simple :SHOWTIME command, which requires almost no resources, to a COBOL source compilation which puts stress on nearly all system resources. Because there are many definitions of response time, it's a relatively useless measure of performance except when specified for every transaction on the system.

On the other hand, terminal users develop a *feeling* for the time necessary to perform certain tasks (*transactions*, if

Magnetic tape drives typically have a low duty cycle . . .

you choose), both in comparison to others and at certain times of the day, week and month. While a terminal user's perception of performance is relative and difficult to correlate to statistical data, the correlation of measurable system parameters with user perception is critical to the management program.

Processing tasks carry certain expectations of processing time. One would expect to take less than five seconds to retrieve a telephone extension from a database given a person's name. If it takes 30 seconds, performance is poor; if it takes one to five seconds, performance is good.

Another example might be the generation of a report of customers who owe more than $500. Getting this in less than five seconds isn't likely, although waiting over an hour might be unreasonable. The difference in expectations can be used to establish a set of rules for trading the capabilities of an available resource for a scarce one. They also can be used to establish rules for providing access to system resources as a whole.

In these examples, we have four seconds for the database lookup and probably several minutes to work on mass data retrievals.

Expectations Plus Perceptions

Even though MPE attempts to provide a good transaction processing environment, it does so at the expense of providing high-batch throughput when competition exists between the two. Tuning parameters can be used to tell MPE the extent to which it will favor one over the other.

Likewise, much effort must go into developing a sense for system user needs for processing capabilities then *tuning*

FIGURE 4

System Availability Statement For September 1987
Calendar Hours — Prime Shift = 315
Calendar Hours — Non-Prime Shift = 525
Scheduled Down Time — Prime Shift = 2
Scheduled Down Time — Non-Prime Shift = 140

System availability for a five-week fiscal month.

FIGURE 5

System Availability Log For September 1987

Date	Time Down	Time Up	Time Unavailable	Time Available	Reason
09/01	21:00	21:20		21:25	Sys Config
09/01	22:00	02:05		02:05	Sys Backup
09/02			17:00	23:50	Big Batch
09/03	00:00	04:00		04:00	Sys Backup
:	:	:	:	:	:
:	:	:	:	:	:
09/30	14:00	14:15		14:20	Power Fail
09/30	17:00	17:55		17:55	MPE Update

A simple data log becomes important for computing* available *and* down time *numbers.

the user's expectations to the overall capabilities of the system.

This is a cooperative effort worthy of negotiation. The result of the tuning process should be clear delineations between the *1. critical, 2. important, 3. valuable, 4. useful* and *5. the useless* processing tasks. The latter category should be no surprise although it's rare anyone would place anything into it unless forced to do so.

To begin the process, two inventories need completing, the available system resources and the processes that consume those resources. Generally, data for the resource inventory is more easily gathered than that for the process portion. Once the resource inventory is completed, performance characteristics for each should be specified, such as in *figure 2*, which shows a typical set of data for print and disk subsystems.

Several terms used in *figure 2* bear some definition. *Capacity* states the upper boundary of the resource in its own unit of measure. Disks are specified in bytes of data stored, printers in pages of print per day and magnetic tape in bytes per inch of tape.

Duty cycle specifies the percentage of time that the unit will be "on" compared to the time it'll be "off." Magnetic tape drives typically have a low duty cycle, say 20% or less whereas a CPU will carry 100% duty cycle.

Minimum-time-between-failures specifies the expected degree of reliability. A unit that fails every 24 hours needs sufficient throughput to make up for lost time. *Maximum time to repair* states the urgency to get the unit online following a failure.

Throughput specifies the rate at which the unit is expected to perform. These parameters work together (or against each other) to determine the maximum expected performance capabilities of the system.

Applications Inventory

The inventory of processing tasks results from a series of inventories performed over an extended period of time (one or more years may be required). Each inventory should further refine the list from broad categories like payroll, accounts payable, human resources and general ledger into subcategories.

Though broad categories are used in the first pass, some subcategories are sufficiently critical to the success of the performance program to be considered from the outset. Weekly payroll, monthly salesman commissions, and electronic mail very well may be ranked higher than other entire systems.

Applications Priorities

Applications for many different management functions can be categorized by company need; i.e., business critical (BC), department critical (DC), department support (DS) and personal support (PS). *Critical* indicates that the function controls the ability of the organization to perform its primary mission; whereas *support* says the function improves productivity or supports growth of the functional responsibilities.

Need and *value* aren't always complementary, just as value and cost sometimes oppose. The categorization process used here doesn't address itself to value or cost. Such evaluations should remain in the applications development and client domain.

Using this scheme, the inventory process should attempt to list all business-critical processes separately,

The sum of the resources required to support the mission-critical processing establishes the must-have *service level . . .*

so their resource requirements may be determined.

Figure 3 depicts two passes over a typical application inventory with priority rankings included. *Pass one* of the inventory process includes only the major categories of seven application systems. Each is ranked to show relative importance to the organization. If, for some reason, insufficient resources are available to keep all seven systems running, the higher ranked systems would get preference.

Pass two isolates three subsystems from the seven already ranked. These three are assigned rankings that place them into more appropriate positions based upon company needs. (Note that the EMAIL system ended up with a higher ranking. An executive must have missed an important meeting.)

It's important this inventory, classification and ranking process be performed by the clients, and agreed upon by executive-level management, because it forms the basis for most equipment purchases, system access priorities and performance tuning objectives. Obtaining executive-level approval also helps to establish client expectations concerning system and support personnel service levels.

The next step: Associate each application inventory with a set of processing resources and performance criteria. The sum of the resources required to support the mission-critical processing establishes the *must-have* service level for the system. The *department support* processes determine the *should have* service level. The *personal support* processes establish the *would-like* level.

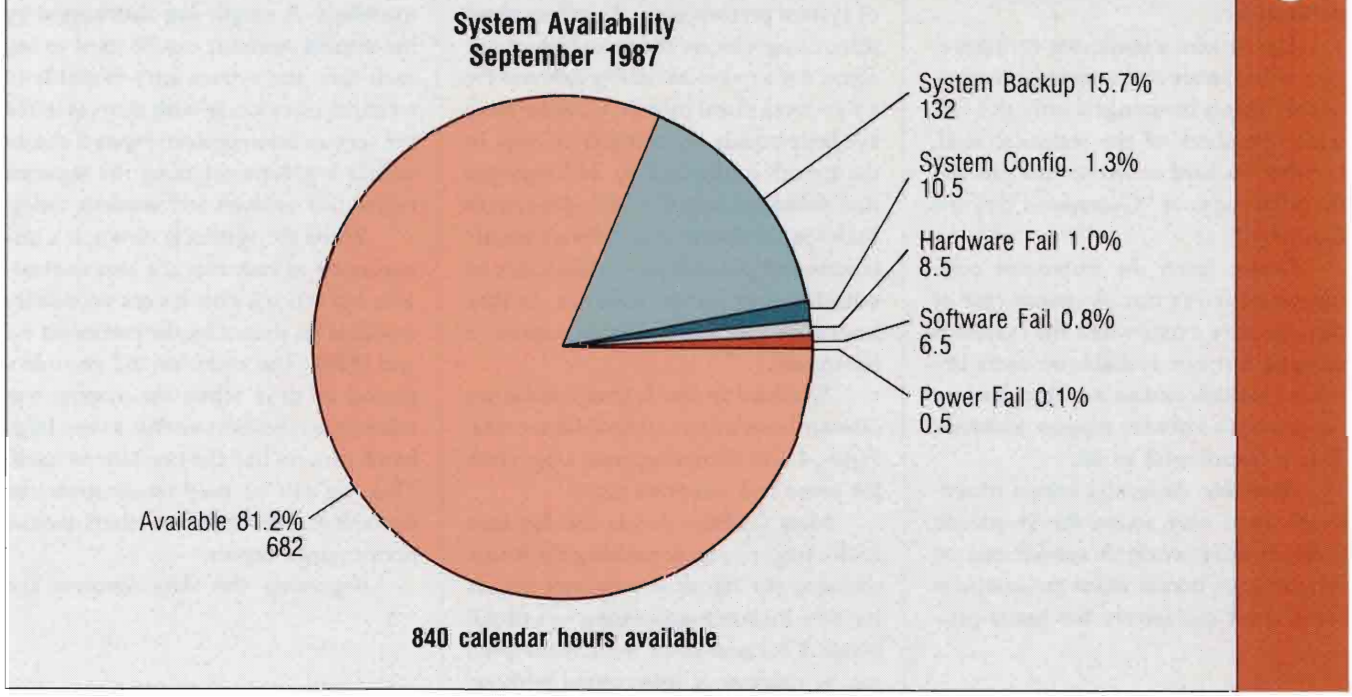
Don't think for a minute that these categories are rigid. The person sitting at the terminal or awaiting a report isn't going to look up the position and category of the application before becoming frustrated with a slow system.

Rather, these categories and rankings are used for disaster-recovery planning, system-failure recovery, long-range planning and for specifying performance measurement tools. The rankings are also used to set priorities for each aspect of the performance measurement program.

A Broad View

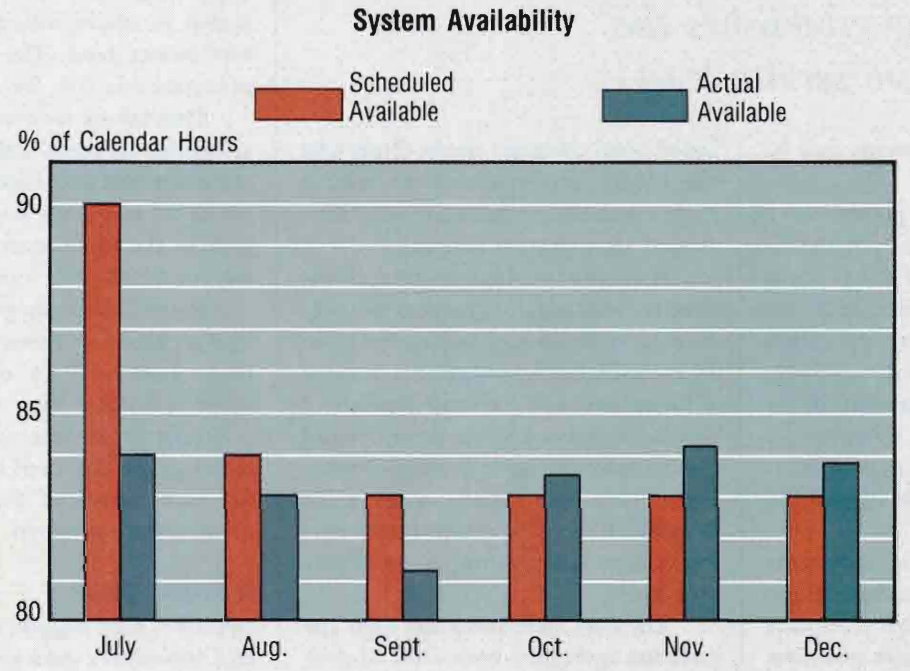
Up, *down*, *slow*, *sluggish*, *erratic*, *OK*, *bad* and, sometimes, *quick* are terms used to

FIGURE 6



The distribution of system availability.

FIGURE 7



The trend of system availability.

describe computer system performance. Following is a set of terms used to describe the "subjective" level of system performance:

Up: At least a minimum configuration of hardware and software is operational. This is meaningful only to a few select members of the technical staff, Hewlett-Packard service technicians and the holder of your "Guaranteed UpTime Contract."

Down: Even the minimum configuration won't run. A special case of this category exists when the system is running but not available to users because it's dedicated to a system backup process or to software support activities. This is meaningful to all.

Available: At least a subset of terminal users may access the system to perform their work. A special case of this category occurs when the system is being used exclusively for batch-processing such as weekly or month-end reporting.

When putting together a statement of system performance objectives, these three categories are the most important. *Figure 4* is a *system availability statement* for a five-week fiscal month. *Calendar hours* available equals the number of days in the month multiplied by 24 hours per day. *Scheduled down time* includes system backups, hardware and software installations and possibly some allowance to outside constraints such as facility improvements that might require a shutdown.

Scheduled up time is computed from *calendar hours* minus *scheduled down time*. *Figure 4* also shows separate objectives for *prime* and *non-prime* time.

Most facilities divide the day into such categories by separating the hours required for terminal accessors versus the time for batch-processing — a useful division because batch work most often can be delayed or interrupted without affecting the end user, whereas transaction-processing can't.

System availability data also is easy to collect. A simple log maintained by the system operator can be used to log each time the system isn't available to terminal users along with the reason for the service interruption. *Figure 5* shows such a log demonstrating the separate entries for *up/down* and *available* times.

When the system is down, it's unnecessary to state that it's also unavailable, but when it's up, it's not necessarily available (as shown by the entries on 9/1 and 9/30). The entry on 9/2 records a period of time when the system was taken from the users so that a very large batch process had the machine to itself. This log can be used to compute the *available* and *down time* numbers for the performance report.

Reporting this data involves the

creation of two charts: one, a pie chart as shown in *figure 6*, showing the distribution of system availability and reasons for down time; and the second, a series of clustered bar charts as shown in *figure 7*, illustrating the trend of system availability. *Figure 7*, expressed in percentages rather than hours, normalizes the data and shows direct graphical comparisons between four- and five-week fiscal months.

Graphic and numeric presentation of the objectives and their attainment focus on your operation's ability to provide adequate service levels. A system manager reporting more than one percent down time because of hardware and software faults should be working hard to resolve them.

An analysis like this showed that one installation would benefit more from purchasing 6250 BPI/125 IPS tape drives than it would from a CPU upgrade.

Another helped demonstrate greater gains from a two-hour *prime time* increase than from adding a third shift of computer operators. Take no action, other than to address gross inadequacies, until at least three months worth of data has been gathered. The cause/effect relationships must be measurable in any management program to support the methodology and add credibility to the decision process.

I'll discuss the terms slow, sluggish, erratic, OK, bad and quick in a future article. At this point, you have enough material to construct a system performance management program or evaluate system performance organizations. In future articles I'll develop a complete program following the pattern established here. Please share your alternative views and complementary programs with us. —*James F. Dowling is manager of Computer Services for Bose Corporation, Framingham, Massachusetts, and technical director of Volz Associates, Inc., also of Massachusetts.*

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COGENT BETS ON 840s

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One of our most valued clients bet his job (and we bet our company) on the new Hewlett-Packard 9000 Model 840. So far, we're both winning.

For a year and a half, we at Cogent Software (Stockton, CA), a systems integrator and custom software firm, and the Corn Products unit of CPC International (Englewood Cliffs, NJ) were on a difficult odyssey, searching for the right computer hardware to run manufacturing management and process control software at four corn wet milling plants of the $700 million food-processing division.

We took a chance on HP and our client at CPC took a chance on us and our recommendation.

Today, CPC has four HP 9000/840s in four separate U.S. locations running our software packages, and we've cemented a close relationship, continuing to develop custom software packages to help them run their business. If things keep going this well, CPC may order more 840s.

We've both taken a pioneering role in the use of this HP computer, which wasn't designed for commercial applications, but rather scientific and engineering ones. We've proven that it's much more a general-purpose machine than anyone thought.

9000

Betty Guerrero

THE HP 9000/840 is the first of a new generation of reduced instruction set computers (RISC) Hewlett-Packard is marketing. These "precision architecture" computers, as HP calls them, are based on a design concept that delivers very fast processing speeds at lower costs than conventional computers.

The design features a 32-bit architecture, and the increase in speed is a result of an instruction set that's been simplified and implemented directly in CPU hardware.

Eventually we hope to develop a fully closed-loop, real-time, computer-integrated manufacturing (CIM) system for CPC that will take information from the processing operation and feed it into the management database, which in turn will control the processes.

Managers would be able to make decisions based on absolutely current information.

This kind of feedback system is particularly important in the food-processing business where traditional MRP systems are inadequate.

Just-in-time inventory control means nothing here, because when millions of tons of produce arrive on their doorstep, they have to be ready to work.

They have to make their products when their customers want them and when the weather makes the materials available. Margins also usually are quite thin, so shaving pennies wherever possible is vital.

Six and a half years ago, Cogent Software was born as a computer dealership and custom software firm here in California's Central Valley. We began by designing systems for a variety of small firms.

However, as we worked to develop the system for CPC, I realized that with my real-time systems background in the wagering operations and food-processing industries, Cogent fit perfectly as a systems integrator in the food-processing field, so now business is expanding in that direction.

There are few software packages on the market now that really address the problems of the food-processing industry.

HP's 9000 Model 840, designed for scientific and engineering applications, has proven to be more of a general-purpose machine than expected.

CPC's Stockton plant processes raw corn to produce high-fructose sweeteners, starch, animal feeds and other products for soft drink manufacturers and divisions of its parent CPC International.

This plant is one of CPC's smaller ones, but often is on the leading edge of technological innovation.

Based on what I knew of HP and some gut feelings about what the 840 would do when it was shipped, we recommended it.

LATE IN 1985, CPC plants across the country began a series of pilot projects in the computerization of their various functions, because the company was switching to a regionalized business structure. This meant that CPC wanted to move to a distributed data processing system from a centralized one to mirror the organizational change.

To make things more interesting, CPC also was going to switch from a Honeywell mainframe to an IBM.

CPC's Stockton plant asked us to computerize its order-processing function, which at the time was running on a Honeywell mainframe using leased lines data entry during the day and batch transmissions from the plant to the headquarters overnight. It wasn't fully doing the job for them.

Down the line, CPC did a study of all the pilot projects in a search for a single vendor that could provide hardware and software for all of its operations.

We developed a very successful order-processing system, one of the tougher jobs, but a critical one because it controls all the money. If the orders don't get into the system properly, shipments don't go out; if the invoices don't go out properly, the money doesn't come in.

Another key ingredient, the one that eventually won Cogent the CPC contract, was a custom communications package. None of the competing vendors had been able to produce one. This package had to enable CPC to pass orders from any plant to any other plant. It had to let a customer order it from one plant and have it ship from another plant, or consign it to a different warehouse.

The arrangements are quite complicated and, further, all of the information had to be sent to a central headquarters point. This problem would be easy enough to solve with a five million dollar X.25 network, but when you try to do it with just modems and straight communications with UNIX calls, it can get difficult.

We originally developed the system on an Alpha Micro mainframe. Against competition using IBM and Prime, our system was faster, better and cheaper. For a variety of reasons, though, CPC asked us to use a different computer.

So, we investigated the AT&T 3B2 Model 300, because we wanted to port to UNIX in order to make our applications more or less hardware independent. We located an excellent translator that could convert 60% of our Alpha-Basic code to a UNIX-based language called UX-Basic. We hadn't heard of UX-Basic before, but were told that it was a popular language in Europe.

What a disappointment! Our application ran so poorly; it just crawled, and this was doubly frustrating, because we'd spent an inordinate amount of time debugging the compiler.

On top of that, just before we were to demonstrate our systems to CPC, AT&T began to have problems in its computer operations, and we worried that CPC management would balk at using hardware from a company that was uncertain about its future computer business.

WITH THREE DAYS LEFT until demo day, we switched to the Convergent Technology MightyFrame. CT was quite responsive to our needs. In one weekend we ported hundreds of our programs, along with the compiler. It wasn't easy, but we got it done and it performed beautifully.

At the time, Cogent was unaware of the decision CPC had made to eliminate Cogent from the contract race when the executives arrived. Fortunately for Cogent, the speed with which we had switched and the quality of our software convinced them to give us another chance. They still wanted to go with a bigger hardware vendor, however, which sent us looking for a new machine.

I had worked with Digital Equipment and Hewlett-Packard over the years and had come to respect them both. I successfully had used HP 1000s, 21MXs, 3000s, some small desktops and lab equipment in the past.

Our final quote gave options for HP, DEC, Prime and Convergent systems. At the time, we hadn't even seen the HP 840. Based on what I knew of HP and some gut feelings about what the 840 would do when it was shipped, we recommended it.

The main factors in the decision were that the HP-UX operating system is an implementation of the standard UNIX System V, and the company is stable and well regarded. We thought we could get the speed we needed from it, and the base price, about $81,000, beat the VAX 8600, also a 4.5-MIPS (million instructions per second) machine, which sells for about $350,000.

To get started, we ported our programs to the HP 9000 Model 550, a con-

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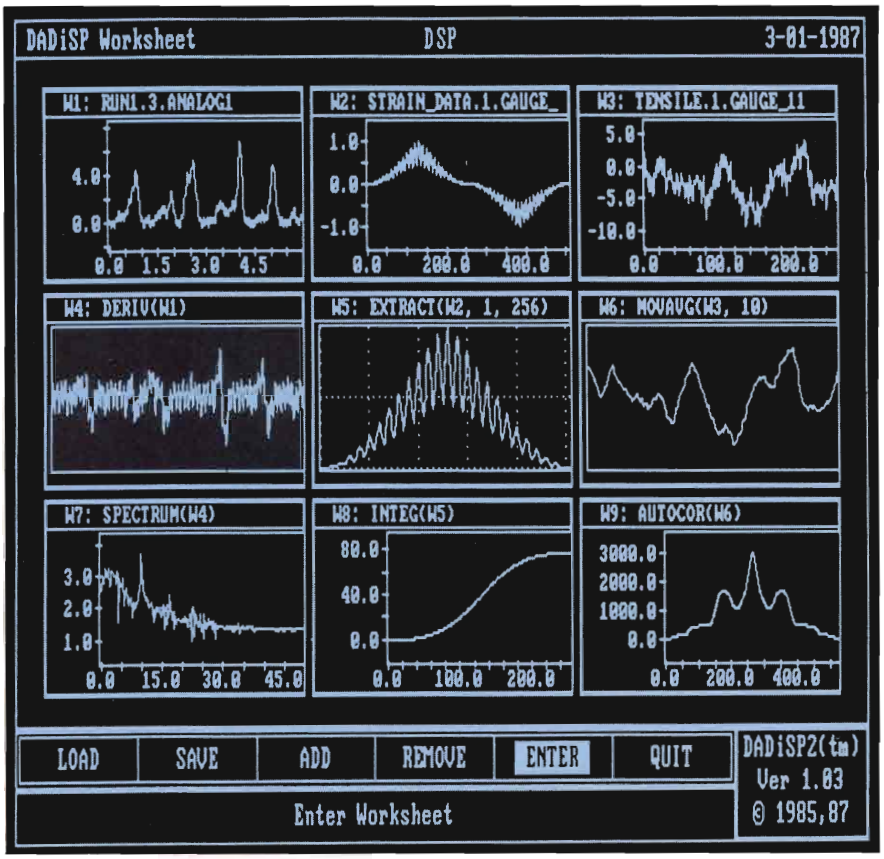

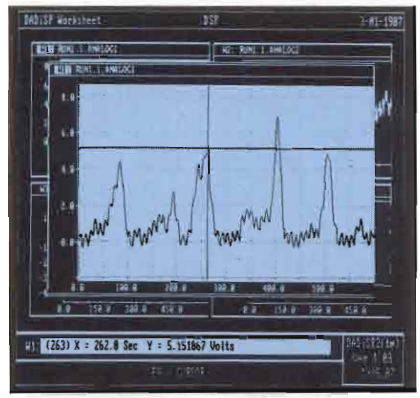

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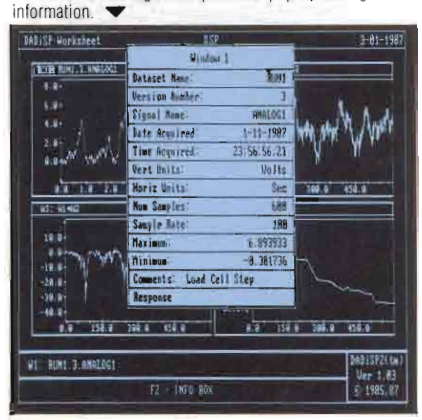

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ventional computer and the largest 9000 before the 840 arrived. This step gave us an idea of HP's support, which was excellent, as well as an idea of the way the 840 would work. CPC liked everything about it except the speed, which we were sure the 840 would provide.

When the computer was released to developers, HP gave us all the time we needed at its Software Evaluation and Migration Center in Cupertino. We got a large workspace with locking cabinets and a technical specialist who stayed with us (there were two of us). In the interim, Cogent bought the source code to the compiler we were using so we'd be able to debug it and then support it no matter where it was used.

We occupied the migration center for 48 hours without food or sleep. The HP technical specialist, Jim Morrison, one of the best engineers and programmers I've ever worked with, stayed too. At the end of that weekend, I couldn't believe the impressive results. Using just the compiler, with some repetitive operations we were getting speeds that were hundreds of times faster than the AT&T 3b2 and 30 to 40 times that of the HP 550.

I thought something was wrong, that we were missing something. And then I thought that the 840, a native C machine, probably was doing so well because it was running just the compiler. With our code, which really is a pseudo-code somewhere between an interpreter and fully compiled, I was afraid that the 840 would slow down drastically. We still got hundreds of times the AT&T and 40 or more times the 550.

The complete porting job, including the compiler, took only four weeks. It was a major effort, but HP made it possible.

I was impressed — both with the 840 and with HP's support. The only problem we had was delivery time: We wanted to take the machine home with us, but HP's schedule was a more realistic three to four weeks after an order was placed.

. . . we were getting speeds that were hundreds of times faster than the AT&T 3b2 and 30 to 40 times that of the HP 550.

Another facet of the 840 that's important to CPC and Cogent for the future is that HP-UX is a real-time operating system, making it different from other UNIX systems.

Cogent got the contract to computerize CPC's four U.S. corn wet milling plants. In the process, we're automating its accounting functions and other applications such as grain mangement. We're moving into production control, quality control, materials mangement and scheduling.

The HP 840s have run without a problem since they were installed. Other software vendors, systems integrators and independent resellers I've met report the same kind of performance and support we experienced.

We think the 840 is better than any machine we've ever seen. It made it possible for Cogent to get the CPC contract and also made our client and the executive who championed us look good. *—Betty Guerrero is president of Cogent Software, Stockton, California.*

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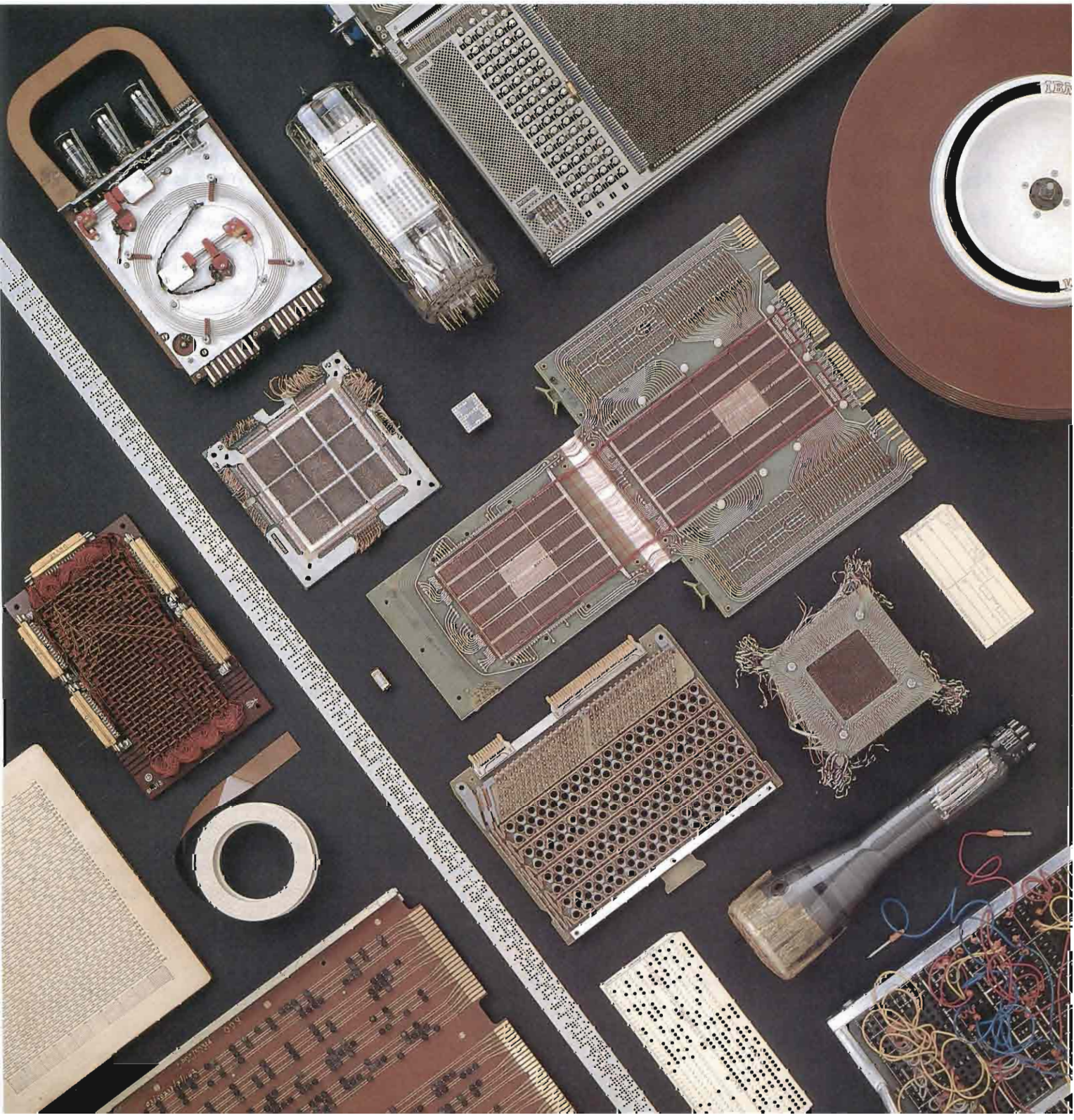

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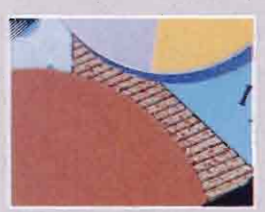
HP Systems Managers Will Be Faced With Choices Brought About By The 4GL Wizards.



DBMS/4GL

Al Cini

Editor's Note: Within the HP 3000 universe, selecting a database management system (DBMS) has been by the virtue (or vice, depending on your point of view) of a choice of one. And that one is that which comes in the box — Image or its latter-day update, TurboImage. That fact has certainly made life easier over history for the HP 3000 user community.

That fact also makes HP-land very different in character from the Digital Equipment Corporation marketplace, where astutely choosing a DBMS/4GL is, at the very least, a daunting feat requiring some technical virtuosity of systems managers.

This general guide to selecting a database is the beginning of a series on Image, TurboImage and ALLBASE/XL — and, most important, on the third-party 4GL software enhancements that have added function and performance to Image — now that the bloom is off the HPImage rose for the moment.

Spectrum developments and delays coupled with user concern about the future of the 3000 and the new class of computers have caused many users to consider the possibility of migrating out of HP's fold and into the arms of another computer vendor. Before they do so, it must be clearly understood that the question of database choices isn't one to be taken lightly.

And, at another level, the choice of databases for PCs didn't used to matter much: If you chose the wrong one, pick a new one and start over again. Neither the money nor the time spent were as critical or sensitive as in a large, multi-user environment. However, the advent of big, powerful storage devices and systems for micros, plus the LAN, now make decisions at the networked PC level more important than ever before and, at the least, departmental in nature.

So, whether you're thinking about the future of Image on your 3000; about your database future outside of the HP community; or your future with networked 150s, Vectras, Integrals or 9000s, understanding what makes a good DBMS/4GL to fit your system and applications needs is mission critical.

Finally and fondly, contributing editor John Abernathy brings it all back to how well Image measures up in his thoughtful sidebar.

A good database management/4GL system is one that will satisfy your specific requirements. A good DBMS/4GL isn't necessarily "relational," or "Codasyl-compliant," or "written in the C programming language."

A reliable product that does what you need at an attractive price is worth considering, no matter whether it uses relations or sets, or whether it's hierarchical or network, or whether it was written using an interpreter in emulation mode. This "buyer's guide" avoids prejudice in favor of one buzzword over another, and tries instead to help you develop your requirements objectively.

No law of nature mandates the use of a DBMS/4GL; many very successful software systems have been implemented without them. Before taking the database package plunge, be mindful of the added cost in database administration effort it will impose on your shop.

For highly specialized purposes involving unusual data models or demanding super-fast response, it may be that no DBMS/4GL product will adequately fill the bill. For such rare situations, you may need to grit your teeth, bear down and write your own DBMS/4GL. For the intrepid few who choose to embark on this course, I offer the following advice: don't do it with an interpreter using emulation mode.

ALL DBMS/4GL PACKAGES provide two crucial services: the ability to define data, embodied in some sort of Data Definition Language (DDL); and the ability to manipulate data, sup-

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ported within a Data Manipulation Language (DML). Look carefully in both the DDL and the DML specifications for any "knock-out" restrictions that make it impossible or unwieldy to work with the information you have in mind.

If ease of use is among your major concerns, consider some sort of "try-before-you-buy" arrangement.

An object or event, such as an employee or an invoice, will be represented within the database by a logical record. Within a logical record, fields will contain individual characteristics of the object or event, such as "date of birth" or "total dollar amount." Structurally similar logical records will be organized into collections usually called files or relations, and the set of all files or relations constitutes the database.

To quickly retrieve one of thousands of records from a file or relation, you might define a special key (index) using a specified field. Employees may be located from within an employee database file by way of such an index defined on a "last name" or "social security number" field. In practice, you may need keys on both fields, or a key that is defined in terms of more than one field.

Different kinds of DBMS/4GL products refer to these structures using their own special jargon and implement them on the machine using radically different techniques, but conceptually they're all much the same.

Starting with the obvious, consider a candidate product's quantitative capacities.

1. What limits does the package impose on:
a. the number of relations or files within a database?
b. the number of logical records in a file or relation?
c. the number of fields within a logical record?
d. the size of a numeric or character string field?
e. the number of concurrent database users?
f. the number or size of logical record access keys?
2. Can fields of all required data types (decimal, floating-point, date/time, string, etc.) be defined?
3. Can access keys involving more than one field be defined?
4. Can the fields be of different data types?

If you're the Department of the Treasury you'll want to make sure that negative decimal numbers in the trillions can be represented in the package. If you're Carl Sagan, the ability to represent a *billion, billion* cubic meters of star stuff might matter most to you. Make sure the product provides the data types and corresponding value ranges you need.

Modeling Your Information

A database management system's DDL must allow you to represent not only logical records, such as employees or inventory items, but the relationships among logical records as well. If the package's DDL fails to provide syntax to express the relationship between, say, an EMPLOYEE and a MANAGER or DEPARTMENT, then the package is plainly not a database management system.

1. Can needed interrecord relationships be represented?

Sometimes, one record (e.g., DEPARTMENT) may be related in some way to another (MANAGERS) or several others (EMPLOYEES). Usually, a particular record will be related to several others simultaneously, as EMPLOYEES relate to both DEPARTMENTS and DEPENDENTS. Make sure that all the necessary interrecord relationships can be represented by the Data Definition Language of your DBMS/4GL package.

2. Does the package support database views or subschemas?

Some products offer the ability to organize your database's records and files into special logical subsets, sometimes referred to as subschemas or views. Using such subsets, you can make your database a lot easier to manage and understand. You may not think you need it (in fact, some DBMS/4GL products force you to use subschemas), but this is a very handy feature and you should look for it.

Edit Sensitivity

In planning and building your database, make sure minimal edit-sensitivity is one of your principal goals. In an edit-sensitive system, a change to any part of a structure requires many corresponding changes in other parts of the structure.

On the other hand, the functional characteristics of an edit-insensitive system can be changed with a single edit. Edit-insensitive software is table-driven, while edit-sensitive code is constant-driven.

Edit-insensitive database definitions are easier to administer, to program for, and to use. Ask the following questions about each candidate product:

1. Are "data" and "programs" truly independent?

You should favor candidate products that don't force you to edit programs or procedures when you change your data definitions. Note that many DBMS/4GL products will require that you recompile or relink applications when database changes are made; this is called "early binding," and represents a common run-time-performance tradeoff against flexibility. When a product forces program recompilation, ask why. You

should favor products that force recompilation of only those programs that refer to the changed data definitions. DBMS/4GL products that automatically report the names of affected procedures when data definitions are changed get a silver star as well.

2. Does the package support computed fields?
A computed field is a data item whose value automatically is determined as a function of one or more other fields, variables, or constants. An employee's age in years can be defined as computed by the current date minus date-of-birth.

Computed fields reduce edit sensitivity by allowing the DBA to change the formulae by which they are calculated without changing the programs and procedures that reference them. They also reduce storage requirements, because computed fields don't occupy space in the database.

3. Can "template" data items be defined, to be referenced later in the definition of actual data fields?
Often, several fields in different records will share a common nature; for example, a "last name" field might exist in both an EMPLOYEES and CLIENTS relation. We prefer DBMS/4GL products that require us to define such generic fields only once.

4. What kinds of changes can be made to the structure of a database without unloading/reloading the data within it?
This question strikes at another potential performance trade-off. If our planned database application is well understood up front, and will be built all at once with little on-going modification, then we can accept the inflexibility of having to reload our data when definitions are changed if it buys us faster or more consistent access performance.

On the other hand, if we plan to implement our application in phases and to change database definitions frequently, we may not be able to afford the "down time" regular data reloading will demand.

This static-vs.-dynamic balance is a principal distinguishing feature between "network" DBMS/4GL products which are more rigid, and "relational" products, which more willingly permit dynamic changes to database structure.

The argument in favor of one or the other general DBMS/4GL approach is becoming moot as vendors of "relational" products begin to offer run-time performance rivaling their network counterparts.

5. Does the data dictionary include a "self-reporting" facility, that can be used to produce database documentation for users and auditors?
Since database documentation is a database administrator's (DBA) most visible product, and given the kind of

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Probably Ronald Reagan couldn't have hoped for more. After all, here was the quintessentially romantic American story of how one marriage and resulting family stuck together, providing stability, predictability and reliability through the turbulent, havoc-wreaked, change-wrought world of the '60s and 70's right up to the present. The HP 3000 computer family and its database management system, Image, are an American marriage of historic and probably socially significant proportions.

OK! OK! Enough snickering in the back row. At least you could say it was a hardware and software combination that thrust a $960 million company primarily known for its instrumentation products (and whose computer wasn't exactly setting the world on fire) toward becoming an $8 billion plus computer manufacturer in competition with the likes of IBM and DEC, especially in the commercial data processing minicomputer marketplace.

This pairing of hardware and software is practically without peer in the domain of all-sized computers. Few hardware/software mates can point to such a lasting history of service where the customer has been afforded the gains of improved technology with so little apparent change in the man/machine interface. IBM, for all its success, is notorious for the imposed trauma of hardware and software change so costly in dollars and time to the customer. Yet, because of this marriage and subsequent family stability, the prodigal programmer could defect from the HP fold for a span of years; only to find, upon his homecoming, the warm, fuzzy feeling of still knowing how things worked, and of being pleasantly surprised at a faster, more complete and more sophisticated database machine.

While the recent evolution to TurboImage has been the most difficult in Image's life span, it's but a small bump in a long road, considering the software's life cycle. Its hardware companion also has experienced a few bumps along the way, but came through stronger and more flexible in the end.

Is this commercial and technological success an accident? No more than the successes of the natural world are accidents (if that's not too metaphysical for you).

Both Image and the 3000 are the outcome of a sound base of excellent engineering for which Hewlett-Packard is renowned in the technological slice of America and the world. Alone, these lifelong companions would have joined the long list of computer has-beens; together they formed the base for a company whose name is now a household word.

What is the fundamental attribute that underlies this success story? Albert Einstein said it best: "Everything should be made as simple as possible, but no simpler." Elegant simplicity.

HP's database system is essentially a two-level hierarchical system that may not always perfectly match a business or technical structure, but nevertheless is capable, with careful manipulation, of solving most of the informational needs of business and industry. It was true in the '60s. It's still true today.

A master level and detail level of structure, with multiple relationships of both. That's all there is to this giant among databases; thus, reliability, durability and flexibility. And service.

But does the database software stand apart from others on the HP 3000?

effort required to keep the documentation of a complex and changing database up-to-date, automated database documentation is a very desirable DBMS/4GL product feature.

The data dictionaries of most relational systems are themselves represented as special relations within the database. A DBA can use the standard database query facilities of such systems to produce human-readable database documentation.

Most DBMS/4GL vendors concentrate on "ease-of-use" features in developing their products, and the user-friendliness gap among DBMS/4GL software is consequently narrowing.

DBMS/4GL buyers still consistently overestimate their users' ability to do their own DBMS/4GL work, though, and typically underestimate the user support costs of DBMS/4GL tools.

1. Does the package offer an interactive query facility? Is it easy enough for non-technical users to work with?

2. Does the product offer on-line documentation or help? Are its informational and error messages clear and consistent?

If you're planning to make the database available directly to *non-computus-mentis* users, the answer to both of these questions should be "yes." Remember that "English-Like" doesn't necessarily imply "easy to use." Studies by IBM have shown that novices can acquire skills in the non-English-like Structured Query Language (SQL) more readily than with many natural-language-oriented query tools. Don't take the vendor's word for it. If ease of use is among your major concerns, consider some sort of "try-before-you-buy" arrangement.

3. Does the product offer:

a. a report writer?

b. a CRT screen formatter?

A candidate product which allows easy definition of interactive screen-oriented procedures or the generation of complex database reports will save you time and effort, but be careful: When these

usually interpretive procedures are running, there may be little left of your computer for anything else.

4. Is there a "host language interface" to the database, for programs written in third-generation languages?

Special database application programs will need to be written by programmers using conventional tools. In these cases, you'll need some way to get at the database from within FORTRAN, COBOL or BASIC programs.

Some products will require that your programmers learn complex and tedious parameter lists and CALLing protocols. Others will permit you to embed simple database language syntax directly into your programs. Obviously, programmers can work more productively in the latter environment.

5. Is both interactive and "batch" database access supported?

Make sure your machine environment's batch processor can execute DBMS/4GL procedures.

6. Can the database be distributed/accessed via a network?

7. Can data from outside sources be imported into the database?

8. Are corresponding export utilities provided?

9. Can separately defined databases be processed together?

10. Will the product work with other required software tools, such as graphics or word-processing packages?

Database integration with non-DBMS/4GL data and programs is a technical issue handled in as many different ways as there are DBMS/4GL products. Make sure you understand your integration requirements fully before making a final decision.

Users complain that "it's a pig." Salesmen brag that "it screams." System managers cry "it brought my CPU to its knees."

In fact, only pigs are pigs; while computer salesmen scream, their products don't; and a computer has no knees.

To control DBMS/4GL performance you must first understand it, and this means largely shedding the superstitious

Is it special? In another suit? Not really. The same file system that houses all HP 3000 software also houses Image, with some minor alternatives for security purposes.

But is Image really good? Was it the right choice? Well, in my book, it gets high marks in many of the points made in the informative article by Al Cini:

- Image does impose performance penalties for complex relationships. But these can be made when crucial to a project and can be avoided for performance gains when not.
- Size restrictions that have become more evident with passing years are solved by the new Turbo enhancement.
- While programming languages vary in their ability to handle most required data types, Image can handle them within reason.
- While manual masters are single-keyed, details can have many keys. Here one might wish for a detail that otherwise behaves as a manual master, since it has so many analogies in the real-life condition of commercial databases.
- Inter-record relationships are represented through associations of multiple masters and details.
- Database views and subschemas are possible through Image's security scheme. One user might never realize the total domain of a database should security exclude access. Data items and datasets are invisible to such a user while apparent to another with the need to know.
- Data and programs are truly independent. This is true both in Image, *per se*, and the supporting HP 3000. HP has many success stories because of this attribute.
- Image provides rudimentary tools for database transformations, too, and they were fine in the early years of the product. But increases in business and technology demands have provided the niche for excellent tools, first by Adager, later by DBGeneral and others.
- The human interface does lack the sophistication most of today's computer users have come to expect. Image's access, inquiry and reporting language (Query) is more of a technologist's tool, but with some effort can be dressed up to behave reasonably civilly (if somewhat limited) to the user. Here, again, solid vendor offerings have come forth to fill many of the gaps.
- Image does provide tools for third-generation languages such as FORTRAN, COBOL and BASIC. They could be better, it's true, but considering their age, it's hard to find much fault. Among minicomputers, the HP 3000 was one of the first to have a COBOL compiler on it (almost as an afterthought, I understand, since the 3000 originally was intended primarily for technical applications). Therefore, it lent itself to almost any kind of general business applications development.
- Image was designed with the interactive (on-line) user in mind. It was once a leader in this arena. And, of course, it does batch.
- Third- and fourth-generation languages provide the necessary bridges to let Image databases and networks communicate (as does modern extension of Query, Query B).
- Is Image a pig? No. Does it scream? No. Performance is reasonable and predictably inversely proportional to database complexity and size.
- Locking is available at every level of detail — base, record and item. The locking scheme (an agreement among users), however, can be circumvented by the errant programmer's design.

Continued . . .

. . . Continued

■ Image really makes the user's life easy in the area of hardware database without restriction. But tools are available for the technician to direct this storage should performance considerations so dictate.
■ Records are accessed by hashing and index. (See the *Image/3000 Handbook*, published by Wordware, 1984, Seattle, WA, and jointly authored by HP 3000 greats Robert Green, Alfredo Rego, Fred White, David Greer and Dennis Heidner, for an interesting and clear discussion of this and all aspects of Image.) Add-on products such as Dynamic Information Systems Corp.'s Omnidex can give binary tree characteristics to an Image database for generic searches.
■ One inherent, but not exactly uncommon, weakness of Image is documentation. HP's Image manual satisfies most needs of the everyday programmer. But when it comes to understanding Image and the designs of planned databases, the *Image/3000 Handbook* can't be equaled. It's so readable and so informative. . . . Can it really be about computers and such?

So, Image is good. Not perfect, but really good. Considering age and history, its nothing but excellent. For most HP 3000 users, it was and is the right pick (forgetting for the moment it was their only choice).

While the escalating expectations and demands of the user community will push for better and better database technologies, Image won't fade from the picture quickly because of the huge investment by this community.

One would hope, even, that some final evolution remains in this tail-end of the life cycle. (I have similar hopes for the venerable HP 3000.) But mostly, one would hope that the bridge to the future can be easily crossed, and the fundamental concept of simplicity not get lost. As for the 3000 itself, Spectrum seems to be an improvement on this theme with the RISC architecture concept. May Image's ultimate successor be as well founded. —*John Abernathy is president of Andover (MA) Software Company, a consulting firm that specializes in software design.*

behavior and misconceptions you've acquired about it. Try to deal scientifically with performance questions about candidate products.

1. Can the vendor provide customer references in a similar environment? How is the system performing for them?

Don't accept performance rumors spread at user conventions or claims made during sales presentations. Ask the vendor for references, and call on them. Most client references will answer your questions honestly and completely. Gather as many such reports as you can (no less than three if performance is a serious concern to you).

Most sales prospects ask vendors for benchmark result information or for help in conducting their own benchmarks. You should discount any vendor-published benchmark information, particularly those that provide performance comparisons with competing products.

Because the interpretation of benchmarks is inherently difficult and misleading, most vendors will be loathe to release them to you.

If you choose to develop your own benchmark test, remember that setting up a truly representative multiprocess performance trial and obtaining valid quantifiable results is a major undertaking. In most cases, you can act with equally high confidence on information provided by references and perhaps a few informal trials.

If you must formally benchmark the candidate products, first narrow the field of candidates by applying other evaluation points. Before you start devising your benchmark, make sure you empty your in-bin, call the family to tell them you'll be home late and then take your phone off the hook.

Performance

In multiuser environments, the handling of concurrent database updates is a major determinant of overall throughput. When a user reads a particular record in the database, the DBMS/4GL must somehow prevent others from modifying it until the initial "holder" is finished with it.

A DBMS/4GL may approach this problem crudely by locking everything whenever anybody does anything, or elegantly by locking only the individual records involved.

1. At what level is a database shared ("lock granularity")?

If you're planning to support lots of concurrent database activity, favor products that lock at the record level. Avoid products that lock whole relations/files or the entire database.

2. What concurrency sharing control is offered?

Database products that allow you to list what you'd like locked when you begin a transaction, or to inaugurate lock-free "read-only" transactions, can avoid locking overhead altogether in some cases and offer significant performance advantages.

Most DBMS/4GL products offer at least partial control over a few performance determinants, such as the size of buffers and pages and other internal database structures. Some additionally permit you to store certain records "via" related records, to increase the probability that they'll be stored on the same physical database page.

1. Does the Data Definition Language offer media control syntax?

2. Can records that are commonly accessed together be stored adjacently within the database?

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3. Are multi-volume databases supported?
While multi-volume databases are obviously needed if your database is too large for a single physical disk, certain DBMS/4GL products that permit you to place different database elements — for example, indexes and data records — on different disk drives can also help improve performance by taking advantage of overlapped disk operations.

4. Are records retrieved:
a. by hashing?
b. by an index?

For certain kinds of access keys, hashing offers consistently quick lookup with little adverse affect on record insertion; for other kinds of keys (i.e., those not uniformly distributed across their range of values), hashing into a "collision" can be very slow, both when storing and finding records.

Record access by binary-tree (B-tree) indexing can be almost as fast as hashing, particularly if the high-level index structures are cached in RAM, and to quickly retrieve database records in sorted sequential order an index will be required. Indexes will significantly slow storage and update operations, however, and you should take this into account if your planned application will involve high-volume database writing.

5. How often and when should database regions be reorganized?
Particularly where index structures are involved, this may be a serious question. For the most part, record access by B-tree index remains stable over time, as the B-tree algorithm performs ongoing index reorganization as records are inserted.

The candidate product may require some sort of regular unload/reload to reclaim "deleted" index space, however, so be sure to investigate this during your evaluation.

To support a hashing algorithm, the planned physical extent of hashed records must be pre-allocated in advance using a "maximum expected record count." If you exceed this maximum anticipated volume of records later, you may need to unload, redefine and reload this part of your database.

6. Does the product provide analysis utilities to report on space utilization or other database performance factors?
7. Does the database package include "fast-load" utilities?
As an early warning of a growing need for reorganization, space utilization reports can be very helpful, as can "fast-load" utilities to get data from native files into the database.

8. Does the data manipulation language automatically optimize queries?
You shouldn't have to tell the DBMS/4GL which indexes or hashing devices to use in your query commands; instead, the DBMS/4GL's DML processor should "optimize" your query automatically for you, hashing or indexing as appropriate.

As a side benefit, such queries are also less edit-sensitive, as they will continue to work without modification if you add and drop indexes or redefine your database.

9. Is the host language interface precompiled or interpretive?
If the DBMS/4GL offers a host-language interface, "pre-compiled interfaces" generally will incur less run-time overhead than "interpretive interfaces."

THE BASIC COMPUTER SECURITY problem revolves around granting or denying various kinds of access to differentiated classes of users. To accomplish this, the DBMS/4GL must either provide a dedicated user authorization database capability or ride piggyback on your operating system's standard user and security structures.

1. How are users and user classes defined?
Look for simplicity and flexibility here. You should be able to move a user easily from one group (e.g., payroll) to another (program development) without operational disruption.

2. What kinds of database access can be selectively granted and denied?
Beyond the mandatory read and write access protection, look for the ability to selectively grant and deny the control and definition functions normally reserved to the DBA. This security feature

is especially desirable if you're planning to allow end-users direct access to the database.

3. Does the package support data access auditing? Security alarms?

A largely forgotten part of computer security management involves the detection of attempted intrusion. If you expect such activity, you should look for this feature.

4. Can views or subschemas be separately secured?

A DBMS/4GL with this feature will offer you a very flexible measure of control over access rights to logical subsets of your database. If you need to allow certain users access to information about only the employees in selected departments, or to everything but the payroll fields in employee records, you'll need to look for a DBMS/4GL product which offers this feature.

5. What other security measures, such as encryption, does the product offer?

When defending your data against the IRS, KGB or high school students, every little bit helps.

6. Can database protection be bypassed by smart non-privileged coders?

A database and all its logical contents are usually mapped onto a standard operating system disk using standard OS files. A brainy programmer who knows enough about the internal structure of the database may use this knowledge to write a program that processes the database file directly, thereby bypassing the DBMS/4GL software and its protection schemes.

A DBMS/4GL developer can take a number of operating-system-dependent steps to prevent this. If this possibility concerns you, make sure you ask candidate vendors to address this in their proposals.

Preventing inconsistent or incorrect data from getting into the database is very much a function of the DBMS/4GL. You should be able to use the DDL syntax to specify at least some validity checking on data stored within the database.

1. Can constraints be defined to prevent illogical database modification?

Effective database administration starts with a serious commitment to a clear and practical database design . . .

"VALID IF" clauses within the definitions of certain fields represent a simple form of database constraint. A "gross payroll" field, for example, should be considered valid on entry only if greater than zero.

More complicated constraints involve relationships among records in the database. You might define a constraint preventing the storage of an order line-item in the absence of a corresponding order header, or the deletion of an employee if any record of that employee's dependents are still on file.

2. Are database "triggers" supported?

A database trigger is a special data manipulation language (DML) routine that is executed automatically under certain conditions. For example, the storage of an invoice item might "trigger" the addition of its "dollar amount" field to the "total invoice amount" of its corresponding invoice header record.

Most people can get by without database constraints and triggers. In fact, DBAs sometimes deliberately avoid them as they incur quite a bit of machine overhead when they are evaluated. Defining these conditions into the database, though, means that they're enforced automatically by the DBMS/4GL independently of any DML procedures.

If you're concerned about the quality of the data in your database, and don't trust your users or programmers to check before they update, you should look for a product with constraint features and use them when you define your database.

3. Does the package support journaling? Transaction staging?

4. Are pending database transactions automatically "backed out" after a system failure?

Writing a "journal" of each modification you make to the database makes it possible to "roll forward" from a complete back-up copy of the database to a specified point in the journal records at a later date. It's a kind of "record-by-record" incremental back-up which, if you have the storage space for it, can pay off during disaster recovery.

Also, as a process updates the database, the retention of "before-images" of the modified data can permit the process to subsequently "back out" of its pending changes. Sometimes called "transaction staging," a database process would use this to explicitly COMMIT or ROLLBACK each database transaction as necessary. This feature allows complex database updates to be grouped logically, and applied on an all-or-nothing basis.

5. Do reference sites report experiences with database corruption?

6. How frequently does this occur, and what recovery procedures are offered? Does such recovery result in a significant loss of data?

A corrupted and unusable 200 megabyte database is no fun. Invest some time to find out if it has ever happened — and how or if it was resolved — at any of the vendor's reference sites.

If you need to get your database up and running on a Smorgasbord of hardware and system software configurations, the following questions demand an affirmative answer:

1. Is the database package supported in all required machine environments?

2. Can my databases be transported easily across these environments?

3. How much does the package cost?

You can spend anywhere from a few thousand dollars to more than $100,000 for DBMS/4GL software, and a package costing twice as much isn't necessarily twice as good. Other price questions worth asking:

1. Is it proportionally priced by CPU size or number of users?

2. Are run-only licenses available for special network access?

3. What kinds of post-installation support agreements can be purchased, and how much do they cost?

Finally . . .

Find out whether you're buying serial number one of the package, and, if for no other reason than peace of mind, check into the vendor's credentials:

1. How old is the product?

2. How long has the product been available on my type of system?

3. How large is the installed customer base?

4. Is the vendor reputed to be responsive to problem reports?

5. Is the product available on a free or low-cost trial basis?

6. What are the vendor's general future plans for the product?

Knowing a vendor's future product plans will give you a general sense of its commitment to its product, but base your immediate buying decision on currently available features, not "futures."

TO BUY THE RIGHT DBMS/4GL, you need to understand and ask the right questions.

Afterward, you'll eventually learn that database management systems don't really manage data, people do. Even the hottest DBMS/4GL package won't know if you've failed to design your data properly, whether you've taken all aspects of your planned application into account, or whether you generally know what you're doing.

Effective database administration starts with a serious commitment to a clear and practical database design, includes the careful evaluation of DBMS/4GL product alternatives, and requires learning and exploiting your selected DBMS/4GL product's functions and features as you realize the design on your computer.

SPL SAILS EASILY INTO C PORT

PowerHouse Users Gain Optimum Spectrum Performance.

SPECTRUM

Alex Robinson

Editor's Note: This article begins a series of briefs based on third-party vendors' experiences in porting to — or migrating to — the HP 3000 series 900 (Spectrum minis). With the new Precision Architecture (HP-PA) reduced instruction set computer (RISC) 930 model now in Beta test (a dozen or so should now be at or soon delivered to test sites as you read this) and the 950 model now in production aiming toward a second-half '87 delivery, Hewlett-Packard is launched firmly into its future.

While it has become axiomatic that hardware always precedes software, HP has tip-toed as gently as a giant can through the minefield of compatibility and portability. Odds are that HP will continue to support "compatibility" with its past technology and its important customer base via an "emulation mode" on the Spectrum for some as-yet indeterminate time (maybe forever). That, however, is no justification for the capital outlay required for a Spectrum-class computer.

The company took advantage of its forum at the Vienna Interex meeting to repeat what had been much earlier pronounced: Spectrum computers won't offer a native-mode version of SPL, despite the apparent building into native mode of some of the SPL constructs to make the port of TurboImage more successful (after doing a temporary but very wise, third-party vendor-endearing about-face on implementing HPImage on early 930s).

This is all smart on HP's part. While it won't cut itself off from the past, it also won't risk the future by not implementing a technology that can vault over the fierce competition in price and performance at the urgent pace that it needs to happen.

Here, then, is a porting brief by a leading SPL-rooted vendor, Cognos, and its PowerHouse *4GL applications development language.*

Cognos' (Ottawa, ON) principal product, *PowerHouse*, a fourth-generation applications development language (4GL), is written in SPL, a programming language designed for so-called stack architecture. Because SPL was designed to work with a stack architecture, so was *PowerHouse*.

"The differences between RISC and stack architectures means that *PowerHouse*, as originally written, wouldn't function as efficiently in the Series 900 environment," says Jim Sinclair, Cognos' manager of information technology.

"But we had programmed in SPL with conversion to C in mind. So, HP's plans hastened a migration for which we were prepared."

The preparation consisted in an SPL-to-C translator Cognos had built several years ago. This translator was used to port the 270,000 lines of *PowerHouse* source code from SPL to C for *PowerHouse* migrations from the HP 3000 environment to other hardware vendors' machine environments.

Those ports had proceeded smoothly, and Sinclair expected similar results this time. "The translation of our most recent version of *PowerHouse* took about three days," says Sinclair. "We performed it in our headquarters according to the plan we had drawn up, which was to take a translated version of the source code to HP's labs and fine tune it."

"Unfortunately," says Sinclair, "when we arrived at HP's migration center, we found that the series 900 machine's C development environment wasn't ready to test the newly-translated version of *PowerHouse*."

HP and Cognos engineers solved the problem by performing initial testing on an HP 9000 model 840 (also a RISC-based Spectrum machine, but with the extension to the engineering computers). The 840 offers a high degree of compatibility with the series 900 machines, and its C development environment

Floating-Point Conversion Between The Old And New HP Machines

Moving from HP 3000 stack machines to 900 Series machines poses a problem of conversion to IEEE floating point formats, which the stack machines don't support. This article explores solutions to two problems associated with IEEE conversion for *PowerHouse* users.

Table 1 summarizes the float point types available on the MPE/XL machines.

The following restrictions apply to the use of the IEEE and HP 3000 formats:

- *Compatibility-mode programs use HP 3000 format floats. No supported mechanism exists for using IEEE formats.*
- *Native-mode programs use IEEE-format floats. A native-mode intrinsic is available to convert between the various formats.*
- *TurboIMAGE supports HP 3000-format floats only as item types.*
- *HP Image supports IEEE-format floats only as item types.*

The float format used in data files affects the mix of programs that can access these files, and might adversely affect program performance.

Native-mode *PowerHouse* supports all floating-point formats as item types. Item-type syntax has been changed to indicate this. If IEEE/NONIEEE isn't specified, a default format is taken from the dictionary options. Such a format may be declared in the OPTIONS statement of the *PowerHouse* dictionary. If no default format is specified, IEEE is assumed.

Note, however, that when *PowerHouse* is run with a version 5.01 compiled dictionary or a compatibility-mode compiled dictionary, the default float format will be NONIEEE.

Float-item-type is:

```
[IEEE      ]FLOAT    [SIZE[4]]
[NONIEEE]                [8]
```

Float-format-option is:

```
[FLOAT FORMAT {IEEE     }]
              {NONIEEE}]
```

Converting between floating-point types can result in loss of precision or range overflow. Each of these can be detected using a specific *PowerHouse* technique.

Precision loss can be detected by converting the source type to the largest type, and then back to the source type. If the original and final values differ, then precision has been lost.

This simple test is complicated by the fact that the most precise float format available to native-mode *PowerHouse* for internal computations is IEEE Float 8. The trick is to use the CHARACTERS function to make the final comparison so that no calculation conversions need be made, as follows:

```
;; Precision loss if Original < >
   Converted

DEFINE Original CHAR*8=
   CHARACTERS (original-float)
DEFINE New-type new-type=
   original-float
DEFINE Old-type old-type=
   New-type
DEFINE Converted CHAR*8=
   CHARACTERS (Old-type)
```

Range overflow can be caught by taking advantage of the fact that zero is the result of expressions with conversion errors.

```
;; Range overflow if Original< >0
   and Converted=0

DEFINE Original Old-type
   =original-float
DEFINE Converted new-type
   =original-float
```

When using QTP, remember to include ON CALCULATION ERRORS REPORT on the REQUEST statement. Note that if you experience range problems you will have difficulty getting QUIZ to report these values, because *PowerHouse* doesn't support scientific notation.

PowerHouse converts all numeric-item values to Float 8 format when performing calculations. Native-mode *Powerhouse* uses the IEEE Float 8 format. As a result, calculation precision will be slightly less than that provided by HP 3000 *PowerHouse*. This is likely to pose a problem only when calculations require an accuracy close to 16 digits.

Those who use the floating-point format in their *PowerHouse* applications, and who are planning on moving to a series 900 machine, might find flagging the Programs and processes that use it a helpful pre-conversion measure. *—Paul Elder is a senior programmer/analyst for Cognos, Peabody, Massachusetts. Jim Sinclair is Cognos' manager, information technology.*

TABLE 1.

Formats	Number of bits		Range		Precision
	Exponent	Mantissa	Smallest	Largest	(Digits)
Float 4 IEEE*	8	23	1.4e-45	3.4e38	7.2
HP 3000	9	22	8.6e-78	1.2e77	6.9
Float 8 IEEE*	11	52	2.0e-323	7.0e307	15.9
HP 3000	9	54	8.6e-78	1.2e77	16.5

MPE/XL floating-point types. The asterisk denotes reference to the 900 Series machines.

was, then, more fully developed.

The solution enabled all of *PowerHouse*'s internal structures and user interfaces to be tested before they were moved to a 900 series machine. "*PowerHouse* moved to the series 900 machine as easily as expected," says Sinclair. "The C compiler, though not ready for release by HP, was remarkably well developed."

HP signed a licensing agreement with Cognos for the SPL-to-C translator last summer. "We view this translation aid from Cognos as an important part of the overall migration strategy for ourselves," said Robert Fillhouer, product marketing manager for computer languages at HP.

"Several of our internal divisions have used the translation aid to help automate the migration of their SPL programs to HP C."

Series 900 machines run in two modes: compatibility and native. In compatibility mode the machines emulate stack architecture HP 3000s. Only in native mode do the advantages of the RISC architecture surface.

"HP is providing upward compatibility between the stack and RISC machines," says Sinclair. "So, we know *PowerHouse* 5.01 will run on the new machine — in compatibility mode. Our goal has been to provide a version of *PowerHouse* that takes advantage of native mode features, which include the new C compiler, virtual memory, a new command file facility, IEEE floating point formats and, of course, significant performance improvements." *—Alex Robinson is a technical writer in Cognos' communications group.*

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Tools and operations software vendors participating in the Fast Start Early Access Program run by HP at its Software Evaluation and Migration Center (Cupertino, CA). The listing includes corporate name, location, primary product, brief description, and reader information number.

■ Adager (Guatemala), *Adapter/Manager*, for Image/3000 databases.
Enter 607 on reader card.

■ Carolian Systems International (Toronto, ON), *Sysplan, Sysview, Intact, Filepro, Omnispooler, Infonet, Itlink, Silhouette/3000,* information management and network software.
Enter 608 on reader card.

■ Cognos (Ottawa, ON), *PowerHouse, PowerHouse Architect*, 4GL applications development language.
Enter 609 on reader card.

■ Computer Representatives, Inc. (CRI, Santa Clara, CA), *Relate/3000*, 4GL relational database manager, applications development tools; *Project Alert*, project management software.
Enter 610 on reader card.

■ Dynamic Information Systems Corp. (DISC, Denver, CO), *Omnidex, Dbmgr/3000, IMSAM/3000, Filemgr/3000, Datadex/3000* information management software.
Enter 611 on reader card.

■ Infocentre (Mississauga, ON), *Speedware, MicroSpeedware*, 4GL applications development software. Also, *Speedledger, The Library Management System, Speedware Graphics.*
Enter 612 on reader card.

■ Operations Control Systems (Palo Alto, CA), *OCS 3000, OCS Librarian*, information management software.
Enter 613 on reader card.

■ Performance Software Group (Sandy Spring, MD), *Fastran, Transact* source code compiler.
Enter 614 on reader card.

■ Protos (Austin, TX), 4GL applications development software.
Enter 615 on reader card.

■ Productive Software Systems (Minneapolis, MN), *Robot/3000*, database, program analysis software.
Enter 616 on reader card.

■ Software Research Northwest (Seattle, WA), *SPLash*, native-mode compiler for SPL.
Enter 617 on reader card.

■ Unison (formerly Computing Capabilities, Mountain View, CA), *Maestro*, batch job management; *Tapes*, tape library management; *Radar*, terminal network management software.
Enter 618 on reader card.

■ Tymlabs (Austin, TX), *BackPack*, system backup; *Data Center Accounting*, system auditor; *C/3000*, C compiler; *PDQ/Quiz*, compiler for Cognos's *Quiz* 4GL; *Mac2624*, HP terminal emulation for the Macintosh.
Enter 619 on reader card.

■ Vesoft (Los Angeles, CA), *Security 3000*, log-on access control software.
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Most government R&D projects generate large quantities of classified data. For instance, an HP 9000 used for data collection and analysis will require a minimum of 10 MB of disk capacity.

At the same time, performance and reliability are necessary features of the storage system. A disk must be fast with a transfer rate of 100 MB/sec. or better. Under normal circumstances, a fixed hard disk with a tape backup system would satisfy these criteria for disk capacity and performance.

However, the Department of Defense forbids contractors from using fixed data storage systems on classified projects and operations. The fixed hard disk can't be physically removed from the system; therefore, the classified data can't be stored on a fixed hard disk. Both programs and data need constantly to be removed and locked up for security.

In the private sector, the same considerations regarding removable disks apply to security requirements for personal and financial data.

The dilemma of removing classified data fast and efficiently is answered with Bernoulli technology developed by Iomega Corporation (Roy, UT). It utilizes basic aerodynamic principles discovered by an 18th century mathematician, Daniel Bernoulli.

The Bernoulli disk drives consist of 20-MB removable cartridge disks that combine the best features of flexible disks and fixed hard disks. The Bernoulli disk's removable cartridge satisfies the defense contractor's requirement for removable media. High performance or disk capacity isn't sacrificed at the expense of removability. The Bernoulli disk's performance and 20-MB capacity are the same as most fixed hard disks available.

Bering Industries' TwinPac dual 20-MB removable Bernoulli and hard disk.

Hewlett-Packard computers are used extensively in environments with data security applications. Bering Industries (Scotts Valley, CA) has specially designed and manufactured Bernoulli systems that are fully compatible with HP computers. The Bering 5800 and 5200 series of Bernoulli subsystems operate on the Hewlett-Packard Interface Bus (HP-IB) and use HP's CS/80 and SS/80 command sets.

The removable cartridge disk has 20-MB capacity with the speed and reliability of a hard disk. Operating systems, programs and files all can be stored on the cartridge and randomly accessed at the same rate as a hard disk.

The Bernoulli systems are available in configurations of a single 20-MB Bernoulli drive, dual 20-MB Bernoulli drives, and a combination single 20-MB Bernoulli drive with a 40-MB or 57-MB fixed hard disk. The 20-MB Bernoulli drive has an average access time of 40ms and a transfer rate of 655 KB/sec.

AERODYNAMIC TECHNOLOGY enables a Bernoulli disk to achieve performance levels similar to a hard disk. In a Ber-

noulli drive, a flexible disk (similar to a floppy) rotates parallel to a stationary plate, appropriately called a Bernoulli Plate (see Figure 1).

Air pumped from the center of the disk towards the outer rim flows between the disk and the plate and prevents the usual turbulent conditions associated with other types of disk drives. During disk spin-up, the air flow increases between the disk and plate and lowers the air pressure. This effectively will push the disk upwards towards the Bernoulli plate where the disk will stabilize on a cushion of air at a high rotational speed.

The read/write head protrudes from the Bernoulli plate. The shape of the head also is designed using the Bernoulli principle. The surface of the head acts like the upper side of an airplane wing to aerodynamically create a negative pressure region.

As the spinning disk pulls the media toward the head, the velocity increases and reduces the air pressure. The low air pressure creates a vacuum that pulls the media toward the head in a small stabilized area. The space between the head and media is less than 0.005 inches.

THE BERNOULLI DISKS share many of the advantages of a hard disk and floppy disk, without corresponding disadvantages. The disk-to-head interface is close and stable and allows very high magnetic recordings.

The air cushion also lets the drive withstand higher vibration and shock conditions than a fixed hard disk without damaging the head or the media. This cushion enables the disk to spin at higher speeds than a floppy is capable of (up to 3600 rpm) without the severe consequence of friction and wear. It also allows the head to move across the media rapidly from one track to another.

The Bernoulli disks share many of the advantages of a hard disk and floppy disk, without corresponding disadvantages.

These performance features produce data rates, transfer rates and access times comparable to those of hard disks.

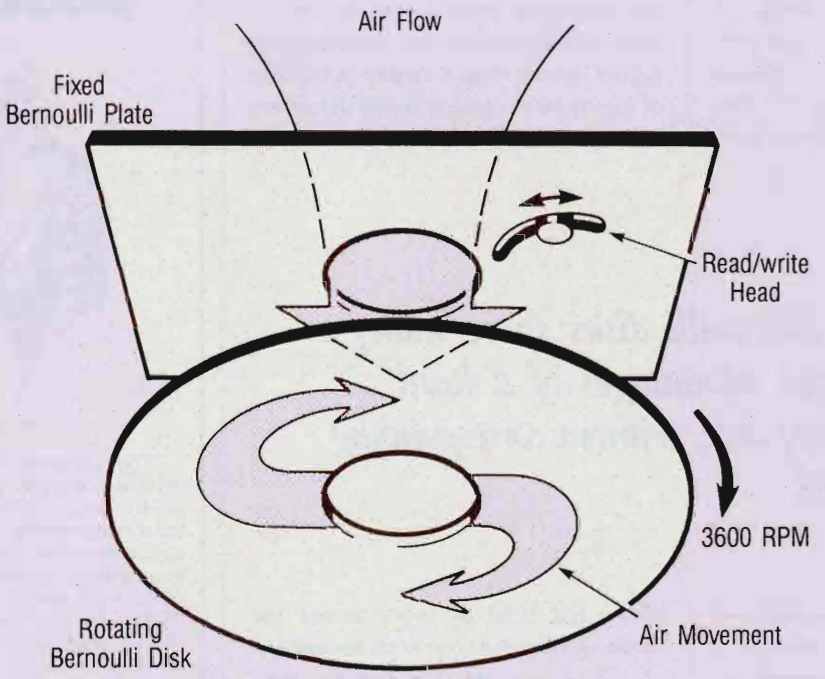
In addition, the track-following servo system used by the drive ensures interchangeability of cartridges between different Bernoulli drives.

A concern about hard disks always is the possibility of a head crash. This concern is all but eliminated with a Bernoulli drive. The thin layer of air used to stabilize the disk may allow contaminants such as dust or smoke particles to pass between the head and media, interrupting the Bernoulli effect. This will result in read/write errors that can be recovered by sophisticated built-in error recovery procedures.

However, this is much less catastrophic than a "head crash" that can occur with a hard disk in a similar situation. Because the disk is located beneath the Bernoulli Plate, the interrupted air cushion will cause the flexible media to drop away from the plate, preventing media or head damage.

To further safeguard against such occurrences, Bering's Bernoulli disk

FIGURE 1



A Bernoulli disk using constant air flow can be placed five millionths of an inch from a read head at high speeds.

systems use extensive air filters and adequate air flow to effectively reduce the possibility of contamination.

There are several drawbacks to using floppy disks and fixed hard disks. Floppy disks are removable, easily transportable and convenient for data exchange. Their major disadvantages are slow speed and limited storage capacity.

Fixed hard disks are fast and have high capacities. Their inherent problem related to classified data is that the capacity isn't expandable and the disks aren't removable.

Bernoulli disks combine the benefits of both the floppy and fixed hard disks to form a hybrid drive with all the best features. The Bernoulli disk systems are ideal for classified data applications because of floppy and hard disks' best qualities: removability, large expandable capacity, high performance and reliability. *—Stephen Sun, Ph.D., is engineering director at Bering Industries, Inc., Scotts Valley, California.*

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Keith Marchington and Bruce Taylor

The X Windows System

Souped-up performance and plunging prices (generally speaking, from $100K to $15K for equal or superior performance in fewer than three years . . . and still dropping!) are fast putting true design and engineering workstations in the commodities class of computers with their PC brethren.

The real-time graphics workstation is the new high-end PC. And, thanks to software vendors who understand this and are increasingly writing highly functional design and engineering applications in price ranges that lead it away from a series of specialty vertical markets toward a broad-based market, workstations are now nearly at a point where their proliferation most closely will analog that of the Macintosh. Almost, but not quite. At least not yet.

A COUPLE OF HURDLES still exist. Most engineering workstations run under variations of the UNIX operating system, which typically is regarded as powerful, but ugly and very unfriendly. Worst of all, each workstation is different.

Porting a graphics-based application from one type of machine to another has been a nightmare for software vendors, frequently taking more effort to accomplish than to write it in the first place.

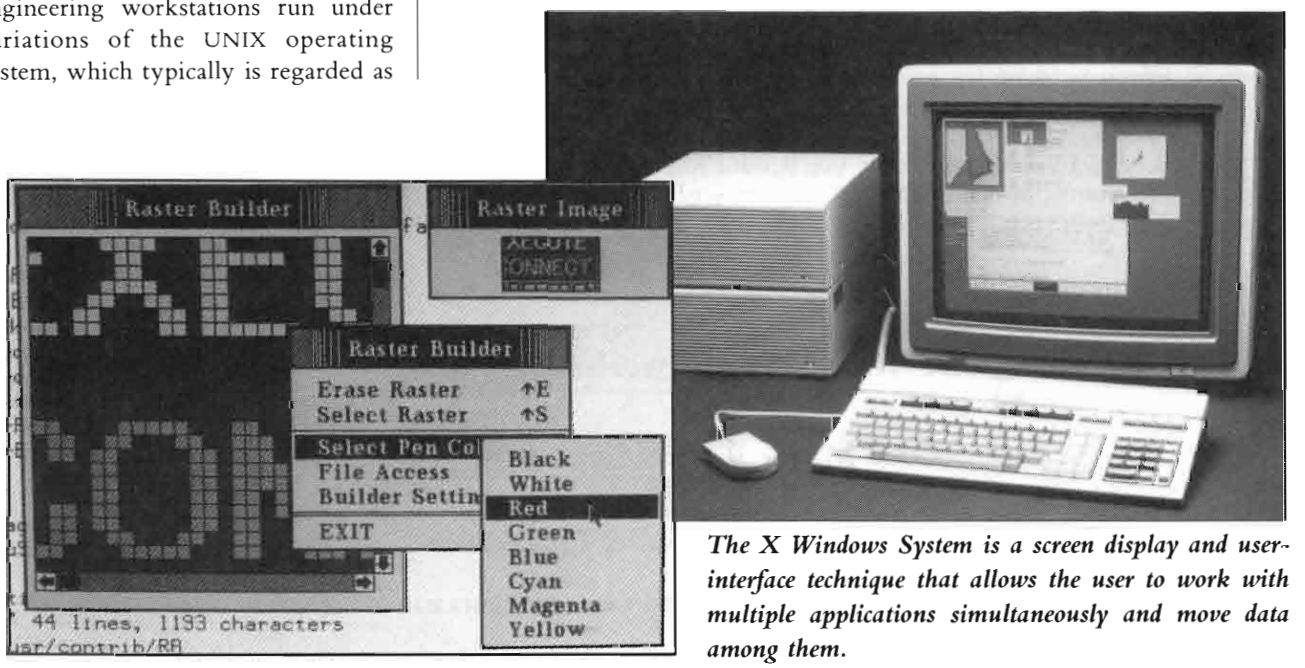
Unlike PCs, where both the hardware and MS-DOS provide a stable platform for software, with engineering workstations even the OS is unstable from vendor to vendor. This has made the kind of software that is found on PCs mostly unavailable on workstations until very recently.

Still, the evolution continues. Prices are continuing downward for low-end workstations and performance is dropping rapidly (Sun Microsystems has announced its Sun 3/50M for $4995 stripped). And UNIX is becoming more friendly as it grows up.

At the systems software end, something even more dramatic has been developed that will go far to resolve the incompatibility of different workstations, the X Windows System. X Windows was developed by Project Athena, a research project at MIT (Cambridge, MA) initially established and funded by DEC and IBM to study large-scale local area networks.

Along the way, the need for some method of displaying graphical information across the LAN became a focus of the project. Additionally, the researchers knew they would be using a variety of hardware from manufacturers like DEC, Sun and IBM. So their early design goals included portability and network compatibility. Soon, X Windows was being distributed to universities throughout the nation.

The X Windows System, like all windowing systems, is a screen display and user-interface technique that allows



The X Windows System is a screen display and user-interface technique that allows the user to work with multiple applications simultaneously and move data among them.

users to work with multiple applications simultaneously and to move data and files among them. The X Windows System gained support as a standard because it is a proven system and is available in the public domain.

In February 1986, X Windows began its commercial life. DEC began shipping an X product for its ULTRIX 32 version of UNIX-based workstations. This initial commercial release of X Windows received little fanfare. But the reputation of X began to grow.

Because MIT owns the license to X and gives X to anyone for the cost of media duplication, X is very attractive. Couple that with the fact that X Windows is a very competent system with many innovative technical features like network compatibility, and the future of the X Windows System seems assured.

THE NEXT BIG STEP for X was at SIGGRAPH '86 (Special Interest Group on Graphics of the Association for Computing Machinery). During a panel discussion, Jim Gettys, one of the authors of X, gave a well-received multi-vendor, multi-machine demonstration of X using workstations from DEC, Sun and HP.

Finally, January 15 this year at MIT, the X phenomenon really took off. Eleven different computer hardware and software manufacturers held a press conference to announce their support of the X Windows System. The vendors are Adobe Systems, Apollo Computer, APPLIX, Dana Computers, Data General, Digital, HP, MASSCOMP, Siemens, Sony and Stellar Computer.

This was an event unprecedented in computer history. It was the first time such an impressive group of vendors got together and agreed on something that would benefit the entire industry.

The X Windows story represents a very big step forward not only for hardware and software vendors, but for customers too.

At the press conference, MIT announced that some of the vendors were working cooperatively to create a set of high-level user interface tools for X, and that a preliminary proposal was available for review. This kind of cooperation is what makes X a phenomenon.

[An interesting side note is that Sun Microsystems, which has made its Network File Server (NFS) the same sort of industry standard that *Lotus 1-2-3* has become in business graphics for the PC — that is, no serious business graphics software vendor can fail to accept *1-2-3* files — has developed what it claims is a super set of X Windows with its Network Extensible Windowing System (NeWS). It asserts that X Windows applications will run under NeWS. However, Sun, although invited to participate in the joint multi-manufacturer conference at MIT in January, declined. The implication is that Sun, who successfully made its NFS a standard embraced by nearly all workstation vendors, may attempt to challenge X Windows as the new graphics compatibility standard.]

The following week at UniForum '87 in Washington, DC, the X Windows System was the center of attention. There were multi-vendor demonstrations of X on the show floor conducted cooperatively by DEC, Apollo and HP. Each vendor had workstations from the other two in its booth, and the entire show was connected by a LAN.

Demonstrations were run cooperatively across the entire show floor. Additionally, attendance at an X Windows hospitality suite hosted by DEC, HP, Apollo and DG and at an X Windows "birds-of-a-feather" session was high and enthusiastic.

Since then, both HP and IBM have announced X Windows products for their engineering workstations in addition to DEC's offering.

For the HP 9000 Series 300 workstation, HP announced the A2320A, an X Windows System that includes full-implementation of MIT's X Version 10, Release 4, plus the Xrlib productivity tools. Sony already sells a workstation with X as a standard feature.

THE COOPERATIVE EFFORTS to make X the windowing standard for engineering workstations continue. The future of X looks bright, and its support by most of the workstation market means the future software availability for workstations never looked better. Software vendors have already begun work to move their applications to X.

The X Windows story represents a very big step forward not only for hardware and software vendors, but for customers too. In an industry once dominated by proprietary work (that mitigates toward keeping software prices high and the installed base of workstations low), standards like TCP/IP, System V, and X Windows represents a technology advance that's good for all. *—Keith Marchington is product manager for X Windows at Hewlett-Packard, Corvallis, Oregon.*

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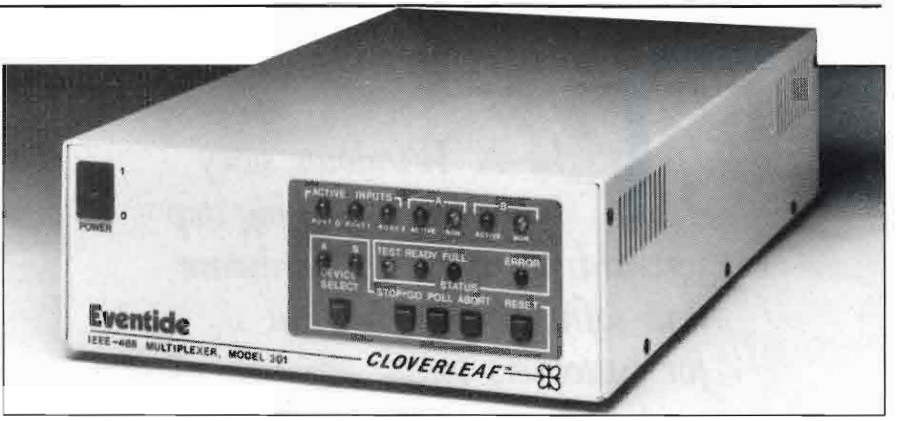
LAB REPORT

Don Person

Eventide's HP-IB Helpers



The* Cloverleaf *allows up to three computers to access a printer and plotter.

If you use your HP desktop computers for any kind of printing or plotting, you know a lot about waiting. Waiting for the printer to free the machine, waiting for the plotter to finish, or just plain *waiting* for your turn at the CPU.

A family of HP-compatible peripheral devices made by the Eventide Corporation (Little Ferry, New Jersey), could speed up your processing time. Three of the units can be more or less classified as spooler/buffers, though I say this for convenience only. They're really a *hot* collection of HP-IB helpers.

In the case of Centronics or serial printers, many printer RAM buffers around can provide intermediate storage in-line between computer and printer. None adapts to the plotter problem unless used within very limited conditions. Little help is available for printers connected via the HP-IB.

Some schemes partition system memory within your computer and spool out the data on a quasi-interrupt basis, but the software spoolers intrude unfavorably. After trying that approach, I built a crude device out of a conventional Centronics buffer and an EPSON IEEE-488 card. It fit my temporary needs but didn't help me in drawing plots.

NOW THERE'S A SOLUTION. Following on the heels of the original *GpiBuf*, some pretty slick designers in Eventide's factory created the biggest HP productivity booster to come down the pike in quite some time. The *Expressway*, as it is fondly named, tackles a handful of productivity problems and can make your life better, particularly if you work with I/O bound programs.

Any HP computer likely can send data to a line printer at least 100 times faster than it can physically output the data. Same truth squared holds for plotters. A hardware spooler listens to the main bus from the computer, stores data as fast as it can be sent, and handshakes it out to the printer or plotter at a rate the output device can handle.

The *Expressway* adds several basic improvements to the generic spooler and obviously is meant for the HP world. It can be programmed, via internal dip switches, to interrogate a plotter at power on, and to remember important things like the physical limits of the unit, its model number and other information that popular programs expect to learn in run time.

The traffic cop inside the *Expressway* recognizes the appropriate HP Graphics Loop (HP-GL) and sends the pre-recorded answer. Position commands are accepted and the "current position meaningless" response replaces the normal GL digitizing message.

Except for the memory, which resides on a flat motherboard, the I/O modules plug in. The host has a card, as does each output device, for a maximum of three units. With an optional memory board, you can have an unbelievable 2M of RAM, though for most appetites, ¼ MB probably is OK.

If you want or need additional buffering, you can add additional *Expressways* in tandem. However, the owner's manual does warn that, although no bad electrical consequences will result, your bank account may be drained severely.

ANOTHER FEATURE setting this box apart from any mere pretender results from the flexibility of the port output. You can buffer and translate for serial plotters, printers, ROM burners and even a modem, if sending is your main desire. You can, of course, mix and match outputs to your heart's content. The serial option permits the setup to be switch-configured, too. Transfer rates from 50 to 38,400 bps parity, stop, number of bits and handshaking all are part of the firmware and aren't a setup problem, after you figure out what you want.

What benefit can you expect for your outlay? With an 80 cps printer, I measured an improvement in BASIC 4.0

program listing on an HP 9816 of more than 25 times. Faster computers can improve that ratio to 50- or even 60- to-one. When plotting, I found a 20-to-one improvement. A 100-to-one ratio or more should be possible with a real speed demon.

The unit is useless for two-way bus activity such as interactive instrument control and mass storage buffering. It simply can't be in two places at once for this kind of work. The *Expressway* still can be used, but disk drives and other two-way devices all must share the main computer bus that bridges port zero.

In my 30-day test, I had no hardware failures with the *Expressway*, and uncovered few faults. If you try to put more than one controller on port zero, as I often do, you may find that one or the other of the two controllers is denied access to the *Expressway*'s ports. Because this connection is technically outlawed, I shouldn't expect it to work anyway.

One slight oddity came to light when I switched the *Expressway* on and off as an independent device. One of the slaves sometimes hangs on the port with an off-line printer. Resetting the computer clears it.

The box has only one annoying factor: It's noisy. You can hear the power transformer from the other side of a quiet room. It's one of those super robust signal components that never break, but its laminations are loose. No big deal, the hum is masked as soon as anything with a fan is put to work. It isn't much to bear compared with the immense amount of time saved.

Given *Expressway*'s buffering talents, does it also help share I/O devices and printers among several different families of HP computers? As a subscriber of the "jump the bus but be careful" school of thought, it's impossible for me to do disk transfers with screwy cable hook-ups, even with my fastest printer.

The Cloverleaf is like an Expressway *connected backwards . . .*

THE *CLOVERLEAF* IS LIKE an *Expressway* connected backwards, logically speaking that is.

Of the four ports on its backside, only one of these is used for an output device. The other three are input channels for up to three computers. You can connect three different HP-IB controllers to use a single peripheral with full buffering.

With an amazingly detailed status display on the front panel, plus manual intervention push buttons, it's a snap to understand and operate. Once the defaults are set up, it's next to impossible to mess up a job. Essentially, one, two or three computers can send output to a single unit, such as a printer, and each job comes out in order.

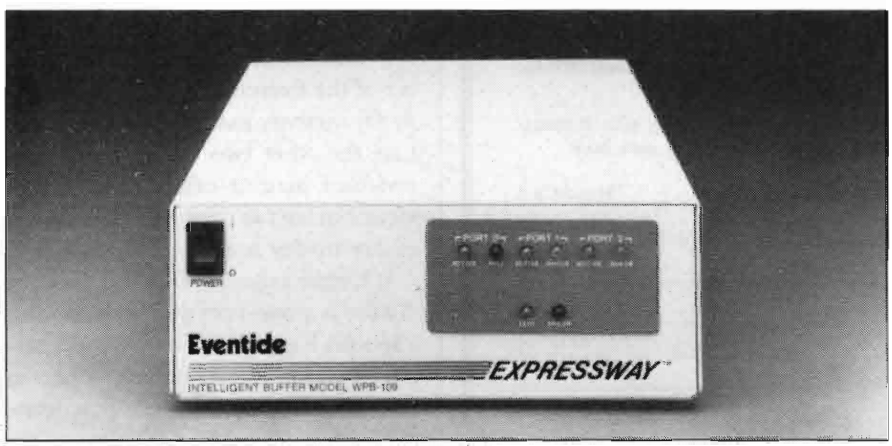
A clever command scheme on the individual port PC boards lets you set an end-of-job character or a device transmission block time-out value to allow flexible job control. With these switches, you can change your mind in the middle of a job or just pause, fix a paper jam and continue.

First I tried it with two computers feeding about 3000 names from a mailing list to a sluggish old HP 82905B. The computers took turns reading zip-zoned floppy disks and printing their blocks of labels. For this test, I selected the user-defined end-of-file character method. I found that whichever computer started its dump first was able to command a single sequence to end, even though both computers were busily reading and sorting disk information and pumping it over to the *Cloverleaf* at the same time.

When the first unit's list was output, the second list followed. Both computers were able to share the spooler at the same time. This is one heck of a nice box!

Then I tried the time-out option. As long as you pick a reasonable interval (in my case, the factory eight-second time was fine), the results are identical. You could use timing to decide job end in cases where all your sources might not be programmed to send the EOF character.

As long as there are no excessive pauses in a process, timing works well also. Simpler to program, too. Just stop sending for more than the time-out interval, and the *Cloverleaf* moves on to its next job. Because total memory in the *Expressway* and the *Cloverleaf* can be ex-



The* Expressway *lets a computer or instrument work, plot and print simultaneously.

Expressway IEEE-488 Intelligent Transparent Buffer/Spooler:

256K — $1395
1 MB — $2195
2nd MB expansion board — $ 800

Cloverleaf IEEE-488 Intelligent Transparent Multiplexer Buffer/Spooler:

256K — $1695
1 MB — $2495
2nd MB expansion board — $ 800

GpiBuf - $ 995

GpiProm - $ 995

Eventide Inc.
One Alsan Way
Little Ferry, NJ 07643
(201) 641-1200
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panded to more than a MB, there's no practical limit to buffer depth.

Need more than a MB of spooling? Take the advice offered with the *Expressway*. Simply stack more units in series to get the amount of spooling you need. You'll run out of either memory or need at some point. Your system configuration lies where the two vectors coincide. In reality, almost everyone will be satisfied with the tremendous amount of RAM available within the standard shell. I couldn't be more enthusiastic in endorsing the *Cloverleaf*.

THE *GPIBUF* SEEMS to be the first member of the Eventide bus accessory family for memory extension and spooling. Like the other two Eventide products reviewed here, it offers good design ideas, but isn't as convenient as they are in day-to-day use.

Unlike other familiar spoolers, the *GpiBuf* is a one-port device. Normally, a spooler has two — for input and output. Ordinarily, data enters one port as fast as the spooler logic and free memory permit. That data goes through the output port with a first-in, first-out

priority at the handshake rate allowed by the peripheral.

The *GpiBuf* works differently. It monitors the bus, waiting for itself to be addressed. When it hears its name, it soaks up data in sequence and stores it. No output process is inherently activated. To dump the buffered data, explicit HP-IB commands must be given. Usually these commands involve an I/O statement to talk up the buffer and engage listen mode for the printer.

Clearly, this device is less flexible than the first two units, and buying *GpiBuf* solely for use as a printer buffer is not as useful. Still, it's got one advantage over the other two.

Think of it as a logger or memory expansion unit. Because it's sensitive to bus commands, it can be programmed to act as a data monitor, accepting data from HP-IB instruments for transmission in sequence to host. You could have the computer doing other things with a lifted bus jumper link while the *GpiBuf* accepts data being received at a low rate from process or data acquisition equipment. Then you reconnect and grab all your information in a burst.

Or how about this: You have a big block of data to work with, but only a small amount of RAM. You can send parts of a sorted list to the *GpiBuf* and remove items from the head of the queue whenever you wish. Thus, you have a virtual memory expander. While not as handy as a spooler, it surpasses the *Expressway* and *Cloverleaf* as a logger or expansion box.

NOW LET'S LOOK at the earliest of the Eventide standalone HP-IB products, an HP-IB-connected EPROM programmer. It has sold the least of the four products, but with its considerable smarts and exceptional merit, it deserves to do better.

In comparison with RS-232-connected EPROM programmers, it's quite price-competitive, very fast and offers superior features. As the basis for comparison, I used the INTEL 2764 standard EPROM at 21v program potential. Because the *GpiProm* uses a variation of the INTEL smart algorithm, the exact time to program a ROM varies depending on the number of short cycles needed for each address to retain its data.

After test-programming a batch of 2764s with this dandy little gadget, I found the average time to be 38 seconds and the minimum value an amazing 24 secs! On older programmers using the original 50ms burn time, the same procedure can take up to seven minutes, excluding the data transfer time. This extra overhead on RS-232 is significant, particularly when you change ROM program contents often.

Plus, the *GpiProm* allows you to dump the program for a ROM into buffer memory in a second or two at most: the HP-IB parallel connection to the rescue. I have to confess that Eventide has sealed the fate of all serial EPROM burners in my mind once and for all with this jewel of a product. Take a look at the features:

- *Internal buffer RAM adequate for programming 128K; 256K units programmable in partitions.*
- *Fast parallel transfer.*
- *Able to read ROMs in the socket.*
- *Personality modules not needed.*
- *Independent blank and verify cycles, both lightning quick. Error addresses returned to controller.*
- *Checksum calculator algorithm compatible with HP computers available via command.*
- *Partial program commands to set the range for partial and/or incomplete program requirements. Address jumped on command.*
- *Programming voltage adjustable on command for handling "A" and other nonstandard EPROMs.*

In essence, I find no real fault with the GpiProm. *It surpasses all its competitors, both in and beyond its price range, even though it can be driven only by a computer with an HP-IB.*

For a unit costing nearly $1000, I expect this level of performance, particularly because serial programmers without comparable flexibility cost the same and aren't as easy to use. The newest revision of the product recognizes virtually every current part number.

A minor limitation is the necessity to send the EPROM data in the form of HEX characters. That is, you send two ASCII characters to convey one eight-bit datum. On slow beasts like the HP series 80, this takes up a little extra time. On a series 200, you hardly notice. Because the unit is HP-IB-connected, you shouldn't need to use hex, but then nothing is perfect. This quirk looks to be a throw-back to earlier times.

In essence, I find no real fault with the *GpiProm*. It surpasses all its competitors, both in and beyond its price range, even though it can be driven only by a computer with an HP-IB. The Eventide folks freely admit that they developed this one for their own needs and only later decided to market it. That decision is truly our gain. I give this EPROM programmer my highest recommendation.

—Don Person is an independent consultant based in Albany, New York.

3000

HP 3000 Memory Add-Ons

Ron Levine

At installation time, the HP 3000 is viewed as a very powerful, capable system able to sufficiently meet all of a corporation's long-term needs. But at many companies, the newly purchased system quickly takes on additional work loads resulting in extra users on the system and requiring the addition of new software packages and add-on hardware. Soon the new system's performance capabilities are stretched to the limit.

Although the 3000 is powerful, the memory-intensive "add-ons" begin to have an effect on system throughput with the result that the same tasks take more time to complete than when the system was first installed, response time increases (slows), and complaints from unhappy users about delays and tie-ups become common.

When this happens, data processing managers usually start thinking about moving up to larger, higher performance systems. After all, it seems that upgrading to a bigger, faster machine is the only option available to meet the ever growing demands of word processing, database management, and spreadsheet applications.

However, the other alternative, increasing the HP 3000's memory size, can sometimes bring immediate performance improvements. And a new system may not be needed at all, or its purchase can be forestalled for several years. This may become a highly sensitive variable if you're now at the point of examining an upward (to Spectrum) or outward (to another computer system) migration. Add-on memory will add life to your existing system and can buy you better performance today and the time to make tomorrow's decisions.

THERE IS A BROAD RANGE of memory expansion products are available for the complete HP 3000 line of computers. In addition to Hewlett-Packard add-on boards, three third-party vendors supply a variety of main memory enhancements — from one MB to 16 MB of storage.

Kelly Computer Systems (Mountain View, CA) offers the broadest HP 3000 memory product line. Memory boards with arrays of all sizes for the low end (series 37, 37XE and Micro XE), mid-range (series 39, 4X and 5X), and high end (series 6X and 7X) computers are available.

EMC Corporation (Natick, MA) also provides a full line of memory expansion options for the HP 3000 line. EMC's memory upgrades for the high-end 3000 line are marketed on the basis that they allow for the expansion of your system up to and beyond HP's stated maximum main memory configurations; i.e., the maximum memory addressability supported by HP.

GFK America (Dedham, MA), the oldest manufacturer of third-party memory for the HP 3000, supplies memory add-ons for all HP 3000 machines from series 37 to series 70.

All three third-party memory expansion suppliers provide a lifetime warranty on their 3000 products without a monthly maintenance charge. Hewlett-Packard offers a three-month warranty and a $10-$55 monthly maintenance charge, depending on the model you own.

Although the 3000 is powerful, the memory-intensive "add-ons" begin to have an effect on system throughput . . .

THE COST OF MEMORY EXPANSION varies from manufacturer to manufacturer ranging from approximately $4000 for a one-MB add-on to the low-end 37 series to $20,000 for four-MB add-on to the high-end 6X and 70 series (HP also provides a $2500, 512-KB expansion for the 37 series).

The features provided also vary from supplier to supplier. To find the best memory expansion option for you, consider the type of hardware it will be used with and compare the price versus the features desired. As with most items, features add to the cost, although some manufacturers offer more for the dollar.

Some of the basic characteristics to consider when purchasing memory expansion, aside from the obvious quality of the product and manufacturer's warranties/guarantees, are:

- CPU Cycle Time: The speed of the

[HP 3000 Memory Expansion Products]

HP = Hewlett-Packard; K = Kelly Computer Systems; EMC = EMC Corp.; GFK = GFK America

Feature/Vendor		Low-End (Series 37, Micro XE)	Mid-Range (Series 4X, 5X)	High-end (Series 6X, 7X)
Memory Board Capacity (megabytes)	(HP)	.5, 1, 2, 4	1, 2, 4	1, 4
	(K)	2, 4, 6, 8	1, 2, 3, 4	1, 4, 8, 12, 16
	(EMC)	1, 2, 3, 4	1, 2, 4	1, 4
	(GFK)	2, 4, 8	1, 2, 3, 4	4, 8, 12
System Capacity (megabytes)	(HP)	8	8	16
	(K)	16	8	16
	(EMC)	8	8	32 (w/soft. patch)
	(GFK)	8	8	32
Memory Chip Size	(HP)	64K/256K bit	64/256K bit	16K/64K/256K bit
	(K)	256K/1M bit	256K bit	256K/1M bit
	(EMC)	256K bit	256K bit	256K bit
	(GFK)	256K/1M bit	256K bit	256K/1M bit
Memory Chip Access Time (ns)	(HP)	150/120	150	150
	(K)	120	120	120
	(EMC)	120	120	120
	(GFK)	120	120	120
Capacitors/DRAM	(HP)	1 0.5 (Micro XE)	1	1
	(K)	1	1	1
	(EMC)	0.5	0.5	0.5
	(GFK)	1	1	1
Board Layers	(HP)	10/8	6	6
	(K)	6	6	6
	(EMC)	4	4	4
	(GFK)	6	6	6
Battery Backup	(HP)	yes	yes	yes
	(K)	yes	yes	yes
	(EMC)	yes	yes	yes
	(GFK)	yes	yes	yes
On/Off Line Switches	(HP)	no	no	no
	(K)	yes	yes	yes
	(EMC)	yes	yes	yes
	(GFK)	no	yes	no
LED Indicators	(HP)	no	no	no
	(K)	yes	no	yes
	(EMC)	yes	no	no
	(GFK)	no	no	no
Length of Warranty	(HP)	30 days	30 days	30 days
	(K)	Lifetime	Lifetime	Lifetime
	(EMC)	Lifetime	Lifetime	Lifetime
	(GFK)	Lifetime	Lifetime	Lifetime
Monthly Maint. Cost	(HP)	$10-$11	$11-$34	$40-$55
	(K)	None	None	None
	(EMC)	None	None	None
	(GFK)	None	None	None

CPU determines the speed at which the data can be accessed in main memory. The memory board speed should be equal to or faster than the CPU speed.

■ System Architecture: Each 3000 family employs different main memory access designs. The higher-end machines use more complex methods requiring several CPU cycles to retrieve multiple bytes of data from memory. The lower-end systems are more straight forward in accessing memory data and therefore are more closely governed by the actual CPU cycle time.

■ Memory Board Speed: Memory board speed is determined by how fast the logic used to control the memory arrays functions and by the operating speed of the array itself. The higher the speed of the memory board in relation to CPU cycle time, the greater the reliability of the data being passed to the CPU (it has ample settling time).

■ DRAM Array Access Time: The speed at which a DRAM array operates is often confused with the speed at which the CPU can access data in main memory.

EMC Corporation
Hopkinton, MA 01748-9103
(800) 222-EMC2
In MA (617) 435-2541
Enter 602 on reader card.

GFK America
908 Providence Hwy.
Dedham, MA 02026
(800) 445-2205
Enter 603 on reader card.

Kelly Computer Systems
1101 San Antonio Rd., Suite 419
Mountain View, CA 94043
(415) 960-1010
Enter 604 on reader card.

The major benefit to using faster DRAMs is that of enhanced data reliability as a result of greater electrical margins and tolerances, not in allowing the CPU to access memory faster.

■ Board Construction: Generally, boards manufactured by entirely automated processes are more reliable than those which include hand-soldered jumper wires and hand-cut traces. Multi-layer construction increases the reliability of the data being accessed due to the improved shielding of the board level electronics from stray signals.

■ Array Access Current: Critical in the design of memory is the amount of electrical energy instantly available when array access is required. Boards with one capacitor per DRAM provide the best protection again data loss.

■ Error Check and Correction: Memory boards containing error check and correction (EEC) capability can eliminate single-bit "soft" errors.

■ On-line/Off-line Switches: The ability to logically disengage the expansion memory from the system backplane aids in troubleshooting system malfunctions and eliminates finger-pointing situations.

■ LED Indicators: LEDs should provide visible indications of operating functions and fault conditions.

■ Service. No matter how well-built, all machines break down eventually. Support must be available from the manufacturer or his representative when it's needed. Mail-in exchange, local backup, and availability of on-site service should be considered when purchasing any hardware.

■ Compatibility: The expansion memory should be compatible with all HP 3000 special features. Battery backup, error correcting, error logging, and all off-line and on-line diagnostics should be fully supported by the "add-ons."

Figure 1 shows the available HP 3000 memory expansion products. *—Ron Levine is an independent consultant and writer based in Anaheim, CA.*

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Codex Simplifies Network Management

The 9300 Series from Codex Corporation (Mansfield, MA) simplifies network management by combining sophisticated network management technology with PC-based color graphics, windowing capabilities, user-customized software for management reporting, and control through a PC mouse.

The new 9300 Series enables users of small- to medium-sized networks with the ability to identify potential problem areas and speed resolution without the need for technical support staff.

The Codex 9320 Network Manager is based on a Vectra or other AT compatible computer, with enhanced display system and digitizer. The 9310 Network Management Kit will convert any IBM AT or HP Vectra to a 9300 Series Network Manager.

Price ranges between $11,500 and $17,500.

Enter 924 on reader card

Three Spectron Products Add Power To Integral

Spectron Technology (Irvine, CA) offers three products to improve the power and flexibility of HP's Integral PC.

The new products, MemoryModule, VideoSerial Interface and MultiSerial Interface, improve the PC's multi- tasking feature, add large increments of memory and provide up to four independent RS-232C channels in a single slot without loss of portability.

Prices for the MemoryModule begin at $1800; for the VideoSerial Interface at $700; and the MultiSerial Interface is $800.

Enter 905 on reader card

Reflection Supports Resource Sharing

Walker Richer & Quinn's (Seattle, WA) Reflection series of terminal emulation/communications software is now available for installation on the HP 3000 under HP's Resource Sharing network server software.

Special versions of Reflection products, licensed for installation on the 3000's virtual disk, may be used by several PCs via one of HP's local area network products.

A single copy of Reflection-RS versions will support up to an eight-PC LAN. Additional users can be added in groups of four. Resource Sharing versions are packaged with one technical reference and eight user manuals.

Initial license prices range from $1750 for Reflection 1 to $3000 for Reflection 7 Plus. Add-on licenses range from $750 to $1250. Additional technical reference manuals are available for $20 each, user manuals for $15.

Enter 906 on reader card

The Codex 9300 Series simplifies network management by combining sophisticated technology with PC-based color graphics, windowing capabilities and user-customized software for management reporting.

MDSS Adds New Module

Manufacturing Decisions Support Systems (MDSS, Cleveland, OH), an online system designed to support manufacturing decisions, now features estimating and quoting.

The quoting function provides the necessary features to prepare, price and track customer quotations. Quotes can be generated from estimates, other quotes or directly from standard product definitions.

Accepted quotations can be converted directly into sales orders.

Enter 907 on reader card

Spectrum Draws Graphicus

Implementation of Graphicus (Graphic User Systems, Santa Clara, CA) software products on the HP 9000 Model 840 Series (Technical Spectrum) is under way.

The conversion of Stat80, an interactive statistical analysis system, is complete and currently available. The conversion of Grafit, a technical drawing system, and Drawit, a general-purpose drawing system, is scheduled for release mid-1987.

The Spectrum implementation comes on the heels of product offerings on the HP 9000 Series 500 and 300 under the HP-UX operating system.

Grafit is priced at $3900, Drawit at $3500, and Stat80 at $10,450. Bundled options start at $7900.

Enter 909 on reader card

Relational NPL Available for 200/300s

DataBase Applications (Princeton, NJ) now offers a relational version of its NPL database System for the HP 200/300 series office computers.

Features include painting of data entry screens with control on value ranges, data types filled and required fields plus use of a full-screen editor, creating of executable programs from NPL.

The NPL Relational DBMS System retails for $1190.

Enter 911 on reader card

EMC Upgrades Falcon Series

EMC Corporation (Hopkinton, MA) has upgraded its Falcon Series disk subsystems for the HP 3000.

The upgraded models provide more flexible mass storage capability. The Falcon I, $12,900, now provides 406 MB of storage for a maximum storage capacity of 1.6 gigabytes per cabinet; the Falcon II, $23,400, offers 812-MB capacity for a maximum of 2.4 GB per cabinet.

Enter 908 on reader card

Sydes N.V. Introduces Multilingual MAKE-UP

Sydes N.V. (Belgium and Santa Clara, CA) has released the international version of its word processor, Make-Up, for HP 3000s.

Make-Up runs on any HP 3000 computer system operating under MPE. It's compatible with a wide variety of terminals such as the HP 2382, and HP 2392, Touchscreen PC and all HP 262X series terminals except the 2621.

Enter 915 on reader card

Fourhills Upgrades Archive/3000

A major enhancement to Fourhills Technology's (Cupertino, CA) Archive/3000 software, the Site Distribution System, allows configuration managers on HP 3000 systems to automatically distribute new versions of programs and other files to remote systems.

Archive/3000 currently provides source control, source compare, and file archiving subsystems. The new Site Distribution System automatically migrates a new version of a file to remote sites that use the file. As each file migrates, reports are produced to provide a hard copy record of the movement. Current license holders will be allowed a free upgrade. Those companies that purchase Archive/3000 by June 30 will get the new subsystem at no additional cost. After June 30, the cost will be $3000.

Enter 916 on reader card

Gateway/1000 Offers IBM Workstation Emulation

Forest Computer (Okemos, MI) introduces an enhancement to Gateway/1000 that emulates an IBM SNA 3770 RJE workstation for HP 3000 computers and bi-directional support of IBM 3287 printers.

Gateway/1000 is a multivendor data communications product that supports interactive pass-through and reverse pass-through communications between 3000s and IBM mainframes.

The IBM workstation emulation adds support for batch communications between 3000s and IBM mainframes.

The printer enhancement adds support for the on-line bi-directional transferring and printing of print spool files between 3000s and IBM mainframes.

Enter 918 on reader card

Financial Consolidation For Spectrum, 3000

The newest member of Mitchell Humphrey & Co.'s (St. Louis, MO) FMS-80 family of financial management software is the Financial Consolidation system.

For the HP 3000 and the Spectrum series, the new software provides critical consolidated financial information to satisfy an organization's internal and external reporting requirements.

It is an on-line, real-time financial system consisting of general ledger, accounts payable and receivable, fixed assets, consolidations, purchasing, financial planning, project accounting, foreign currency and fund accounting.

Enter 919 on reader card

Telamon Enhances Network Engine

Network Engine version 2.6 from Telamon (Oakland, CA) enables HP Predictive Support and HP Trend products to access modems connected to Network Engine hardware units.

The hardware units connect ATC/ADCC/ATP ports on the 3000 to autodial modems or direct connect lines. Network Engine software provides terminal users, batch jobs and applications programs access to these ports for automated communications. The Network Engine supports asynchronous access to remote database services, electronic mail networks, and distributed micro, mini, and mainframe computer systems for terminal users and batch jobs.

Enter 920 on reader card

Captools Check Image Capacity

FMT Associates offers a package of utilities for checking Image or Turbo-Image database capacities and utilization.

Captools consists of three programs, Capcheck, Caphist and Captrend.

Capcheck reports the dataset number, dataset name, current capacity, current number of entries and the percentage of utilization for the selected database.

Caphist reports the same as Capcheck, plus it provides the previous capacity, previous entries and percent of change since the program was last run. Captrend goes a step further by reporting the previous values for each dataset for the last six times the program was run.

The Captools package sells for $100 for object code only, $200 for both source code and object code.

Enter 923 on reader card

CRI Upgrades ProjectAlert

Version 1.40 of ProjectAlert, a PERT- and CPM-based project management system, features expanded graphic capability, modeling and "what-if" capability, plus faster data entry processes.

ProjectAlert, from Computer Representatives Incorporated (CRI, Santa Clara, CA) now displays graphics on line, expands or shrinks graphic output on both the screen and the plotter and produces multicolor Gantt charts labeled by calendar day, month and year.

The expanded network library now stores multiple versions of a single project, or reproduces a model project, allowing it to be used as a template for other projects. ProjectAlert, priced from $10,000 to $116,500, is available on HP 3000s, DG MV and DEC VAX computers.

Enter 925 on reader card

MCBA Enhances Its HP 3000 Line

MCBA (Santa Clara, CA) has enhanced its line of accounting and distribution packages for HP 3000 computers.

New features include job scheduling and built-in interfaces to the MCBA manufacturing system. Also, all system-level code, controlling such functions as password security, file maintenance and printer and terminal configuration, is consolidated into one set of programs, applicable to all MCBA packages installed.

Enter 914 on reader card

Pascal Formatters For All HP Systems

MJH Systems (Boise, ID) now offers a new line of Pascal formatters for HP computers called Pasform.

The formatter enables programmers to program in whatever style is most efficient for them, yet allows project managers to develop project coding standards for documentation, maintenance and meaningful metric collection purposes. It gives a programmer total control over the format and capitalization (casing) of HP Pascal source code.

Pasform is available for the HP 9000 series 200/300 Pascal workstation and HP-UX, 500 HP-UX, HP 1000 RTE and HP 3000 MPE. HP 64000 Pisces Pascal source can be cross-formatted from the HP 9000/500 or HP 3000 with special versions of Pasform written for that purpose.

Pasform costs between $500 and $1500.

Enter 921 on reader card

Interactive Announces Sylog For RTE-A, -6/VM

Sylog is a new system console logging software package for use on both RTE-A and RTE-6/VM available from Interactive Computer Technology (Lake Elmo, MN).

SYLOG intercepts messages directed to the console (LU 1) and redirects them to a file and/or other device, always posting them to disk immediately.

The console terminal itself takes on a new LU number and can be used as a normal session terminal without annoying messages in the middle of screens. Sylog costs $800.

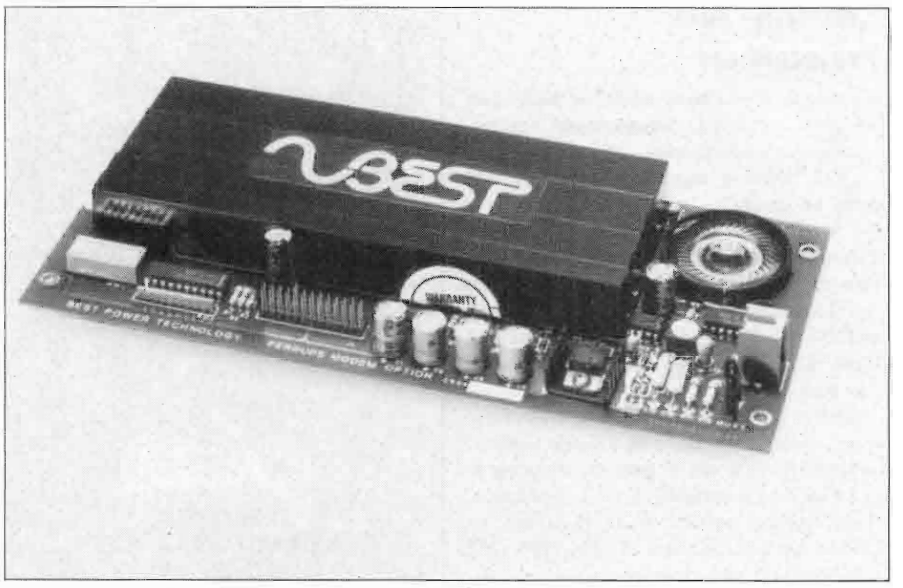
Enter 922 on reader card

Modem Option Allows Remote Ferrup Control

A built-in modem that allows control and monitoring of Ferrups uninterruptible power supplies from remote locations via ordinary telephone lines now is available from Best Power Technology (Necedah, WI).

The 300 to 1200 bps modem has auto answer, auto dial features with provision for programmable access codes for maximum security. The software that's part of the modem board option automatically phones the remote location if any one of up to 14 alarm conditions (power out, high ambient temperature, automatic shutdown pending, etc.) exists.

Enter 926 on reader card



The 300 to 1200 bps built-in modem for Best UPS.

OCS/Express Does More

Operations Control Systems (OCS, Palo Alto, CA) has announced OCS/EXPRESS, a new release of OCS/3000, the data center scheduling system for the HP 3000.

With the new release, job information can be loaded automatically and scheduled with a single command. It also allows you to define your own custom schedule tags to determine when jobs will run. OCS/Express also schedules and executes files containing standard MPE commands.

OCS/Express is available at no charge to OCS/3000 users covered under OCS's maintenance service.

Enter 927 on reader card

DISC Introduces New Quiz Interface

Omniquiz is Dynamic Information Systems Corporation's (DISC, Denver, CO) newest product designed to provide the sophisticated retrieval capabilities of its OMNIDEX product transparently to Quiz users.

Omniquiz interfaces directly with Quiz to provide the functionality and speed of a high performance relational database.

It is being marketed in two versions: Level One provides partial key retrieval and sorted sequential access across multiple data sets and sells for $6500.

Level Two provides full Omnidex capabilities including partial key retrieval, sorted sequential access, keyword retrieval, and multi-field selection and sells for $9500.

Enter 928 on reader card

Informix-4GL 1.1 Features Windows

Informix Software (Menlo Park, CA) offers version 2.1 of Informix-SQL and version 1.1 of Informix-4GL for UNIX, DOS and VMS.

The new windowing feature of Informix-4GL version 1.1 enables application developers to improve the human interface of their programs. Developers now can include pop-up menus, dialog boxes and views of more than one data-entry screen at a time.

The new releases also include data clustering, auto indexing, and query optimization.

Enter 930 on reader card

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Lasergraphics Offers Personal Film Recorder

Lasergraphics recently introduced the Rascol II Personal Film Recorder (PFR) that produces either 300 4000-line color slides or 60 2000-line emulation slides an hour.

The Rascol II/PFR is fully compatible with virtually all graphics software available for the IBM PC by accepting graphics in either Lasergraphics Language or Hewlett-Packard Graphics Language (HP-GL).

Software products compatible with the Rascol II/PFR via HP-GL include Harvard Presentation Graphics, Chartmaster, Signmaster, Mapmaster, GSS, Graphwriter, AutoCAD and VersaCAD.

The complete Rascol II/PFR system costs $5000.

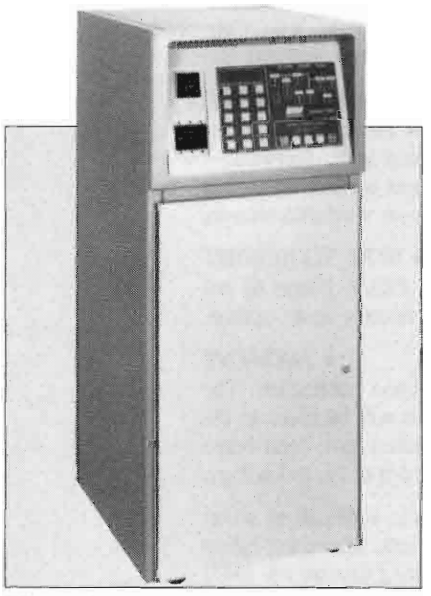
Enter 929 on reader card

LorTec Expands Single-Phase Line

The new 4 kVA uninterruptible power system now available from LorTec Power Systems (Elyria, OH) incorporates advanced instrumentation in a compact, single-phase unit suitable for office use.

The new system provides uninterrupted AC power for HP 1000 and other minicomputers.

Enter 938 on reader card



The 5 kVA ContinuAC single-phase UPS from LorTec Power Systems.

Dow Jones Now Services Zentec Model 8392

The Dow Jones Service Company now provides repair service in the U.S. and Canada for the Zentec Model 8392 terminal.

Zentec Corporation's (Santa Clara, CA) agreement with the Dow Jones Service Company will enhance the ability to react to customers' immediate service requirements. Service will be performed by one of Dow Jones' three Component Repair Centers or by one of the 76 Regional Service Centers.

Enter 933 on reader card

Kelly Expands 3000 Memory

With Kelly Computer Systems' (Mountain View, CA) recent announcement of the HP 3000 Slotsaver, users of Model 3300A, HP 3000 Series 37, 37XE and MICRO XE can, for the first time, expand main memory in their systems to up to 16 MB to improve system performance.

The new memory board works in all three systems, with existing HP 3000 memory, and is available in 2-, 4-, 6-, and 8-MB configurations.

Kelly memory is fully compatible with the HP 3000, including error correcting memory, memory logging and battery backup.

The HP 3000 Slotsaver is forward and backward compatible within the HP 3000 Series 37, 37XE and MICRO XE product line. It will work in each system by itself or in combination with HP's 1-, 2-, or 4-MB memory boards. Smaller Kelly memory configurations can be upgraded to larger configurations under Kelly's standard upgrade policy.

Enter 931 on reader card

Advanced MicroSolutions Offers QMS

Advanced MicroSolutions' (Menlo Park, CA) Quality Management Solutions form an integrated system of software products designed to run on the HP 9000 family of computers.

Operating in a standalone mode or networked to share data and peripherals, this system will allow the user to install the computing power necessary to automate manufacturing functions.

QMS includes database management. statistical quality control, statistical process control, automatic test, and processing monitoring and control.

Enter 936 on reader card

Zentec now offers repair service for its Model 8392 terminal from the Dow Jones Service Company.

Martinsound Introduces MS-380 8-MB Megamemory

Martinsound Technologies (Alhambra, CA) announces the MS-380 Megamemory Board for the HP 9000 Model 200/300. The MS-380 is 8 MB of RAM memory and also is available with error correction as the MS-380EC.

In addition to the MS-380, the Megamemories family includes the MS-380 4-MB RAM board, the MS-320 2-MB RAM board and the MS-310 1-MB RAM board.

Enter 934 on reader card

Business/XL 3000 Software

The Business/XL software modules from Smith, Dennis & Gaylord (Santa Clara, CA) has features to meet the processing demands and audit controls necessary for large growth-oriented companies.

The Business/XL modules are a fully integrated, on-line interactive system; every module may operate individually or as a group. They are truly "user managed" systems requiring little MIS involvement in day-to-day or monthly operation.

Smith, Dennis & Gaylord also offers custom software work and can customize reports and formats.

Enter 939 on reader card

Tymlabs Announces Product Upgrades

Tymlabs Corporation (Austin, TX) has released Version 2.21 of BackPack, the firm's

high-speed replacement for HP's STORE, RESTORE, SYSDUMP and DBSTORE facilities, and Version 2.1 of Mac2624, an HP block mode terminal emulator for the Apple Macintosh.

The new version of BackPack contains several new features that make it a more complete backup solution for varying configurations with differing system management philosophies.

In Version 2.1 of Mac2624, Tymlabs has increased the speed of screen display by 75% and doubled the rate of transmission in the transfers.

Enter 932 on reader card

NSD Enhances JobRescue

NSD Inc. (San Mateo, CA) announces version 3.0 of JobRescue (formerly SMP), with new report error checking and historical options.

JobRescue ($3000) is a system management tool that eliminates paper printing of job listings while providing operator and user notification of job errors and full $Stdlist access and archival.

With Version 3.0's error checking capabilities for all spoolfiles, reports can be scanned for exceptional conditions before printing.

JobRescue is an HP Referenced Software Product.

Enter 935 on reader card

Beagle/Plus Tests, Proposes Hypotheses

Beagle/Plus, a Machine Learning System from VRS Consulting (Marina del Rey, CA), tests and forms hypotheses from data files. This data analysis system incorporates several advanced ideas from the field of artificial intelligence.

Beagle/Plus takes as input a file of data and produces rules that predict a given goal. It uses an evolutionary algorithm to process the data in order to discover rules. However, it's not necessary to give Beagle any rules; it will test your hunches.

Beagle/Plus is priced at $2500.

Enter 940 on reader card

Microtec Research Releases XRAY68K

Microtec Research (Santa Clara, CA) announces XRAY68K, an integrated High Level/Assembly Level Debugger for the 68000/10/20 family of microprocessors.

The XRAY68K Debugger can be used

to execute and debug programs created by Microtec's 68000/10/20 C compiler and assembler. It allows the use of multiple execution environments.

One version will work with a software simulator as the execution environment. A second version works with In-Circuit Emulators from such companies as ZAX, Applied Microsystems and Microtek and allows high level debugging in real time.

XRAY68K currently is distributed on HP 9000 s320 UNIX, VAX/VMS and PC-DOS.

Enter 942 on reader card

Logic Sciences' New Graphics Processor

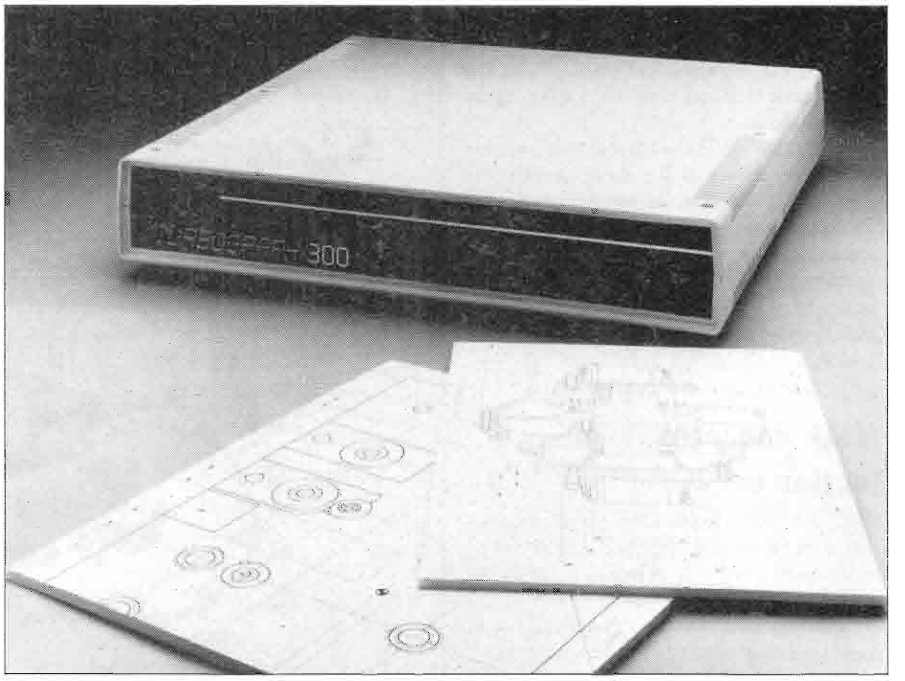
The Turbograph 300 Series III from Logic Sciences (Houston, TX) is a new standalone vector-to-raster processor designed to convert data supplied by host IBM 3274 cluster computer environments into a format that can be printed quickly on a number of printers and plotters.

The Turbograph 300 Series III provides the same vector-to-raster processing capabilities of the Turbograph 300 with special communications hardware that allows it to accept vectors from IBM 3274 hosts.

It provides IBM 3287 emulation in SNA Control String (SCS) and 3270 Data Stream Character (DSC) modes with vectors transmitted to the Turbograph in HP-GL or IBM-GL. It also provides support for the Computer Graphics Metafile (CGM) standard, which is compatible with such industry standards as the Graphic Kernel System (GKS) and the Programmer's Hierarchical Interactive Graphics System (PHIGS).

The Turbograph 300 Series III is priced at $4000.

Enter 937 on reader card



Logic Sciences' Turbograph 300 Series III vector-to-raster processor.

DISOSS Support For ADR/eMAIL

Applied Data Research (Princeton, NJ) introduces an electronic mail system with a transparent interface to DISOSS, IBM's Distributed Office Support System.

The DISOSS interface is the first step in a connectivity strategy that allows ADR/eMAIL to communicate directly with other office support systems while insulating the ADR/eMAIL user from the other software environment.

The latest release of ADR/eMAIL provides mail processing and information distribution capabilities to the IBM Personal Services series of products. HP, DEC, Wang, Data General, Unisys and other DISOSS-compatible minicomputers are supported.

The permanent license price for ADR/eMAIL is $21,500 for VSE and $35,000 for MVS environments. The DISOSS interface is priced at $2500 for VSE and MVS. It requires DISOSS version 3.2 or later.

Enter 941 on reader card

Architect Means Applications Simplified

The need to increase the MIS professional's productivity for the entire life cycle of applications has prompted Cognos Incorporated (Ottawa, Ontario) to launch PowerHouse Architect, a menu-driven solution for users of advanced application development language PowerHouse and HP 3000 computers.

The Architect is entered through a main menu screen. Subscreens enable a programmer to create or maintain a data dictionary, generate a fully-functional prototype, select Application Documentor options, define a command for the PowerHouse Tool Box or access the PowerHouse components. These are on-line screen builder and transaction processor QUICK, volume processor QTP and report generator QUIZ.

Traditionally, HP PowerHouse users built their data dictionaries by using a text editor to enter lines of code describing a database's elements, records and files. These statements, the Source Dictionary, were compiled to create a Compiled Dictionary. The Compiled Dictionary then was used to build a set of application files addressable by the PowerHouse components.

In contrast, PowerHouse Architect allows a user to enter element, record and file definitions interactively through a series of screens. The compiler and build steps can be activated by selecting screen options.

Enter 943 on reader card

BBS Releases BBS-Prism

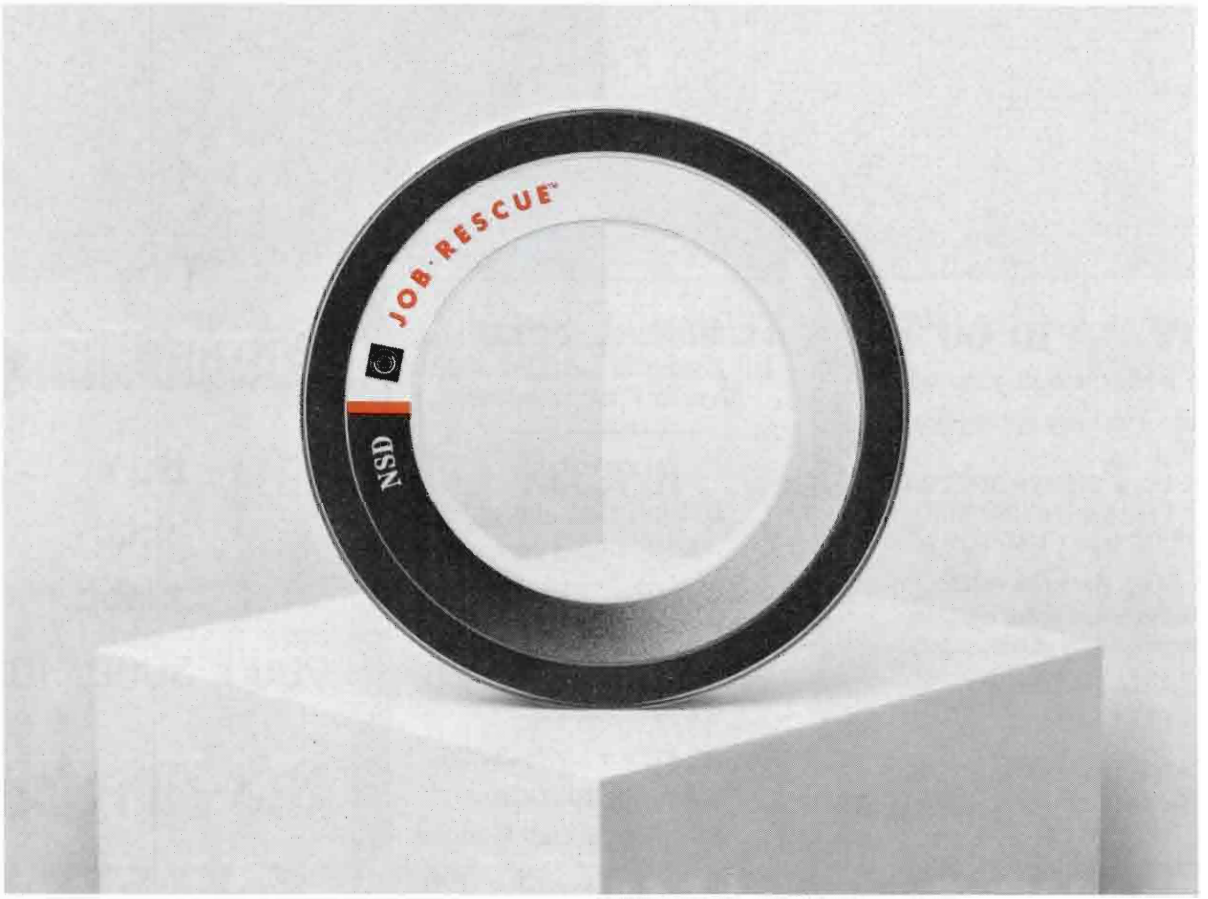
Bradford Business Systems (Laguna Hills, CA) has released BBS-Prism, a full-screen editing subsystem for the HP-150, HP 3000 and IBM PC.

The package offers true full-screen editing, compiles from within the editor including support for most compilers on all supported machines, a word processing environment, left and right scrolling, a built-in calculator, the ability to run other programs and perform DOS and MPE functions from within the editor and more.

The package is based on Speededit, but was rewritten to be ported to PCs and other systems in the future.

Enter 955 on reader card

Announcing the end of an error.



NSD announces no more hidden production errors. No more wasted effort reviewing every $STDLIST at the end of a run. And no more job listings buried in printouts. Now there's a simple way to save your time and your money.

Our new improved version of the SMP program is here. It's called JobRescue.™ As soon as you try it, you'll understand why. JobRescue runs in the background and continuously examines $STDLISTs. If you choose, it notifies you of errors by displaying a warning on the console. You can then send this warning to other users.

With JobRescue, there is a lot more at your command. For example, now you can keep your $STDLISTs on line for more than 24 hours. Let's say you come in on Tuesday. You can review Monday's reports or hold them for another day. JobRescue lets you hold your $STDLISTS with their flagged errors for up to 127 days!

What's more, you can now specify which $STDLISTs and which errors on those $STDLISTs you want to examine. You can store $STDLISTs without errors in a file or purge them completely. Users can specify that certain $STDLISTs should be printed even if they have no errors.

With all that JobRescue does, it might surprise you how easy it is to use. You simply STREAM a job. In many cases, online commands are only one word long. In fact, because of your familiarity with HP programs, you already know most of the commands. And we guarantee JobRescue for one full year.

To show you just how well JobRescue performs, we're offering a free trial run. The end of an error means the beginning of smooth operations for you.

NSD

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ADVERTISERS INDEX

[CALENDAR]

[JUNE]

HP 3000

1-2: BUG/DUG (Belgium, Netherlands) joint Belgian and Dutch conference with vendor show in Eindhoven, Netherlands. Contact Dorien Halbertsma (Netherlands) at 30/521114 or Luc Beersmans (Belgium) at 15/200463 or telex: 39410 ICHASS

1-4: Comdex Spring '87 Conference and Exhibition, Georgia World Congress Center (Atlanta, GA). For registration information, call (617) 449-6600.

17: CINMUG (Ohio) co-sponsored workshop conducted by Speier Associates at the Cincinnati Hewlett-Packard office. Topic: "Advanced VPLUS Programming." Call (513) 351-8888.

18: SEFLUG (Florida) afternoon meeting and SEFLUG officer elections. Contact Ellen Baiardi at (305) 472-4200.

29 — July 3: HPCUA (UK) annual conference at the Metropole Hotel (Brighton, England). Contact Tim Cullis at (01) 959-4359 or telex: 9157656 TRAFAL G.

[JULY]

HP 3000

15: OKRUG (Oklahoma) dinner meeting. Topics to be determined. Contact Kathy Hearns (908) 655-6690.

16: GHRUG (Texas) one-day meeting at the Hobby Hilton (Houston). Contact Phil Curry at (713) 331-6111, ext. 255.

27-30: Siggraph Conference and Exhibition, Anaheim Convention Center (Anaheim, CA). Conference July 27-31; exhibition July 28-30. Call (212) 752-0911 for more information.

30-31: MARUG (North/South Carolina, Virginia) summer quarterly meeting at the North Hilton Hotel (Raleigh, NC). Contact Stephen Day at (804) 569-4857.

HP 1000/9000

14: Bay Area Technical UG (California) meeting. HP Palo Alto Sales Office, 7 p.m. Contact Bill Hassell, (408) 988-7231.

23: Baltimore/Washington DC LUG (Maryland) one-day meeting at HP Rockville office. Panel discussion on "Graphics." Contact Nick Seidenman at (301) 961-1885 or Rosemary Braxt at (301) 921-6298.

[AUGUST]

HP 3000

14-15: ORERUG (Oregon) annual summer conference (Newport, OR). Call Lora Seal at (503) 485-5611, ext. 262.

HP 1000/9000

11: Bay Area Technical UG (California) meeting, HP Palo Alto Sales Office, 7 p.m. Contact Bill Hassell, (408) 988-7231.

OPINION

Don Mitchell

Users Are People, Too, You Know

User . . . Ever wonder why an industry of mature adults, ostensibly professionals, ever came to hang such an unpleasant, vaguely scatological moniker on persons who, for the most part, mean us no ill will or harm?

While I was waiting for an early morning cab outside a Detroit convention center last fall, a bystander asked me what was going on in the hall.

"User's conference," I said. "HP users from all over the place." As I uttered the initials HP, I noted confusion, and disdain when I said, "users." Before I could explain, her eyes focused on a point indeterminately behind me, then rolled heavenward.

A dozen rough-looking street people marched out the gate under the command of a security guard, roused most likely from their overnight shelter within.

"A user's conference?" she sighed. That's what they call it these days?"

Sometimes street talk says in a word what otherwise never quite gets said in five minutes of "educated" language. *User* is a four-letter word with a lot more meaning than we probably intend.

Why does the computer industry — alone among the major industries — have users? People who drive cars are drivers. People who hire attorneys are clients. People who wait for doctors are patients. People who apply software to review tasks are called users. People who employ the tools of their trade are proudly known by the trade they ply: carpenters, plumbers, dentists, machinists.

While there may be reasons more flattering to toilers in the information processing field, the fact of the matter is that the dubious title of user serves a single societal purpose: It separates the haves from the have-nots in the information world. It breaks things down very neatly into We and They. Us and Them. EDP people and dull people. MIS and the great unwashed.

Ironically, in the vast majority of cases, our jobs exist because of the work *they* do; not vice versa. The charter of the user is to meet deadlines and keep the company afloat, but the job description calls for one to push *enter* 45 times an hour and keep his mouth shut.

"But this is changing," you may offer. "You're talking about the old shop and the old attitudes. The whole thing changed with the advent of the personal computer. Today's user knows there may be more to data processing than five screens and a maintenance report."

Perhaps so, but my question is a difficult one: Are we EDP professionals

THE USER BILL OF RIGHTS

- I'm entitled to the dignity and respect due any intelligent person, whether I have a DP background or not.
- I'm entitled to have a say in the discussion regarding, "What I Need to Know." I don't need to control that decision, but I'm entitled to input.
- When software arrives or is modified, I'm entitled to an orderly, carefully planned transition phase to prepare me for changes in the way I do my job.
- I'm entitled to basic (greater detail at my option) information about the way in which the computerized portion of my job is accomplished. (Example: If my report has been spooled, I deserve to know what that means, and when I can expect to receive it.)
- I'm entitled to procedural and structural safeguards (and to the knowledge that they are in place) that protect my work.
- I'm entitled to thorough, professional training on any application software I'm asked to use.
- I'm entitled to thorough, professional documentation of those portions of software and/or application procedures that affect my job.
- If I use commercially supplied software, I'm entitled to know the terms of the license under which that software is used. (Example: If there's an expiration date, I deserve to know it.)
- If I make constructive suggestions for system improvement, I deserve to have those suggestions heard and reasonably considered.
- If any system information is kept regarding the performance of my job, I deserve to know what aspects are being monitored and who gets that information.
- If I use a terminal as much as half an hour a day, I deserve to have computer literacy training available at my option, so I can receive general information about the computerized aspect of my job.

helping in this revolution, or are we doing everything we can to get in the way? Here may be the best index of where you stand: How often do you think or utter these six little words: "*They don't need to know that*"?

Let's burst two myths here. Myth A (my own, with which I reluctantly part) says the person who drives software is inquisitive, sensitive, intelligent and diligent.

Myth B, currently in vogue, is that one who uses software is dull, uncaring about consistency and accuracy, content with meaningless rote activities and loving of endless repetition.

Okay, so neither A nor B is accurate. But it seems that when we don't know exactly which mythical user we've got (as in the design of a new system or when we're limited to grandiose assumptions about our user population such as assuming an eighth-grade reading level), we ought to be less condescending than we usually are. We ought to assume at least the mythology of brightness and competence until proven wrong.

Whose interests are served when we even think that nasty little sentence: "They don't need to know that"?

If we can't make such an assumption, if the task we're asking the user to perform is truly mindless, then perhaps it should be automated. If indeed we choose to sit a person down to 40 hours a week of tedious repetition of a trivial task, we're doubtfully serving the best interests of either that person or those who hire us to make such judgments.

It's in precisely this type of environment — where the task's purpose is obscure to the user, where the feedback is in Greek, and where the human interaction (if indeed any exists) is primarily negative — that users crawl into the self-fulfilling Neanderthal shell we've built for them. In a torpor, they become obvious errors.

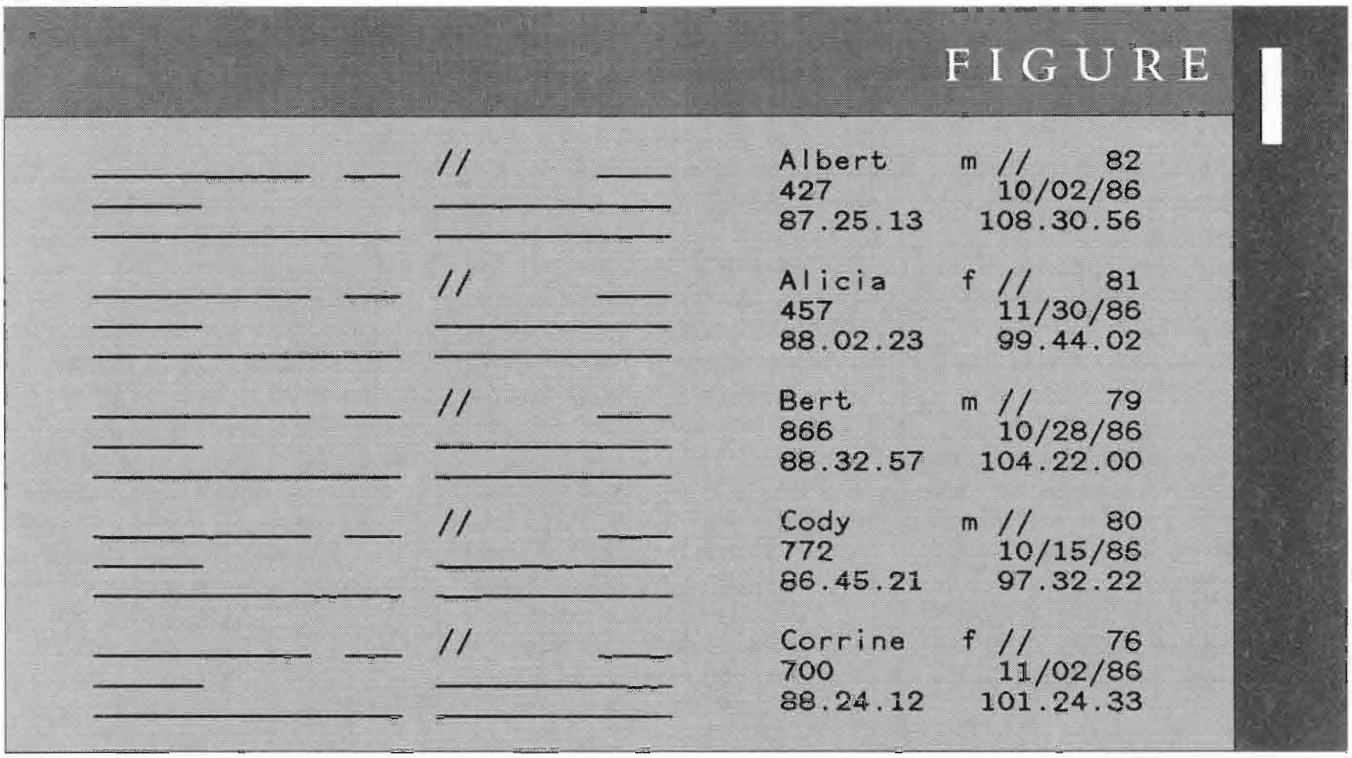
So what's our response? Instead of trying to humanize their jobs, we go back to the drawing board and further simplify the system to ensure that even more obtuse, mindless souls than the present lot can press *ENTER* 45 times an hour.

Hyperbole? Of course. But consider these indicators and tie them into your own experience.

A prominent software advertisement, trying to make the point that the software is easily learned, proudly pictures an ape sitting at the terminal.

As far as I'm concerned, anyone in a position of authority over systems operations has an unavoidable mandate

FIGURE



to ensure that all participants have at least a base level of understanding.

Whose interests are served when we even think that nasty little sentence: "They don't need to know that"? Certainly, at some level, we serve users, letting them bypass information that would clutter rather than organize their knowledge of the system. As a car driver, I don't need to understand catalytic conversion (though I would expect information to be available if I were interested). And in some cases, we preserve the system integrity and security. Too often, however, we accomplish two less-worthy objectives:

- *We reinforce a condescending assumption about user interest in software and/or the ability to understand the processing, thus predisposing them to fulfill our lowest expectations; or*

- *We artificially preserve a bailiwick of our own expertise and create a need for users to come to us for help. There's little in our work more gratifying than the "bailing out" of people who don't have our particular knowledge or experience and, therefore, need our assistance.*

The litmus test is to look at the time and effort required to inform users and to confront the question, whether it's laziness, ego or fear of loss of status rather than any lack of "need" on the user's part, that drives our decision to not inform, not educate. If we're not being lazy, then the knowledge previously has been documented somewhere. If we're not being egotistical, then that reference source is freely available.

The manual I'm talking about doesn't, by the way, provide the password for MANAGER.SYS. It does contain enough information to reasonably describe all common uses of the software and typical error conditions, plus it provides enough conceptual background to give meaning to the work required of the user.

We reinforce a condescending assumption about user interest in software and/or the ability to understand the processing, thus predisposing them to fulfill our lowest expectations . . .

Only under these conditions can system authorities legitimately make the kind of complaints about users that are heard all too often and all too unfairly from shops where users are expected to be dumb and are told little or nothing about what they're doing.

Figure 1, for example, shows the kind of exercise every data processing pro should perform and review every half year or so. Use the information provided at the right to fill in the forms at the left.

Notice that there are only five forms, not five thousand. It'll take you only two minutes, not 40 hours a week for the next four years. You can wonder about the meaning of this data if you like, but remember: It's not your business to ask.

There. Now that you're done with but a split second in the life of a user, what are your feelings about the task? Ready to settle in for a career of same?

Would it help you to know (and would it cost anybody much for you to know) that you aren't working with the medical records of the elderly here, but with scientific observations of Canadian polar bears? That these bears were spotted from the air and darted with an anaesthetic, and while they snoozed, a team of biologists weighed them, estimated ages, took blood samples? That radio collars were attached, and the locations of these encounters (in latitude and longitude) will be compared against satellite-transmitted readings to measure the incredible distances these animals traverse?

Granted, most data entry work lacks such exotic touches. But what does such "background" information do for your feelings about the task you were asked to do?

"Nonessential information for the user," you might say. "He doesn't need to know that." You're right, if the user were the software or hardware you want him to be. But users are people. Until that's recognized, not only in the design of the system, but in documentation and training that carry that system forward, there'll be turnover, turmoil and trouble in your shop. And plenty of inaccuracy, too.

So much for critique of the status quo; now on to something that can be done, today, to improve our relations with those who do the truly productive work of data processing. If you have the courage of a Martin Luther, post "The User Bill Of Rights" on the department doorway.

I don't think any of this revolutionizes data processing, but perhaps I've pointed out an essential unfairness that's limiting to users, DP managers and systems performance alike.

Through a concerted effort, perhaps we can restore the appreciation and respect we all owe those who use our systems and our software. *—Don Mitchell manages SIMULEARN Incorporated and has specialized in computer-based training for Hewlett-Packard 3000 users for seven years.*

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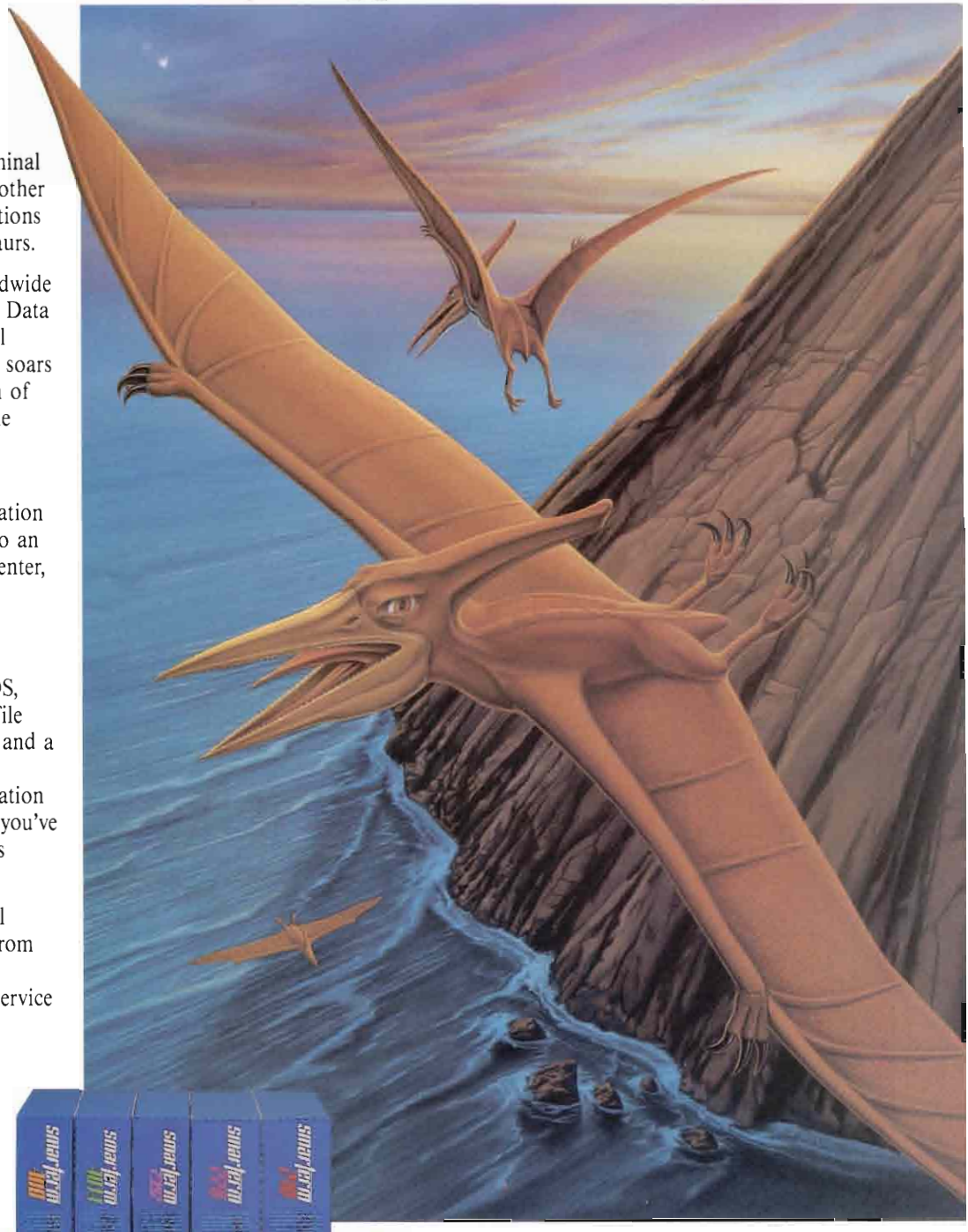

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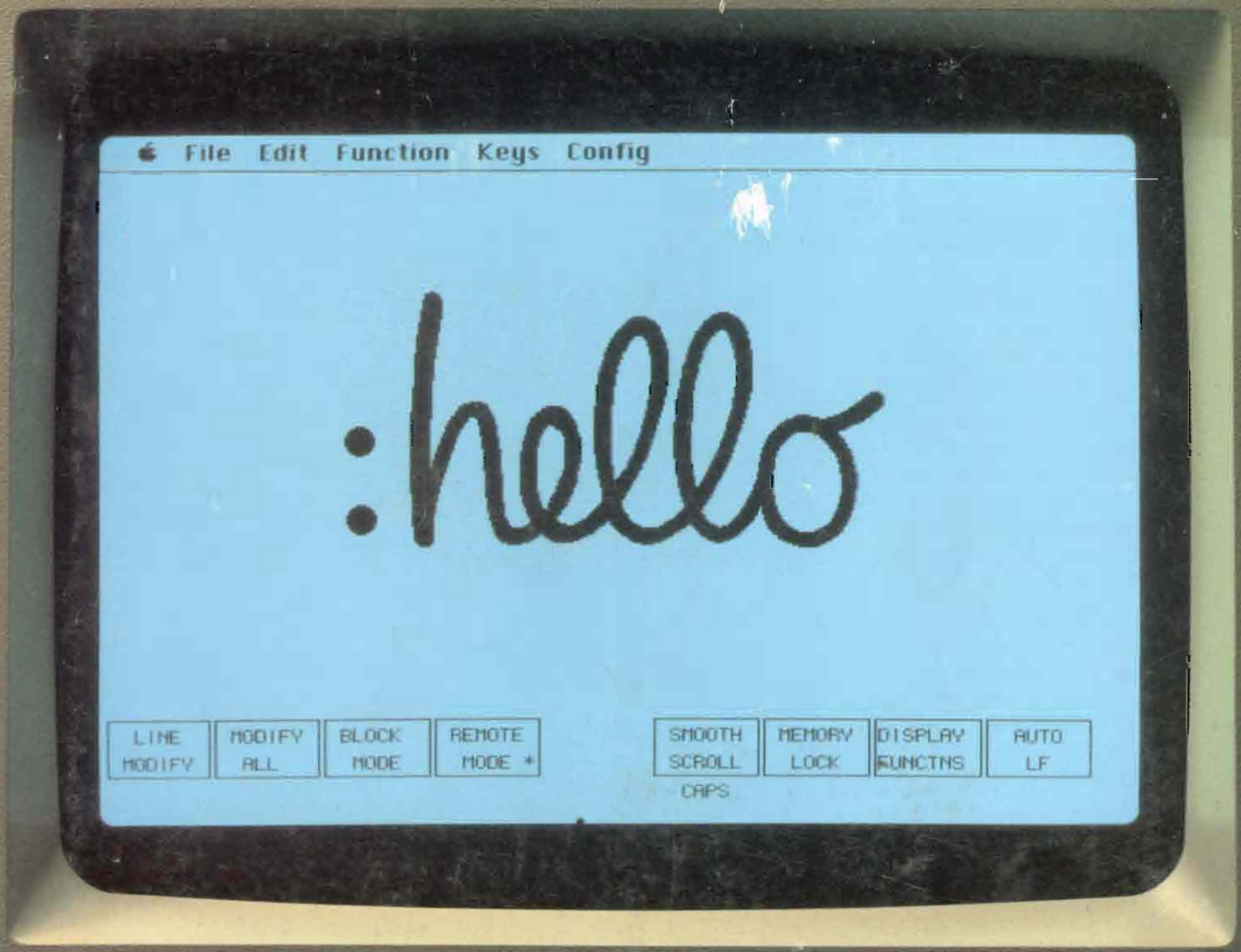

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