HP Professional

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

AUGUST 1987 ■ VOL. 1, NO. 3

■ Printed Report Management

■ Automating Training

■ Formatting PASCAL

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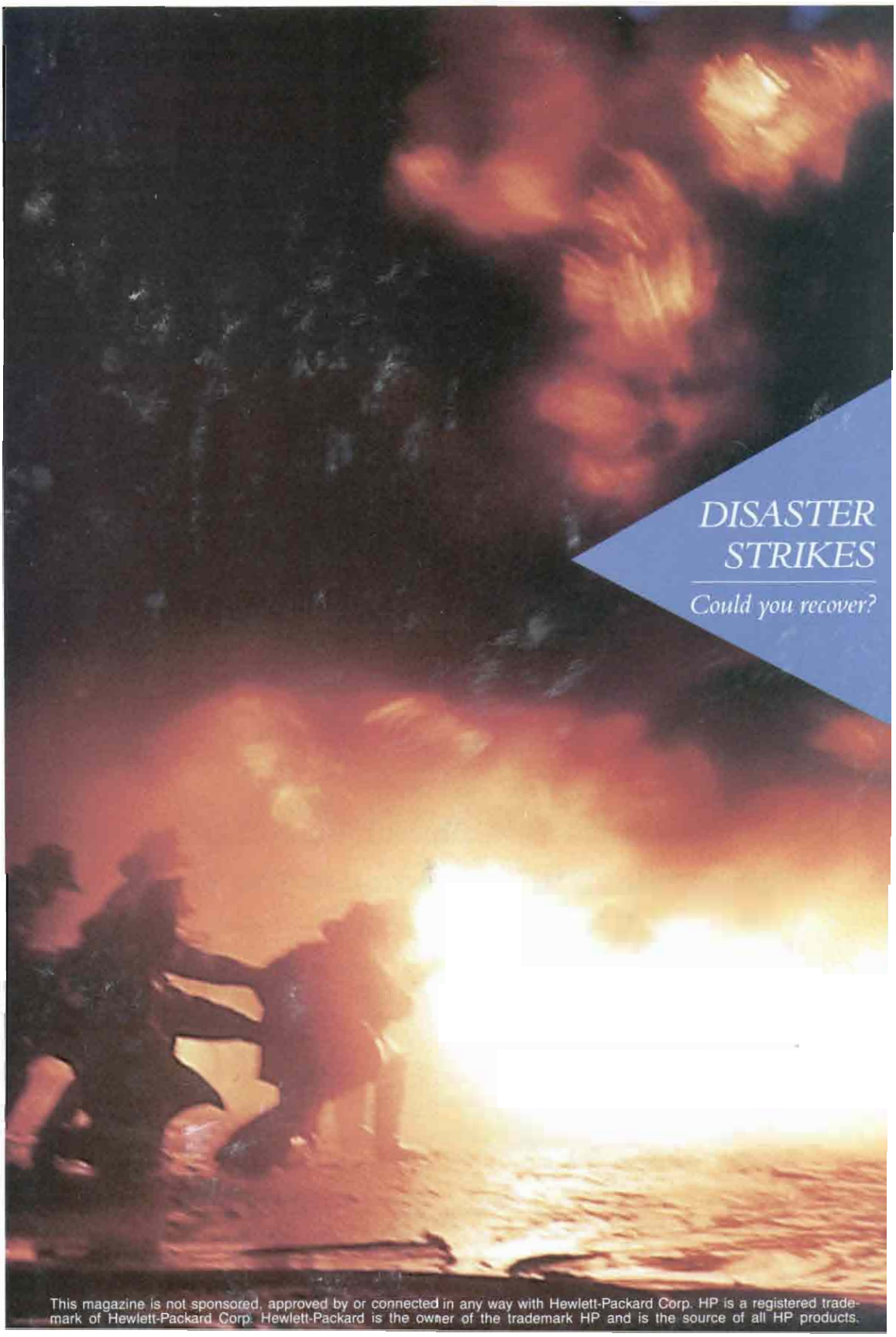

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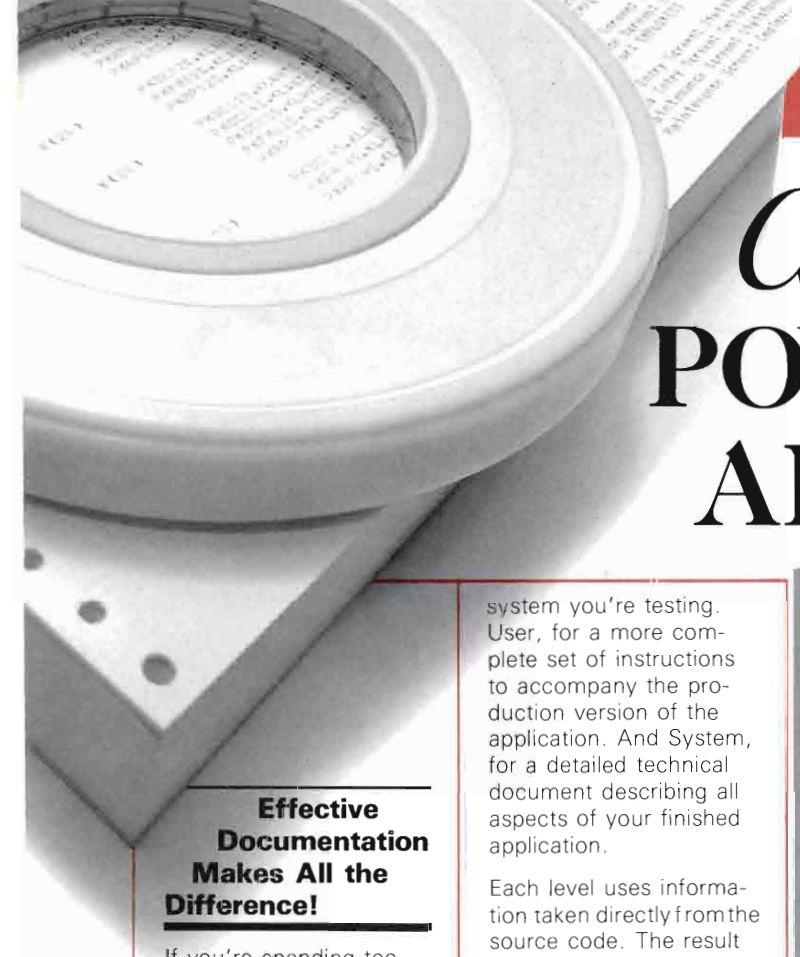

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So if you want to replace the aging daisy-wheel printer, or get to all the power that TDP *really* has, or just want to avoid walking four blocks to the data center's HP2680, try a LaserJet: with PSP/Plus, the LaserJet has joined the HP3000 family.

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Editorial

MANAGING EDITOR Lonni Wright
COPY EDITOR Karen Detwiler
EDITORIAL ASSISTANT Randi Koenig
CONTRIBUTING EDITORS Jim Dowling, Don Person
CONTRIBUTORS Milton Beychok, Martin Gorfinkel, Glenn E. Hobbs, John J. Hunter, Judy Kimsey, Doug Knapman, Don Mitchell, Michael O'Malley

Design

DESIGN/PRODUCTION DIRECTOR Leslie A. Caruso
DESIGN/PRODUCTION ASSOC. Ruth Ann Leiby
ART/PRODUCTION ASSOC. Timothy M. Kraft
ART ASSISTANT Sue Ann Rainey
PRODUCTION ARTIST Richard Kortz
SENIOR TYPESETTER Joseph E. Hohenwarter
TYPESETTING/PRODUCTION MaryEllen Springer
DESIGN CONSULTANT Greg Paul, Brady & Paul Communications

Circulation & Administration

VICE PRESIDENT Peg Leiby
CIRCULATION DIRECTOR Mary Wardlaw
CIRCULATION MANAGER Karen Savory
CIRCULATION FULFILLMENT Virginia Ashabranner, Josh Friedman
ACCOUNTING Andrea Beneke
COMPUTER SYSTEMS Bonnie Auclair, Kevin Kennelly, Ruth Mermelstein

PROFESSIONAL PRESS, INC.
President: Carl B. Marbach
Vice President: R. D. Mallery
Vice President: Peg Leiby
Vice President: Helen Marbach

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HP PROFESSIONAL is published monthly by Professional Press, Inc., 921 Bethlehem Pike, Spring House PA 19477. Subscriptions are complimentary for qualified U.S. and Canadian sites. Single copy price, including postage, $4. One year subscription rate $30 U.S. and Canada; $60 foreign. All orders must be prepaid. Second class permit applied for and pending at North Wales, PA and additional entry. POSTMASTER: Send all correspondence and address changes to HP PROFESSIONAL, P.O. Box 445, Spring House, PA 19477.

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BPA Membership applied for 4/87.

Connectivity

At HP's booth at the Miami Design Automation Conference, there was one particular display that caught my fancy.

They had "one each" of the major 32-bit workstations: DEC, Apollo, Sun and, of course, HP. They were all connected with an Ethernet (TCP/IP) and were running UNIX (of course). All the files were being served by NFS and all were running X Windows. A little airplane was flying through a window across the bottom of each screen. Either the plane was in that workstation's airspace, or there was a message telling you where the plane was and how many screens away. Displays from the VAX were on the Sun, displays from the HP on the Apollo, and so forth. All were updating in real time.

This catchy show display really underlines a major truth about the world of computing today: Standards are *real*. Standards are here to stay. They are bigger than any manufacturer, because they serve the user community. The community has embraced them, and woe to the manufacturer who thinks they can be ignored.

X Windows is a wonderful example. In a nutshell, it is a network graphics display. Graphics displays now can be written completely independently of the target machine and can be moved around the network wherever they are needed. The author needn't give thought to whether the display is ultimately to show up on a 9000 or a VAX!

The X Windows server takes advantage of whatever special skills (such as Polygon filling) that the target platform may possess and allows the platform to do the grunt work of actually creating the display. HP embraced the X standard early and has made major contributions to it.

There will be a major event early in 1988. The Interoperability Demonstration will carry these major steps further to fruition where the several manufacturers demonstrate actual interoperability of their several systems for all to see.

There are some deeper implications here, especially for the 3000 community. Notice that C is the new implementation language for the commercial Spectrum. Notice that there really is no physical difference (other than the nameplate) between an 800 series Spectrum and a commercial 900 series. There is and will be a high demand for "interoperability" between the commercial Spectrum machine and the UNIX-based workstations in almost any environment.

If interoperability can be achieved by the incorporation of various standards (such as X Windows), why not? There is a real danger that the 3000 community might become isolated from the mainstream.

We are only a few months (my guess) from seeing the initial "microSpectrum" chip set. With today's tools, producing such a chip set is a nearly trivial exercise. The availability of workstation-sized machines that can run your 3000 software and communicate over Ethernet will revolutionize the way you do data processing, just as it is throughout the rest of the industry.

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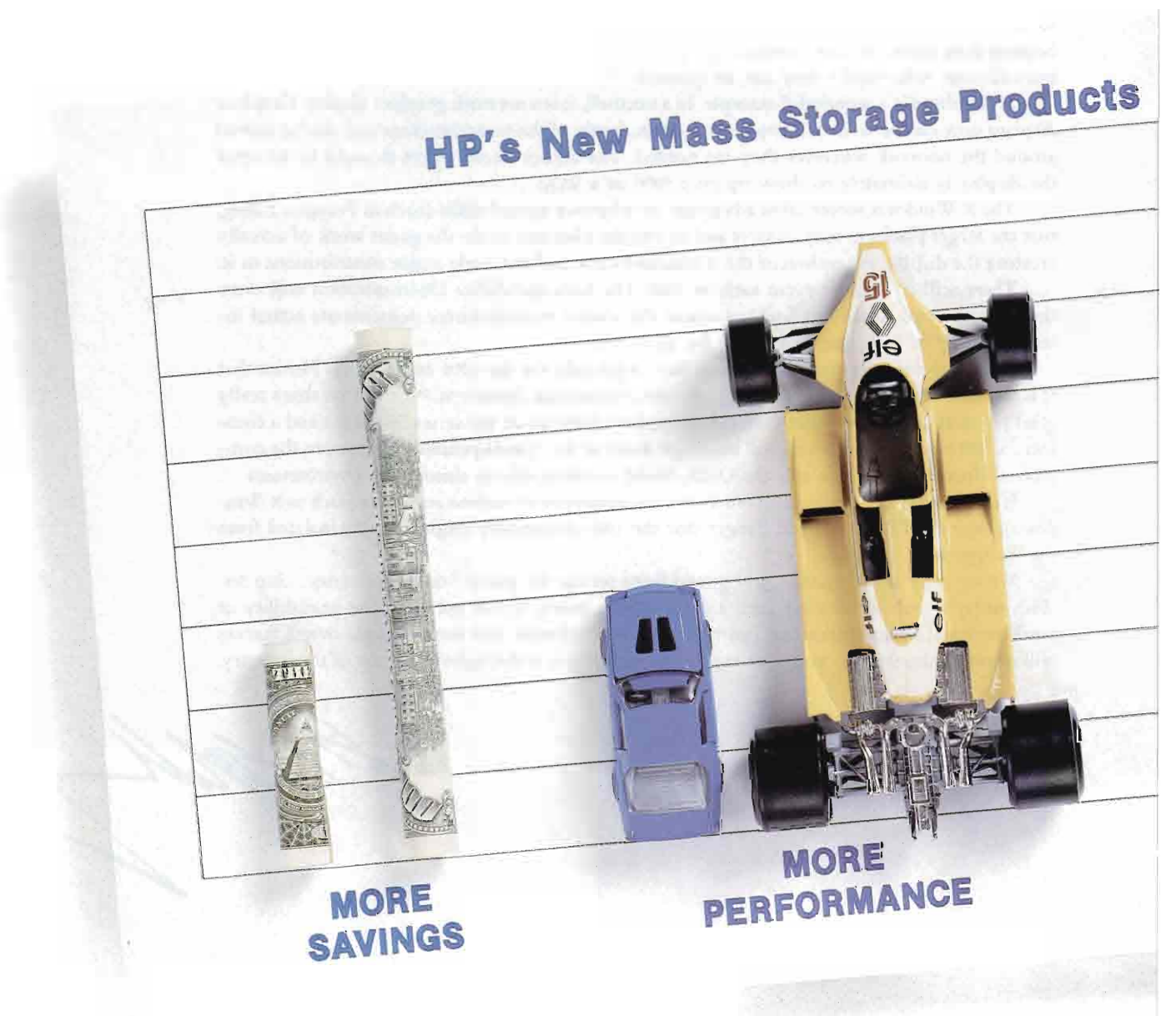

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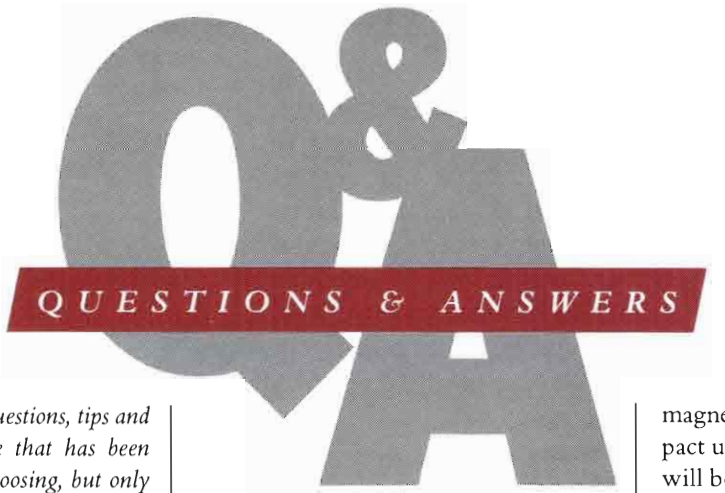

We wait patiently for your questions, tips and techniques to fill this space that has been allocated to topics of your choosing, but only one of you came to our rescue with a comment. So, after sharing that with you I'll offer more from lessons learned, facts gathered and random raw data.

This month I'll pose a few questions of my own and I ask that anyone with a comment or a reference to the answer send it along, so we can share it with others. — Jim Dowling

Editor's Note: If you have questions concerning any aspect of Hewlett-Packard computer operation and applications, send them to Q & A, HP PROFESSIONAL, *P.O. Box 445, Spring House, PA 19477.*

UNSUPPORTED

QUESTION: *Robert L. Kaczmarowski sent me a note indicating that the program VALIDATE.PUB.TELESUP was included on his system from HP and that this unsupported utility has been found to be an effective tool for verifying that backup tapes are in good condition.*

ANSWER: I have used various versions of VALIDATE including the ones that have been included in the TELESUP account over the years. I agree that it is likely that this program would do a good job of checking backup tapes, but remember that it is unsupported. Various versions have produced error messages such as "Short Record in Middle" that indicated a problem, but subsequent retrievals from the tapes were successful. I have also found cases where the program actually validated a tape set into which I had substituted a reel from another and it did not detect the switch.

At a user conference several years ago, I presented the results of several tape validation tests, each run on the same damaged tape. We took a STORE tape and crumpled the first 200 feet or so into a tiny ball, then scratched off a little bit of the oxide at various locations. RESTORE with the KEEP option accepted the tape as did VALIDATE, TAPEDIR and STAN (many other tape validation programs have existed over the years). The only way that we could get the tape to cause a problem was to attempt an actual RESTORE in which case a parity error was detected.

When this same tape was used for another STORE operation, the STORE ran fine, but files could not be retrieved from it. Since then I have heard more horror stories involving STOREs of files to tape from which only empty files could be restored, tape sets that had a file in its directory but the file could not be found to restore, and many cases of HP 7970 "Low Boy" drives that STORED OK, RESTORED OK then magically went bad overnight.

This latter problem probably was caused by threading the tape improperly over the guide roller that is just upstream from the tape heads, causing it to be skewed as it passed over the heads during the Write, Rewind and Re-read test. When mounted properly the next day, the drive saw it as being skewed.

If at this point, you can still sleep nights, ponder this: I was told recently that if one aligns a reel of recorded tape in a particular relationship to the earth's magnetic field, then imposes a sharp impact upon it, some or all of the data bits will be scrambled. It may be a folk tale, but just as the song says, "I know there ain't no heaven and I pray there ain't no hell," I'm going to stop slapping my tape reels.

TECHNIQUE #1

Quite often I see batch processes PURGE a very large file then turn around and BUILD another one just like it. The MPE File System did a lot of work locating and assigning all of that disk space and now it's being told to put it back where it got it from, then get it all back again.

Give MPE and your fellow users a break and try this:

```
!FCOPY FROM=;TO=filename !EOD
```

The file is now "logically" empty in a blink (if FCOPY is ALLOCATED). There are other ways of doing this. Pass them along so we can contribute to the CPU saved club.

TECHNIQUE #2

Do you get tired of typing "!COMMENT" in front of a long series of lines in a batch job file when you are documenting it (Documentation, to many, is the stuff that the person you replaced never did and you don't have time for, because you're trying to figure out how the systems run)? Here's an alternative:

```
!JOB DOCIT,DOCU.MENTOR !IF
  JCW = FATAL THEN
```

The following line can contain almost anything that you might like to

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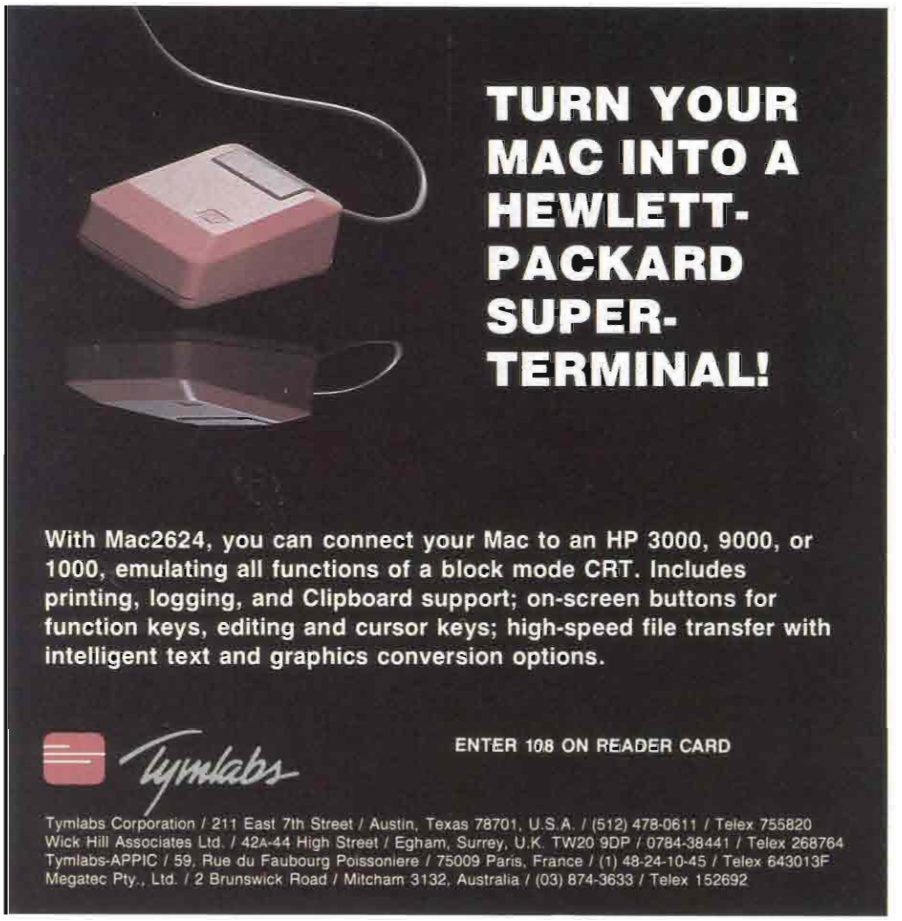

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put into them. There are, however, several things that can't come between the "!IF" above and the !ENDIF below.

Try this technique and see what happens. Send along your findings of what can't be used and also note that a few odd things can happen about 1/10000th of the time.

```
!ENDIF !TELLOP **
  DOCIT is DOCKED ** !EOJ
```

SOME QUESTIONS

I am an inquisitive kind of person. For example, I wonder where all the tire rubber goes that all the cars leave on the highways. The tires wear out and the road wears out, too. That's not a question for you, but if you should have the answer, pass it along to me with answers to any of the following:

1. Does anyone know why the fact that I might choose to log all spool file closes or not should affect the default output priority of a spool file?
2. Why do jobs and sessions share the input priority setting? A follow-up to this is: Why should logging job initiations affect the default INPRI?
3. How did MPE know that I just installed an update to the operating system so that it could send me that nice message *once* and never again?
4. Where is the template for printed report header trailer pages stored? For a number of years, I've wanted to change it so that it would be unique for each of my machines.

I'll sign off for this month leaving you with this recently observed problematic triviality:

You can only issue so many FILE equations during a job or session before new ones disappear without warning. Apparently the limit is actually tied to the total number of characters in all outstanding FILE equations. When this limit is exceeded, new equations simply don't happen. Using RESET to get rid of some does not help. The only fix is RESET @. I know I heard someone out there mumble "So that's what caused that. . . ." ■

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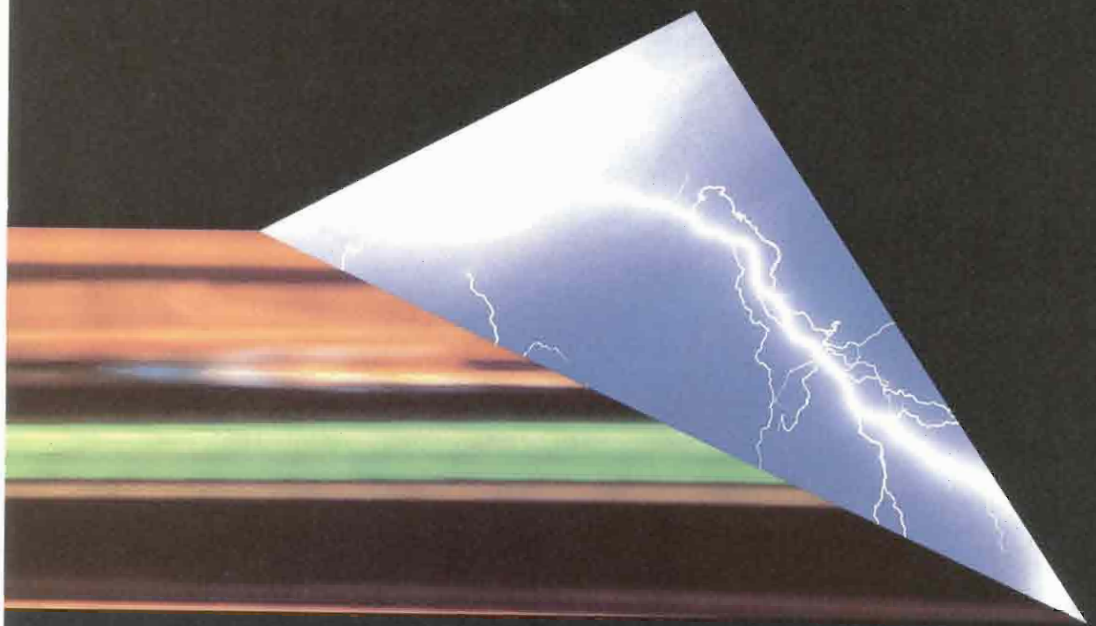

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Model 318M Added To 9000 Series

Workstation Used In Design Work

Hewlett-Packard's entry-level monochromatic workstation, Model 318M, has been added to the HP 9000 series of computers.

The Model 318M is used in design work or software development as part of an engineering work group. It features a Motorola, Inc., 68881 floating-point coprocessor and 4 MB of synchronous random-access memory.

The base HP 9000 Model 318M system costs $7,800 without a disk drive. The price is $14,550 with an 80-MB disk and 60-MB cartridge tape drive.

New Software Simplifies Distributed-Applications Development

NetDelivery, System Dictionary Available For 3000

Hewlett-Packard's new distributed-application services products for the HP 3000 family of business computers are designed to simplify the development and management of applications for users in distributed-computer environments.

The new HP NetDelivery software provides transparent delivery of information between user-developed applications, regardless of the network configuration or state of the network links between HP systems.

The enhanced HP System Dictionary/3000 product helps users manage network resources more effectively by identifying and documenting information in a distributed-application environment.

The new products will address multivendor environments as well as HP system environments through integration of industry and de facto standards for distributed-application services as they are available and are requested by users.

Through a programmatic interface, the new HP NetDelivery software allows users to write customized applications that exchange information transparently and reliably between applications in different locations.

It provides a reliable delivery system by storing application messages and files on disk. Messages or files not transferred because of a communications line or system failure are retransmitted automatically when the line or system is available.

For example, if the communications line goes down as a user is sending financial information from a regional office to corporate headquarters, HP NetDelivery will retransmit the information, transparently to the user, until it is delivered successfully.

In addition, routine access to remote data or processing resources can be scheduled through the product's transfer-scheduling facility. Thus, users can schedule information transfers over the most cost-effective routes during periods when transmission rates are low.

With the HP System/Dictionary 3000, users designing distributed applications can locate, share and manage company-wide network resources more effectively.

The new product has a global dictionary that documents the location of data and applications as well as their relationships. In addition to describing the application software that resides in the network, the dictionary can document network-configuration details.

By identifying what resources exist within company-wide networks, data redundancy can be minimized and data integrity can be maximized by sharing existing data among sites, allowing data processing to take place wherever there is sufficient processing capacity.

The two new distributed-application services products are part of HP's range of AdvanceNet solutions, tailored to meet the business as well as networking technology requirements of each area of a company.

NetDelivery is priced at $3,800 for the HP Micro 3000 system and $9,850 for HP 3000 Series 39-70 systems.

HP System Dictionary is included in the preconfigured fundamental operating software for all HP 3000 computers.

Chicago's McCormick Place.

Cognos To Release PowerHouse HP-UX Version

Field Testing To Begin Within Year

In response to a rapidly growing acceptance of UNIX-based software and an increasing demand for an HP-UX solution from its markets in Europe and North America, Cognos (Ottawa, ON) plans to release an HP-UX version of its fourth-generation development language, PowerHouse, next year. Field testing is scheduled to begin within twelve months.

The HP-UX release of PowerHouse will offer compatibility with MPE-V, MPE-XL Micro and HP-UX. Series 840 users will be able to take advantage of the benefits of PowerHouse. The HP-UX version will offer identical features to the MPE-XL version.

JTC1 Committee Formed

To Meet In November

A major outcome of the most recent round of International Standards Organization (ISO) meetings which ended May 28 was the formation of the Joint Technical Committee 1 (JTC1).

The committee, consisting of the ISO and the International Electrotechnical Commission (IEC), have agreed to collaborate in defining international information technology standards.

The two international standards groups have scheduled the first JTC1 meeting to be held in Tokyo in November.

SME Moves Autofact '88 To Chicago

McCormick Place To Host Event

The Society of Manufacturing Engineers (SME) plans to move Autofact, the major computer-integrated manufacturing conference exposition, to Chicago for 1988. The 1988 dates are October 31-November 2.

Now in its tenth year, Autofact has been held annually in Detroit since 1985. Its consistent growth has left sponsors faced with either finding more space or losing exhibitors. While expansion at the Cobo Conference/Exhibition Center currently is under way, the need for space was immediate, forcing SME to look to Chicago's McCormick Place to house the event in 1988.

"Autofact has evolved to reflect total integration," said Tom Heath, managing director of technology advancement at SME, "covering all aspects of computer-integrated manufacturing, including robotics, machine vision, sensors, bar coding and all critical components of CIM. A large number of new companies have requested to be a part of this event, and space requests are still coming in. We simply felt that we could not wait until the Cobo expansion was complete."

Autofact will return to Detroit in 1989, when the expansion of the Cobo Center is complete. The event attracts some 25,000 to 30,000 manufacturing executives, managers, engineers and technologists.

Christine Hughes

Dean O. Morton

HP Hosts OA Seminar

At a recent press seminar at Hewlett-Packard's Cupertino, CA, facility, HP management and marketing experts, industry analysts and MIS leaders clarified the company's position in the office automation market and discussed the current state and future trends of the industry.

Dean O. Morton, chief operating officer and executive vice president of HP, expressed HP's promise for an exciting future, confirming the company's goal of having six Precision Architecture RISC-based systems available by the end of this year. As announced earlier, the HP 3000 Series 930 will ship this month and the Series 950 will ship sometime in the fourth quarter of this year. He also announced that 50 customers have completed migration to the Spectrum computers.

According to Morton, HP's "firm foundation" in the marketplace consists of the Precision Architecture technology, multivendor networking, support for standards and open systems, a strong peripherals offering, excellent PC integration, a broad workstation/graphics family and highly ranked sales, service and support.

In presenting their ideas to the group, speakers reinforced HP's philosophy and expressed optimism about the future of MIS and the office automation market. Christine Hughes, vice president and director of Office Technologies at the Gartner Group, Inc. (Stamford, CT), said the "traditional role of MIS is changing." Significant organizational restructuring will occur within MIS and the end user community because of the evolution in the structure of office systems within the next several years. This evolution in office structure means an evolution in software products, according to Hughes. MIS will have the task of "providing cross communication."

Other major topics of interest included the organizational benefits of personal computers and the value of industry standards.

Hewlett-Packard officials plan to host such a seminar semiannually to keep the public abreast of changes in the industry and within the company.

Pinnacle Micro Inc. To Specialize In Software, Hardware Sales

To Focus On Scientific, Desktop Systems Marketplace

Pinnacle Micro Inc. (Mission Viejo, CA) has been formed as a new sales/distribution firm specializing in the sales of software and hardware add-on products for the scientific and desktop computer systems marketplace.

Pinnacle Micro's first product lines include memory boards, coprocessors, software compilers and assemblers, analog to digital converters and multifunction cards from Infotek Systems, DTACK Systems and Intelesis Technology. Other products working in the Motorola 68020 and Intel 80387 based computer systems will be added in the future.

Its founder is William F. Blum who recently resigned his position as vice president of sales/marketing at Infotek Systems (Anaheim, CA), a manufacturer of memory boards, coprocessors and software compilers for HP 9000 Series 200/300 workstation computers. Prior to his stint at Infotek, Mr. Blum spent 17 years with Hewlett-Packard in various management and sales positions.

TGS Signs Marketing Agreements With HP, Sun Microsystems

Figaro Available On HP 320/SRX, 350/SRX, 825/SRX

Template Graphics Software (TGS, San Diego, CA) recently announced formal engineering and marketing agreements with Hewlett-Packard and Sun Microsystems (Mountain View, CA) for custom versions of TGS's Figaro software for the high-end HP 320/SRX, 350/SRX and new 825/SRX graphics workstations, and the Sun 3/160 GP+ and 3/260 GP+ graphics workstations.

Figaro, TGS's implementation of the Programmers Hierarchical Interactive Graphics System (PHIGS), is

a high-performance device and computer-independent standard designed for 2D and 3D graphics applications requiring hierarchical data structures, geometric modeling, rapid display modification and interactive input.

TGS is working with HP and Sun to develop tightly integrated implementations of Figaro. These implementations will utilize the high performance HP SRX and Sun GP+ and GB graphics accelerator for transforming, clipping, rendering of geometric primitives and hidden surface removal.

Figaro is integrated with the window managers and supports peripheral input devices including mouse, tablet, function button box and dials. Using these accelerated implementations, Figaro application programmers will be able to easily develop portable interactive applications which will perform many times faster than implementations not designed to use graphics accelerators.

Figaro software is engineered for the graphics and computing environments found in integrated workstations and superminicomputers. Figaro directly utilizes virtual memory facilities for graphics data storage, data manipulation, and data traversal for display. It is integrated with resident workstation window managers and utilizes the interactive input capabilities of these engineering workstations.

Product deliveries are planned for fourth quarter 1987. Single unit price for these custom configurations will begin at $5,000 and substantial discounts are available for multiple, site and corporate licenses.

M/A-COM Telecommunications Awarded HP Contract

To Expand X.25 Corporate Network

M/A-COM Telecommunications (Germantown, MD) recently received an award from HP to expand significantly its current X.25 corporate network.

According to Douglas Avery, manager of Corporate Networks for HP, "HP is continuing to expand its corporate network both in the domestic U.S. and abroad. M/A-COM's X.25 gateway, redundant architecture and outstanding network control are vital components to the success of our X.25 corporate network."

M/A-COM's full service private packet network offering, the Integrated Packet Network (IPN), consists of a complete range of packet exchanges from eight to over 600 ports, Access Processors for synchronous and asynchronous network access and a user friendly Network Control System sized according to need.

OSI DIS Issued Early

HP, DEC, IBM, Others Support Standard

Months before a standard was expected to be issued, an International Standards Organization (OSI) subcommittee issued a draft international standard (DIS) for managing network resources.

The Open Systems Interconnect (OSI) systems management standard refers to the control and monitoring of the use of network resources such as data storage, processors and interconnection devices on one or multiple layers of the OSI model.

Meeting in Tokyo, the ISO set the standard but must hold additional meetings in the future to approve each part of the standard, such as port management and network error thresholds.

The new standard has received support from Hewlett-Packard, IBM, Digital Equipment Corporation and numerous other companies. The standards are expected to be different from anything the companies are currently using as network management.

CalComp, Lasergraphics Sign Third-Party Maintenance Agreement

Covers CPS-201

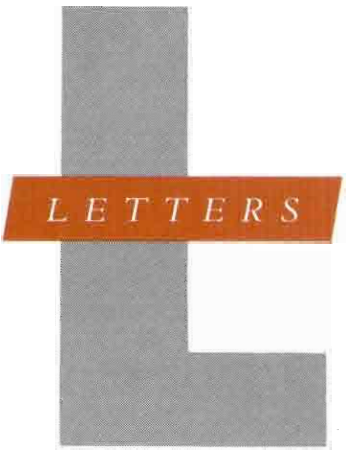
CalComp (Anaheim, CA) recently announced it will provide on-site third-party hardware maintenance agreement service for the CPS-201 Color Printing System marketed by Lasergraphics, Inc. (Irvine, CA) The CPS-201 system includes a Lasergraphics rasterizing computer and a CalComp high resolution, high speed color thermal transfer plotter/printer.

Initially, CalComp will provide on-site hardware maintenance agreement coverage for the CPS-201 in most major U.S. cities. Negotiations are under way to extend this coverage to Canada and to include other products.

Lasergraphics' customers still can use the company's own return-to-factory maintenance service, but the agreement with CalComp provides them the option of on-site service.

A Lockheed Company, CalComp develops, manufactures and markets more than 100 computer graphics products and holds major positions in the plotter, digitizer and graphics display markets.

Lasergraphics is a supplier of computer graphics printing and film recording systems, and manufactures the RASCOL series rasterizing microcomputers.



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

WELCOME ADDITION

Congratulations for launching the *HP PROFESSIONAL* magazine! It will be a welcome addition if you maintain the quality of *DEC PROFESSIONAL* magazine.

In this field where there are so many publications, engineers and business people do need a reliable journal with a clear focus on current issues. Your article on 4GL systems is a good start, for database technology and fourth generation languages surely will be the next big wave of advancement for computer users.

I urge you to pay particular attention to the reviewing of software products from HP and third parties. Applications of computers today are so complex that it generally is true that software more than hardware performance determines whether a user's needs can be met. Users have no real objective source of guidance for important software decisions other than published reviews. That is a most valuable service to your readership.

Thomas D. Truitt
Database Applications, Inc.
Princeton, NJ

STRATEGIC RESOURCE

Information to middle and upper management has certainly become a strategic resource necessary to make vital decisions on their own products in order to maintain and improve market share. This has resulted in significant pressures placed upon MIS to develop strategic systems providing management with immediate access to information.

We also have seen the evolution of DP manager to MIS manager and vice president MIS. We anticipate that the next step in this evolution will lead to the emergence of a new function, that of Chief Information Officer (CIO) who will be a key player in corporate strategic planning.

To address these new and dynamic requirements, several alternatives have been proposed, such as DBMSs, code generators and various spreadsheet utilities. We believe that a high-function, fourth-generation language that can enhance current applications and facilitate the creation of new applications by accessing database systems and file architectures provided by hardware vendors is the optimal solution.

This is a highly topical subject of interest to MIS professionals, and we hope that the editors of *HP PROFESSIONAL* share our beliefs and will provide ongoing coverage in this important area.

Ron Nordin
Cognos, Incorporated
Ottawa, ON

MUCH SUCCESS

If *HP PROFESSIONAL* meets the same high standards as its sister publication, *DEC PROFESSIONAL*, I see much success for your publication.

Jean M. Sylwanowicz
Network Research Corporation
Oxnard, CA

CONGRATULATIONS

I found your first issue the most useful and informative publication in my stack of computer technology reading.

Each article was well presented, timely and informative. The articles were written to allow technical, as well as management personnel, a full understanding of the subject without boring or bewildering.

Even your advertising was well placed and informative. The knowledge of the new products available for the HP environment like ours will be invaluable! The reader service card was well utilized and I have already begun receiving requested information for potential future purchases.

Kendra J. McCarthy, Director,
Procurement & Materials Management
Commonwealth of Virginia
Petersburg, VA

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INDUSTRY WATCH

Dave Mallery

The Promise Of CIM

After years of dealing with DEC, I must say that it is refreshing indeed to deal with a company that *wants* to get its message across to the public. In the company of about 30 editors and writers and a few dozen of HP's finest, we retreated to the wilds of the Napa Valley for two days of information, punctuated with the fruit of the vine.

In a nutshell, the state of CIM in 1987 is filled with promise, loaded with companies that are just putting a tentative toe into the water, and just a tiny number that are actually going all the way to total factory integration.

There are really three levels of Computer Integrated Manufacturing:

The first is workcell control in which one or more numeric machine tools and/or robots are integrated under the direction of a computer.

The second is the grouping of several workcells under an area control computer.

The final step is the total integration of the factory under the aegis of a central machine. In that final promised land, data is fed back to the host on reliability and yield, and back to the design systems as well. The entire network is linked by a local area network (LAN; either MAP or 802.3 Ethernet) and acts as a whole.

THE CONCEPTS OF CIM are applicable across a vast spectrum of industries from continuous process, such as chemical and photographic, to the discrete, such as circuit boards or sheet metal work.

CIM got its start in the continuous process industries in which both the process is expressable mathematically and the problems of robot manipulation are absent. Material flows through the plant or refinery and process is controlled by monitoring data points such as pressure and temperature in real time

In a nutshell, the state of CIM in 1987 is filled with promise, loaded with companies that are just putting a tentative toe into the water . . .

and making adjustments to maintain the chemical reactions within the design ranges.

Although conceptually simple, the realization of CIM within the process industry has taken decades and vast expenditures. Much of the present expansion of CIM technology has the process pioneers as "godfathers."

Discrete material handling such as circuit boards and sheet metal is now coming of age.

There have been numerical control machine tools for decades as well, but the pipes that carry the work in the refinery from reactor to reactor are missing in the machine shop. In recent years, the control of these NC machines has migrated from the primordial paper tape to intelligent controllers.

Factory automation really begins when clusters of intelligent machine tools are brought together under the aegis of a cell controller and the work in process is manipulated from tool to tool and out of the system by robot manipulators or intelligent conveyers.

Machine tools, aided by vision systems, change their tools in real time, detect broken tools and generally manage themselves. This is the so-called "island of automation" on today's factory floor.

THIS EVOLUTION FROM the bottom up may not be the most optimum from the view of the traditional system analyst, but it represents the level attainable in the real world of budgets and cost analysis.

Attempts to proceed from the top down, the so-called "greenfield" (start with a green field and build a new factory) approach, have been few (but successful). They are so expensive and risky that they are seldom done save by the most financially secure.

The local area network may be the salvation of American industry. It will allow islands of automation on the factory floor to communicate with each other and with other segments of the corporate world.

The first level to be attained is the supervisory and statistical control of a supervisory computer over the cell controllers. This computer will be able to make decisions about the entire work flow treated as a process. It can gather overall statistical information in real time as well as allow plant level access to the information in the individual cells.

The X Window protocol will allow simultaneous monitoring of the several processes from a single workstation.

The next level is the joining of the several processes within a plant and, finally, interfacing to the design network and "mainframe."

Put a Falcon in your HP 3000 and watch it fly.

Introducing Falcon Series™ high speed disk subsystems from EMC.

The Falcon Series is the first family of disk drive subsystems that outperforms HP's drives in every respect.

Nothing comes close to the Falcon for speed. Because every subsystem is equipped with 4MB of high speed cache, a dedicated Motorola 68000 microprocessor and the most efficient caching algorithm possible. Together with the fastest Winchester disk drives, they can improve on the speed of an HP 7933 disk drive by a full 90%. They even beat HP's new Eagle drives.

The Falcon also lets you expand your storage without expanding your computer room. By combining 406MB or 812MB subsystem modules in a single cabinet, you can put up to 2.4 gigabytes of storage in the same footprint as an HP 7933/5 disk drive. That's 6 times the storage in the same space.

What's more, no one can give you a more reliable drive. With a MTBF of up to 30,000 hours, our sealed Winchester drive technology is 3 times as reliable as older removable drives. They give you more environmental flexibility too, since they require no special air conditioning or ventilation. And maintenance is not a problem. Your contract with HP remains unaffected. EMC offers you several maintenance plans designed to make your disk management simple and easy, and maximize your uptime.

To cap it all off, Falcon subsystems cost you less per megabyte than comparable HP units.

So if you want your HP3000 to fly, give it a Falcon.

For more information, contact EMC Corporation, Hopkinton, MA 01748-9103. Or call **1-800-222-EMC2.** (In MA, 617-435-2541.)

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ENTER 128 ON READER CARD

Interconnect to the engineering design area allows really important two-way communication: statistics on the process for quality control and batch tracking, and immediate engineering updates into the process. Modern workcells are reaching the point where they are capable of reconfiguring themselves in real time, building products in lots of ONE. This can be realized only by a truly online access to the engineering side.

THE COMPUTING COMPONENTS of such a network are finally coming of age. The new standards emerging within the UNIX world finally make it possible to build such a system and not spend most of your life writing incompatible interfaces and unmaintainable drivers. X Windows makes graphic display over a network a simple matter. Network File Servers allow access to distributed data. Standardization of UNIX itself will allow the true goal of "interoperability" of different manufacturers' workstations.

There has been much furor lately about MAP. MAP is an Ethernet-like protocol sired by General Motors for the factory floor.

There are two problems with MAP: First, it is new and has been stuck at version 2.1 for too long. The recent furor raised by DEC's Ken Olsen finally has gotten the proponents of MAP off their duffs and will force them to speed the definition of version 3.0 of the standard. This level of the protocol is probably robust enough to really penetrate the market.

The other problem with MAP is that it needs a broadband cable. This is built out of cable TV components and allows multiple independent channels (like several Ethernets in one cable), and even can handle T1 voice and data and video all at once. The problem with this is that, since it is new and the demand is low, the functions of channel interface have not yet been cast into silicon. That means broadband is *expensive*.

Only demand will cure that, and only wide acceptance of version 3.0 will create the demand. ■

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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.

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NEW PRODUCTS

Teleray Introduces UL Rackmount Terminals

Teleray announced a family of fully enclosed rackmount terminals that are UL approved and have a 1/3-larger display in the same panel size as earlier units. All Teleray models are available in this industry-standard RS310C configuration that's commonly used in factory and laboratory systems.

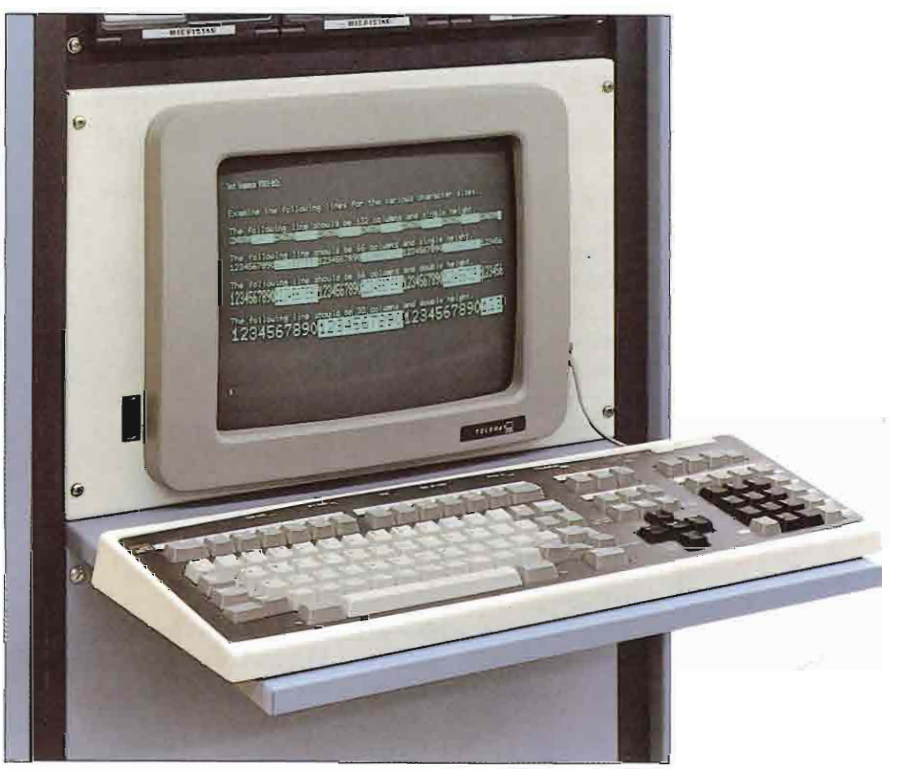
Each rackmount terminal is comprised of a display/logic unit and a keyboard assembly. The display features a 14-inch green, amber or soft white CRT in a 12¼″ high x 19″ wide panel; the keyboard is a conventional detached unit that can be mounted for space-saving purposes on a rack shelf.

Teleray models available in this new rackmount style include the 20-DHP that is both HP 2392A and DEC VT220 compatible, the 20-DDG (DG D210/211 and VT220 compatible), and the HON 5, 6 and 7 which emulate a broad range of Honeywell models, from the asynchronous VIP7305 to the synch/async HDS 7.

The rackmount option lists at $400. Quantity and OEM discounts apply.

Contact Teleray, a division of Research Inc., Box 24064, Minneapolis, MN 55424; (612) 941-3300.

Enter 900 on reader card



Teleray's new UL approved rackmount terminal.

STR Announces POS/3000

STR Software Company announces version B.02.00 of the POS/3000 Network Management and Point of Sale Polling Software for the HP 3000.

This release of POS/3000 provides support of an expanded range of point of sales terminals, enhanced data communications port management, data file management and support for asynchronous polling of the MCI Mail network.

Users now can configure an integrated network of both synchronous and asynchronous devices. This allows an HP 3000 user to develop a single integrated network capable of polling point of sales terminals and virtually any type of computer.

In addition to polling remote synchronous devices, POS/3000 asynchronously sends and receives electronic mail messages from the MCI Mail network and the HP 3000. These messages are formatted into standard ASCII text files on the HP 3000 whereby they may be edited with any available editor. Companies with distributed HP 3000 computers now can poll the MCI Mail network providing lower cost mail service to their users.

In order to communicate with a full range of point of sale terminals, POS/3000 now has added Sweda, ICL, and the IBM 5262 to complement its list of supported terminals.

Contact STR Software Company, P.O. Box 12506, Arlington, VA 22209; (703) 689-2525.

Enter 901 on reader card

MINX Available On New HP Systems

MINX Software Inc. has introduced the MINX Information System on the new HP 9000 Model 825S and 850S.

The product is designed to assist management in the supervision of marketing, engineering materials, production control and finance.

The MINX Information System consists of 13 modules covering the following areas: accounts payable, material requirements planning, purchasing, shop floor control, bill of materials and order management.

An electronic spreadsheet and report writer allows you to analyze information stored in the files that make up the system.

Features include extensive hardware compatibility, password protection, online help at each prompt, easy installation, complete inventory and financial audit trails, continuous real-time updates to the general ledger and online database inquiry capabilities. Fill-in-the-blanks data entry, embedded

database searches and user-definable procedures are all standard features in the system.

The modules are integrated using a common database, thus eliminating the need to enter and store the same information several times. Each module is written in C.

Full documentation is included with the system. A software subscription is available on an annual basis and consists of phone-in consulting assistance, program warranty, documentation updates and product enhancements. On-site and classroom training are available separately.

MINX Software Inc. is located at 4966 El Camino Real, Suite 108, Los Altos, CA 94022; (415) 969-6528.

Enter 902 on reader card

Laser Connection Enhances Desktop Publishing

The Laser Connection announced the release of one new feature and five new products, all designed to enhance laser printing in the desktop publishing environment.

The addition of the HP emulation to the PS Jet family of laser printers puts the most sought-after emulations into one printer. The PS Jet and PS Jet + upgrades and printers now offer LaserJet + and HPGL emulations. The PS Jet family also features Adobe Systems' POSTSCRIPT page description language as well as Diablo 630.

The Laser Connection's new products include the Paper Plus 500 sheet feeder, the IS 300 image scanner, the MacKISS driver, blue toner cartridges for any Canon CX based laser printer and the Prepaid Refill Certificate toner refurbishing program.

The Paper Plus 500 works with any Canon CX based laser printer and increases its paper handling capability to 500 sheets and 100 envelopes. The IS 300 image scanner scans text, images and photographs to an IBM PC/XT/AT, PC compatible or Macintosh.

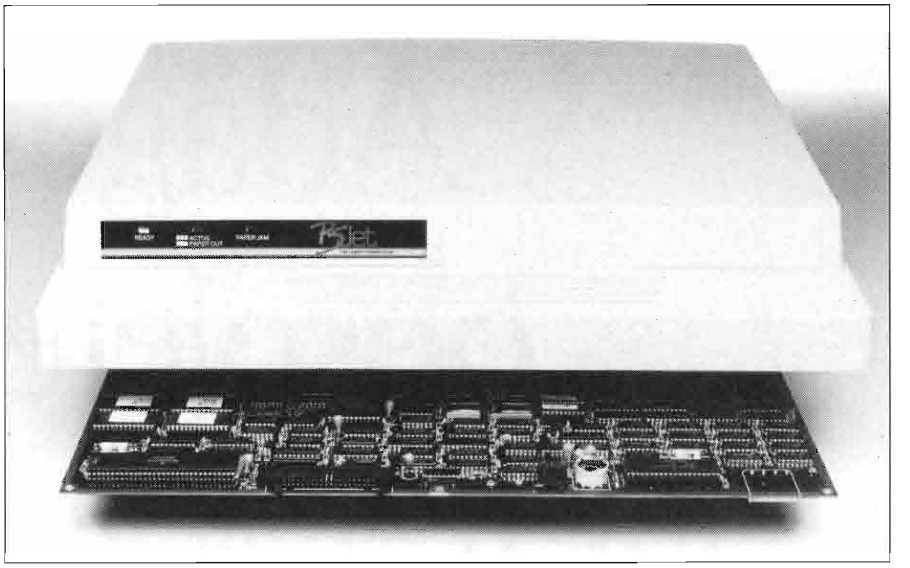
For more information on these products, contact The Laser Connection, P.O. Box 850296, Mobile, AL 36685; (205) 633-7223.

Enter 903 on reader card

FMT Releases LABLES/3000+

FMT Associates Inc. announced the release of LABELS/3000 + Mail List Management System. Changes have been made in the system to reduce disk storage and increase overall performance. New features have been added to simplify its use and reduce list maintenance time for the user.

LABELS/3000 + eliminates duplicate records on disk when the same record appears on several different mail lists. To the user, the mail lists appear to be separate and independent. The system maintains the relationship between the mail list record and the record that is stored on the disk.



Hewlett-Packard emulation has been added to the PS Jet family of laser printers.

Each record in an individual mail list may be assigned an unlimited number of category codes and/or user codes. Category code, user codes and comments are linked to the mail list record that created them. The codes are included in the expanded print selection criteria that now includes numerous Boolean operands.

In addition to printing mail labels, the system also provides for the printing of postcards, index cards, rotary telephone index cards, envelopes and shipping lables.

LABELS/3000 + output features include first label (form) information including user logon, dateline, device, filename and file owner. The last label (form) in the run also includes elapsed time of the run. For label runs, a recap report with a breakdown of the number of records by zip code is provided.

LABELS/3000 + for the HP 3000 is written in COBOL and view and run with IMAGE or TurboIMAGE databases.

Contact FMT Associates Inc., 6475 Fox Run Circle, Juniper, FL 33458; (305) 744-3652.

Enter 904 on reader card

Analogic Announces AP500 Array Processor Interface

Analogic Corporation introduced a hardware and software package that interfaces the AP515 Full Floating Point Array Processor to HP's new 9000 Series 800 Precision-Architecture minicomputer systems. The first of these new systems is the HP 9000 Model 840 running HP-UX. According to Analogic, the result is a 30 to 100 times increase in computational speed.

The Analogic AP515 Array Processor interfaces to the Series 800 via two HP CI/O interface boards, occupying two consecutive CI/O backplane slots. It supports Programmed I/O (PIO) and Direct Memory Access (DMA) data transfer between the HP computer and the array processor. The measured average DMA transfer speed is 2.2 MBs.

The Analogic software package includes the device driver, a library of more than 350 array processing functions callable from FORTRAN and C, and utilities for extensive programming development and diagnostics.

Single units start from $32,000.

To obtain additional information, contact Analogic Corporation, 8 Centennial Drive, Centennial Industrial Park, Peabody, MA 01961; (617) 246-0300. TWX: (710) 348-0425. Telex: 94-9307.

Enter 905 on reader card

Lasersoft/3000 Released For HP 3000, LaserJets

Business Systems International (BSI) has released Lasersoft/3000, a utility for any HP 3000 user with an HP LaserJet PLUS or LaserJet 2000 printer. The complete Lasersoft 3000 system includes Font Management, Forms Design and Data Merging. All modules may be purchased separately.

Lasersoft 3000 electronic forms are in-

Continued on page 88.

Adager obsoleted database reloads back in 1978.

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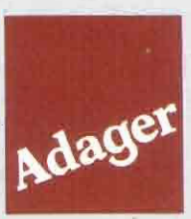

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An Analysis Of HP Local Area Networks, Hardware And Software.

Starring HP LANs

[By John J. Hunter]

Hewlett-Packard offers an impressive line-up of IEEE 802.3 compliant local area networks (LANs) and the hardware and software to support them. The HP StarLAN is designed to accommodate personal computer transactions and interactions, employs unshielded twisted-pair wiring as the backbone medium, and supports a data transfer of 1M bps.

The HP ThinLAN and ThickLAN products are conventional Ethernet-type systems and use coaxial cable to handle a data transmission speed of 10M bps. The LANs connect PCs and HP 3000 hosts and permit data interaction among all components. The Thick and ThinLANs differ in the type of coaxial cable used, the number of nodes configurable and the size of the node segments.

ThinLAN employs the RG-58C/U cable (the so-called "thin coax"), specifies a 185-meter subnet, and allows 30 nodes (PCs or HP 3000s) per segment. Up to 116 nodes can be configured on a fully extended ThinLAN.

ThickLAN is fully IEEE 802.3 compliant. It uses conventional RG-58A/U coaxial cable for the backbone, and divides the network into three cable segments of 500 meters each. Cable segments are joined by repeaters and the maximum cable length is 2.5K meters. That figure includes the backbone cable length and the length of the cables connecting nodes to the backbone. ThickLAN attaches up to 100 nodes per segment and up to 1,024 nodes per network. ThickLAN supports PCs and HP 3000s.

HP permits the StarLAN and ThinLAN to be extended beyond their normal limits through bridges. StarLAN can be bridged to ThinLAN or ThickLAN, and ThinLAN can be linked to ThickLAN.

Those three LANs replace the old HP OfficeShare Network and EtherSeries/150. The OfficeShare Network was the predecessor of ThinLAN, and provides similar capabilities. The EtherSeries/150 was OEMed from 3Com Corp. and was intended to link HP PCs to each other and to IBM PCs. That function now is handled principally by StarLAN.

> The MPE-V/E is both multitasking and multiprocessing, does memory and disk caching and permits address prefetching.

HP now uses the name OfficeShare to designate the family of products encompassing StarLAN, ThinLAN, ThickLAN and Serial Network. The Serial Network is more a facility than a LAN in that it permits a PC to dial into an HP 3000 and use its resources as though the PC were attached directly.

THE STARLAN AND THINLAN allow an HP Vectra, IBM PC/XT/AT or HP 3000 to be employed as file/printer/plotter servers. In addition, ThinLAN permits the HP TouchScreen MAX II also to be employed as a server. Depending on the type of application and/or the number of nodes in the network, however, the PCs may prove inadequate to function at acceptable levels of service.

The problem is the MS-DOS operating system employed by the PCs. MS-DOS is a single-tasking, single-processing operating system, and highly interactive applications might find response time too slow. This is especially true if the PCs are employed as file servers, since the disk access times — depending on the type of disk used — can be in the 30-msec. to 65-msec. range. The internal and external disks used with the HP PCs have a 45- and 40-msec. access time respectively. While access times could be sped up through techniques like directory hashing and elevator seeking, HP does not employ them.

That puts the HP products at somewhat of a disadvantage when compared with LANs from 3Com and Novell, both of which have added system enhancements that operate with MS-DOS to speed overall services. The 3Com and Novell products overcome the single-user, single-tasking limitation of MS-DOS by employing time-slicing to attain multiuser, multitasking capabilities. Novell's NetWare implements directory-hashing whereby the most frequently used disk addresses are placed in a subdirectory mapped to cache memory.

Elevator-seeking speeds accessing by allowing the disk control program to check disk head positions and service I/O requests that can be satisfied with minimal head movement. 3+ also uses elevator-seeking, but instead of employing directory hashing, all directories are held in cache memory.

Novell also has done an excellent job with system integrity, offering facilities unequalled by 3+. NetWare users are protected against faulty disk locations, database "pollution" and complete file server failures. Novell maintains redundant copies of the file allocation tables and directory entries on different disk cylinders for each network volume. Thus, should the disk area that normally holds the directory fail, the server remains operational.

Another disk problem that occurs occasionally is sector failure during normal operation, making data written to those areas unretrievable. Novell prevents that by performing a read-after-write verification, and moving data from bad sectors to good ones. It also marks bad sectors so that no other data will be written to them. The 3+ does not offer such facilities, but rather relies on MS-DOS disk management.

Novell employs redundancy to protect against disk and disk controller failures. Using the disk duplication facility, users can create a mirror image of the primary disk and switch over to it if the primary fails. Duplicate controllers offer the same level of system integrity and furnish a substantial performance boost for read and write operations. With a dual disk, dual controller combination, split seeks can occur during disk reads, whereby the operating system examines read/write requests, determines which drive can respond most quickly, and initiates commands to permit concurrent read/write operations. Up to three reads and writes can occur concurrently.

While the HP MS-DOS lacks those facilities, the MPE-V/E operating system used with the HP 3000 provides a number of services to make that unit a first-class server. The MPE-V/E is both multitasking and multiprocessing, does memory and disk caching and permits address prefetching. It also supports read/write in cache, and permits read/write operations to be performed in parallel.

The HP operating system doesn't hold redundant directories on different disk tracks; rather they're stored in main memory so the opportunity for failure is greatly diminished. The integrity of data written to disk is also assured by performing a read-after-write parity check. HP doesn't support elevator seeking but does process read requests on a priority basis. While that's certainly faster than sequential processing, it's still a cut below. Mirrored disks also are not handled by the MPE-V/E.

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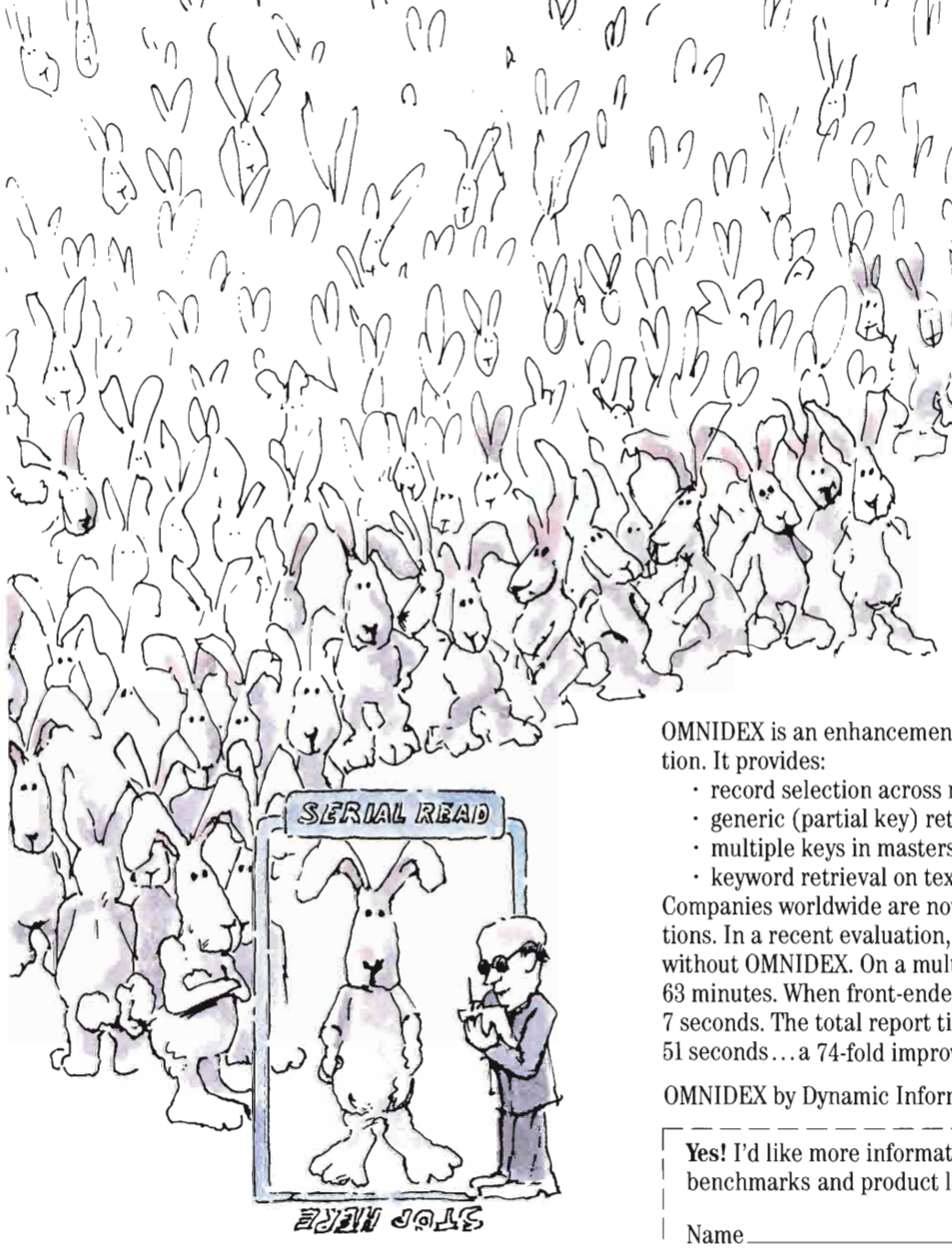

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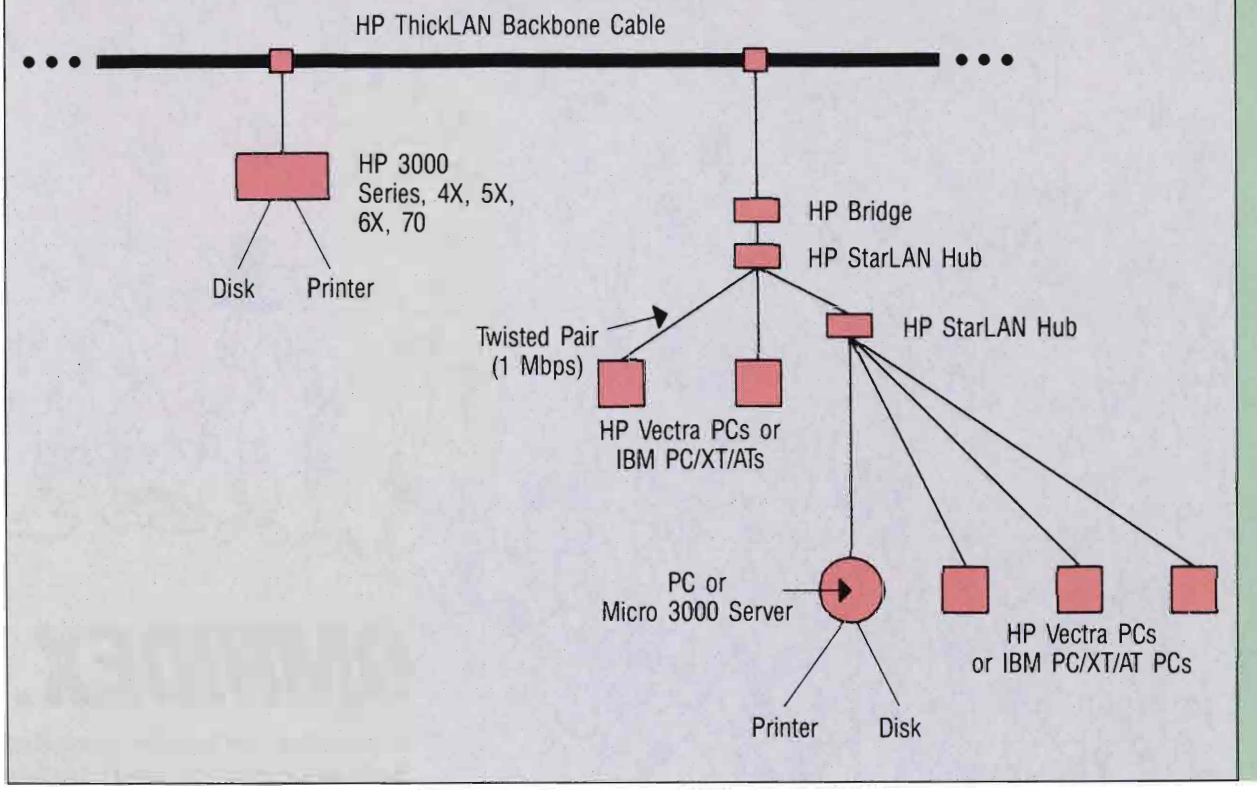
FIGURE



Example of HP StarLAN

HP HAS CHOSEN a different architecture for handling subnet extensions for StarLAN and ThickLAN. StarLAN (see *Figure 1*) uses a star network configuration, but instead of employing a wire closet as its center, it uses an 11-port StarLAN hub to connect PCs and servers. To expand the network, users attach StarLAN to a ThinLAN or ThickLAN via a StarLAN Bridge that converts the 1M bps backbone data speed to 10M bps, and vice versa. Thus, the ThinLAN/ThickLAN backbone becomes the backbone medium for multiple StarLAN nodes, and permits StarLAN to be extended the full length supported by those LANs.

In contrast, the AT&T StarLAN product uses a wiring closet as its hub and transmits data at 1M bps. Therefore, the HP unit should be faster on the backbone, but throughput will be slowed during the 10M bps to 1M bps conversion.

The ThinLAN product is much like DEC's ThinWire Ethernet in that both use the same type of coaxial cable and interconnect 30 devices on a 185-meter cable segment. ThinWire, however, operates at 4M bps while ThinLAN supports a 10M bps backbone speed.

DEC uses a nine-port repeater. Eight connect 185-meter segments and the ninth connects the repeater to a baseband transceiver that links the unit to the backbone. The ThinLAN repeater is a five-port hub, four of which attach 185-meter segments. That repeater can be used to interconnect ThinLAN segments, or as a link to ThickLAN. To extend ThinLAN segments, the repeater can be placed in the middle of the ThinLAN backbone and will support a cable run in each direction provided the combined length is less than 185 meters. According to HP, the repeaters permit ThinLAN to be extended an additional 1500 meters.

The following covers the major features of StarLAN and ThinLAN. ThickLAN is fully IEEE 802.3 compliant, so a description of its facilities is omitted.

THE HP STARLAN is based on IEEE 802.3 Ethernet standards, but employs unshielded twisted wire pairs instead of coaxial cable as the backbone medium. The LAN provides access to HP's distributed data processing system and Personal Productivity Center services. The StarLAN in-

tegrates personal computers such as the HP Vectra and IBM PC/XT/AT as well as HP Micro 3000 and 3000 XE hosts, and permits users to share printers and disks by designating a PC or Micro 3000 as the system server. Up to 50 nodes (consisting of PCs or Micro 3000s) can be configured.

StarLAN employs a star configuration, conforms to IEEE 802.3 Type 1BASE5 standards, and permits data to be transmitted at 1M bps. A StarLAN hub connects nodes together and to servers. Each node can be 250 meters from the hub; thus the maximum distance between nodes is 500 meters. Up to 50 nodes (including servers) can be configured in a StarLAN subnet.

Nodes access the LAN backbone via CSMA/CD and recover from packet collisions in accordance with Ethernet recovery procedures. Data transport protocols implement IEEE 802.3 at Layers 1 through 3 and HP AdvanceNet TCP/IP and MS-Net at the upper layers.

StarLAN places operational restrictions on users. For example, only 10 workstations can be connected to a PC server simultaneously. There are also limits on the number of printers and disks supported by PC servers: Only four printers and/or plotters and no more than seven disks can be configured for any one server.

The HP Vectra used as a server offers a wide range of disks and printers. Users can choose between 20M and 40M internal or external disk systems, but external requires an HP 88500A disk/tape interface. There are 12 printers offered, consisting of the HP ThinkJet, QuietJet, and LaserJet, a letter-quality daisy wheel, and two 200-cps dot matrix printers, one of which is letter quality. The Plotter supported is an eight-pin A3-/B-size automatic sheet feed unit.

HP StarLAN supports all strategic Personal Productivity Series applications and all MS-DOS programs. In addition, most programs that run on Microsoft networks also can be used. With StarLAN, Hewlett-Packard's Electronic Mail System, Advanced Mail, HP Disk Manager, and Productivity Services-Information Access are also supported.

To interface with the 3000, IBM PC users need the Virtual Terminal emulation software that requires 185 KB RAM, in addition to 135 KB needed to interface the PC to normal StarLAN facilities.

StarLAN also permits PCs to interface with HP 3000 Series 37 host running on the HP ThickLAN. Bridging between the StarLAN and ThickLAN requires a StarLAN Bridge, however.

THINLAN 3000/V LINK (see *Figure 2*) allows HP 3000 Micro and MicroXE Series 37 and 39-70 computers, HP Vectra or TouchScreen PCs, and IBM PC/XT/AT personal computers to communicate directly with each other. This LAN attaches nodes to an IEEE 802.3 Type 10BASE2 thin coaxial cable, and supports cable runs up to 185 meters at a transmission rate of 10M bps. Up to 30 nodes (PCs or HP 3000s) can be connected in each network segment.

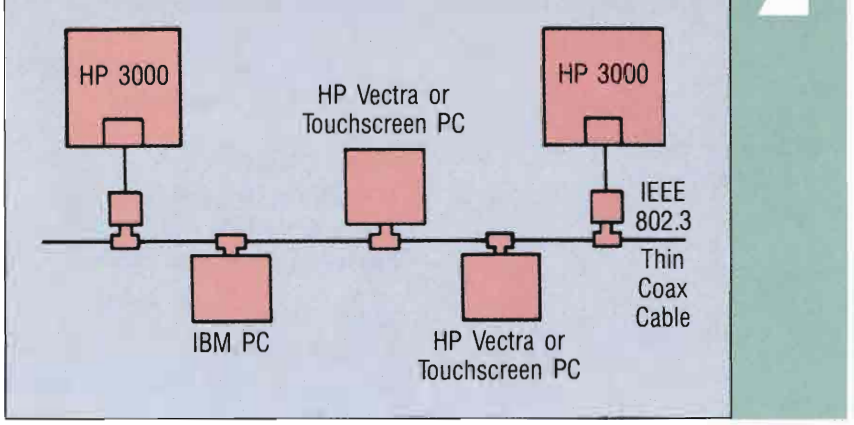
Both the cable length and number of nodes can be expanded through use of a ThinLAN hub, or by bridging to ThickLAN. Nodes access the network through the CSMA/CD protocol and employ conventional Ethernet procedures to recover from packet collisions. The network transport software is based on a full implementation of TCP/IP, including the transport and network layer functions of the ISO OSI Reference Model.

ThinLAN consists of network software, the Local Area Network Interface Controller (LANIC), and the thin cable Medium Attachment Unit (MAU). The LANIC card plugs into the HP 3000 backplane and handles IEEE 802.2 and 802.3 protocols, checks incoming and outgoing frames for errors, determines if the backbone data is busy, and transmits frames. The LANIC contains an 8-bit microprocessor, a VLSI communications controller chip with a 16-bit data path, CSMA/CD access handling firmware, online diagnostics and software for collecting performance statistics.

The software provided corresponds to Layers 1 through 4 of the OSI model. It also includes a programmatic interface to network communications and mode management software. The lower layers correspond to OSI Layers 1 and 2 and consist of IEEE 802.2 and 802.3 protocols. The network layer corresponds to OSI Layer 3 and is based on the DARPA internet protocol; it also provides fragmentation/reassembly and interneting capabilities.

The transport layer, corresponding to OSI Layer 4, is based on HP's full implementation of TCP/IP. TCP/IP also provides the mechanism for detecting

FIGURE 2



HP ThinLAN

and correcting duplicated, lost or out of sequence packets. Layers 5, 6 and 7 of the OSI Model are HP implementations. HP's Network InterProcess Communication (IPC) is for HP 3000-to-3000 communications, and is implemented in the lower half of Session 5. (The upper portion of the layer is unused.)

The higher level services — the Presentation and Application Layers — require HP 32344A/RNS/3000. NS/3000 provides interactive and programmatic facilities such as file transfer, IMAGE database access, remote files and peripheral access and remote process management. Node management software, also included with ThinLAN, provides a user-friendly interface for functions like configuration, tracing and logging.

HP permits the ThinLAN to be interfaced with its ThickLAN by employing a ThinLAN hub. Officially called the HP 28645A, the hub is a 10M bps multipoint repeater for connecting IEEE 802.3 Type 10BASE2 segments to a Type 10BASE5 backbone. That hub also can be used standalone to extend a ThinLAN network 1500 meters beyond the single segment limit of 185 meters. A fully-configured and extended ThinLAN contains 116 nodes.

The ThinLAN hub has four ThinLAN ports and one network interface port for connecting to a 500-meter ThickLAN, and each ThinLAN port supports a 185-meter ThinLAN segment. A ThinLAN hub port can be located anywhere along the LAN segment, thus allowing a single port to support two cable runs provided the total length is less than 185 meters. The ThinLAN hub, therefore, can act as the concentrator for an eight-cable configuration. The ThinLAN hub has an auto-segmentation that automatically detects a failed segment and disconnects it from the network. When required, it's automatically reconnected.

NS3000/V PROVIDES EXTENSIVE easy-to-use networking services to the HP 3000 and to a degree the PCs. With NS3000/V, interactive users and applications can do file transfers, remote database accessing, inter-processor communications and remote file and peripheral accessing without knowledge of the communications systems. Remote file and peripheral accessing, however, require that users know the locations of the file or peripheral to be accessed.

HP 3000 processors running the MPE-V/E and subsequent operating systems can use NS3000/V to read/write files and databases located on remote systems using the same commands employed to read/write local units. An HP 3000 running this system can communicate with similar HP 3000s over a point-to-point link, DS/X.25 Network Link and HP Satellite Network Link.

NS3000/V provides networking capabilities to products using HP AdvanceNet Architecture, compatible with the OSI Reference Model. NS3000/V provides functionality at Layers 6 and 7 — the Presentation and Application Layers.

NS3000/V provides a set of intrinsics for file manipulation that can be used equally well for local and remote file manipulation and peripheral accessing. Unlike many operating systems, the MPE treats peripherals similarly to files, and therefore the same intrinsics are used for those devices. NS3000/V implements entension at the intrinsic level, in cooperation with the operating system. Therefore, user applications written in most languages (as well as HP utility programs) can access remote files and peripherals. To access remote files and peripherals, however, users must append the node name to the file name in the FOPEN call.

The HP IMAGE database also can be accessed with systems running NS3000/V. IMAGE provides a set of intrinsics that allow an application program to access the database, and NS3000/V transparently extends the intrinsics to allow manipulation of remote IMAGE databases. For accessing remote databases, users have the option of imbedding the database location in the application or the user can enter the location. To isolate the user and applications from needing to know the location, IMAGE allows the database administrator to create a database access file that defines the locations and authorized users.

Under NS3000/V Virtual Terminal Facility, a terminal

StarLAN, ThinLAN, ThickLAN
Hewlett-Packard
1820 Embarcadero Road
Palo Alto, California 94303 (800) 367-4772
Price: $595 for StarLAN user kit and $1,375 for StarLAN hub; $895 for ThinLAN.
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Digital Equipment Corporation
Maynard, MA 01754-2571
(800) DEC-INFO or call your local sales representative.
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3Com Corporation
1365 Shorebird Way
Mountain View, CA 94043 (415) 961-9602
Enter 600 on reader card

Novell Corporation
1170 North Industrial Park Drive
Orem, UT 84057 (801) 226-8202
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AT&T
1 Speedwell Avenue
Morristown, NJ 07960 (201) 898-8000
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located on a local HP 3000 can log onto a remote HP 3000 and conduct interactive sessions as if locally connected. Character- and block-mode applications using VPPLUS are supported. Multiple remote sessions to a single node can be established, and an interactive user can specify the prompt for each session. Programs also can communicate with the remote operating system command interrupts. For PCs connected to an HP 3000, Virtual Terminal allows them to access most applications, provided the PC is using HP's OfficeShare Network software and hardware.

The NS3000/V Network InterProcess Communications (NIPC) facility substantially reduces the communications overhead needed to post frequent transactions to a remote database. NIPC consists of 18 programmatic calls for the rapid exchange of data between processes. Communications are peer-to-peer, and any process can send/receive message by means of common intrinsics.

NIPC calls allow transactions to be sent to a cooperating applications program that performs the database accessing locally and returns only the final result. This obviates the need for and load on a single intrinsic to handle all posting operations.

Program-to-program communications is also permitted by NS3000/V through a set of nine intrinsics. These intrinsics allow programs to operate in master-slave mode, permitting two or more user programs residing on separate HP 3000s to exchange data and control information directly.

The HP LANs are well-suited for distributed or hierarchical networks, thanks to the bridges provided to link the LANs together. In addition, the Networking Software greatly simplifies the process of accessing data at different locations around the network, and the file manipulation intrinsics make local and remote file data handling transparent. It's unfortunate, however, that the NS3000/V requires users to know the node name when accessing remote files and peripherals.

Individually, the StarLAN and ThinLAN aren't that impressive as far as node handling is concerned. AT&T's StarLAN accommodates 1,210 nodes versus 50 for the HP product. The DEC ThinWire can be extended to handle 1,024 nodes, while ThinLAN capacity is 116. Of course, both HP LANs can extend their node handling and lengths through bridging to ThickLAN, provided that network is available. *—John J. Hunter is president of TMS, a marketing management consulting company based in Devon, PA.*

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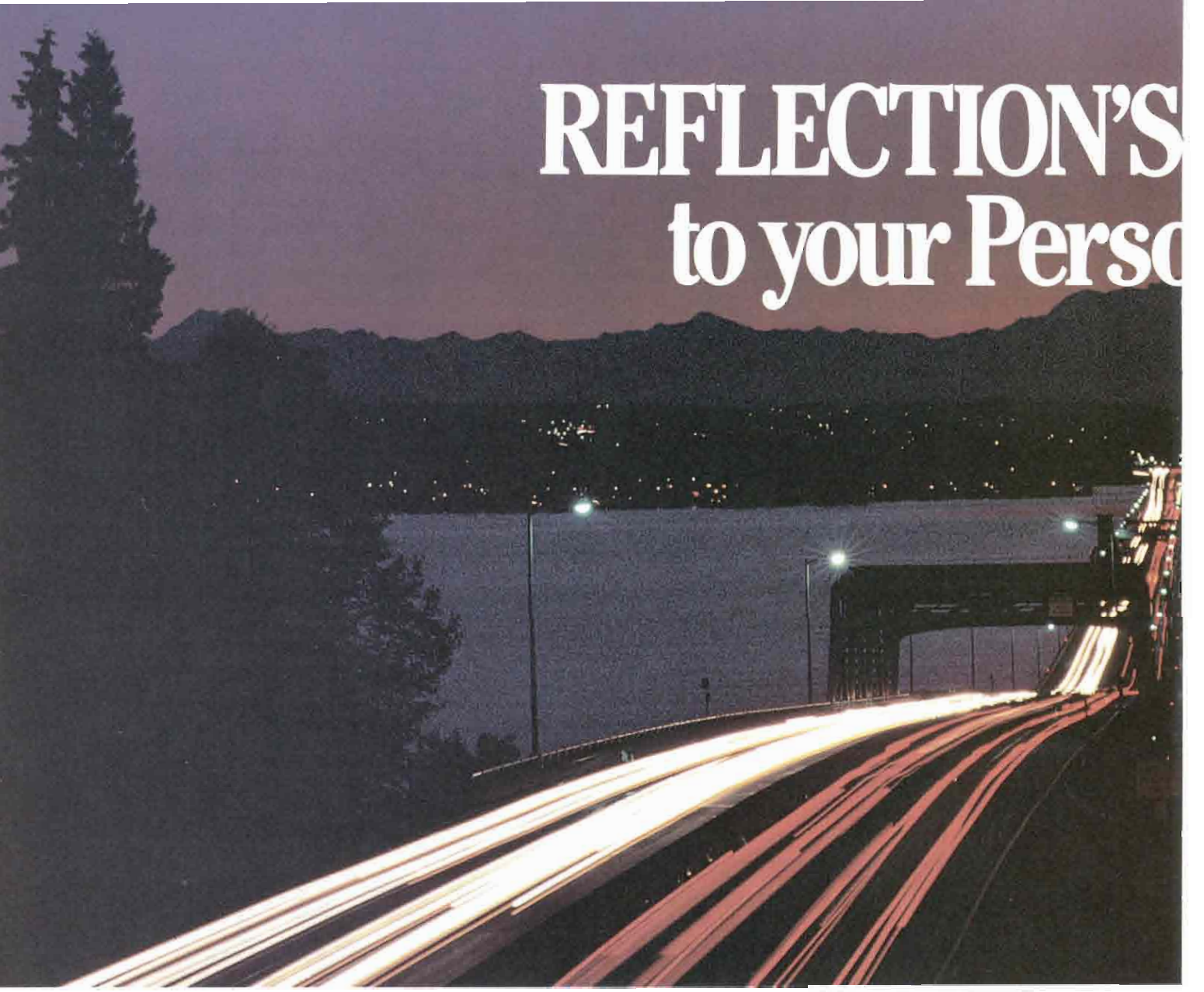

The leading HP terminal emulation software joins the leading data extraction utility to make downloading of data from the HP 3000 to PC based spreadsheets and databases easier than ever.

The Reflection Series from Walker Richer & Quinn and DataExpress from IMACS Systems Corporation.

Together they allow PC users to extract data and download with the same emulation/communications software used with all their other HP 3000 applications. Reflection does it all.

Reflection supports the widest range of connections and is available for the widest variety of PCs – IBM and compatibles, HP's Touchscreen, Wang, and HP's Portable Plus. And, now there's Reflection for the Macintosh.

Reflection offers graphics and color graphics emulations as well as top-of-the-line DEC terminal emulation with file transfer software for the VAX.

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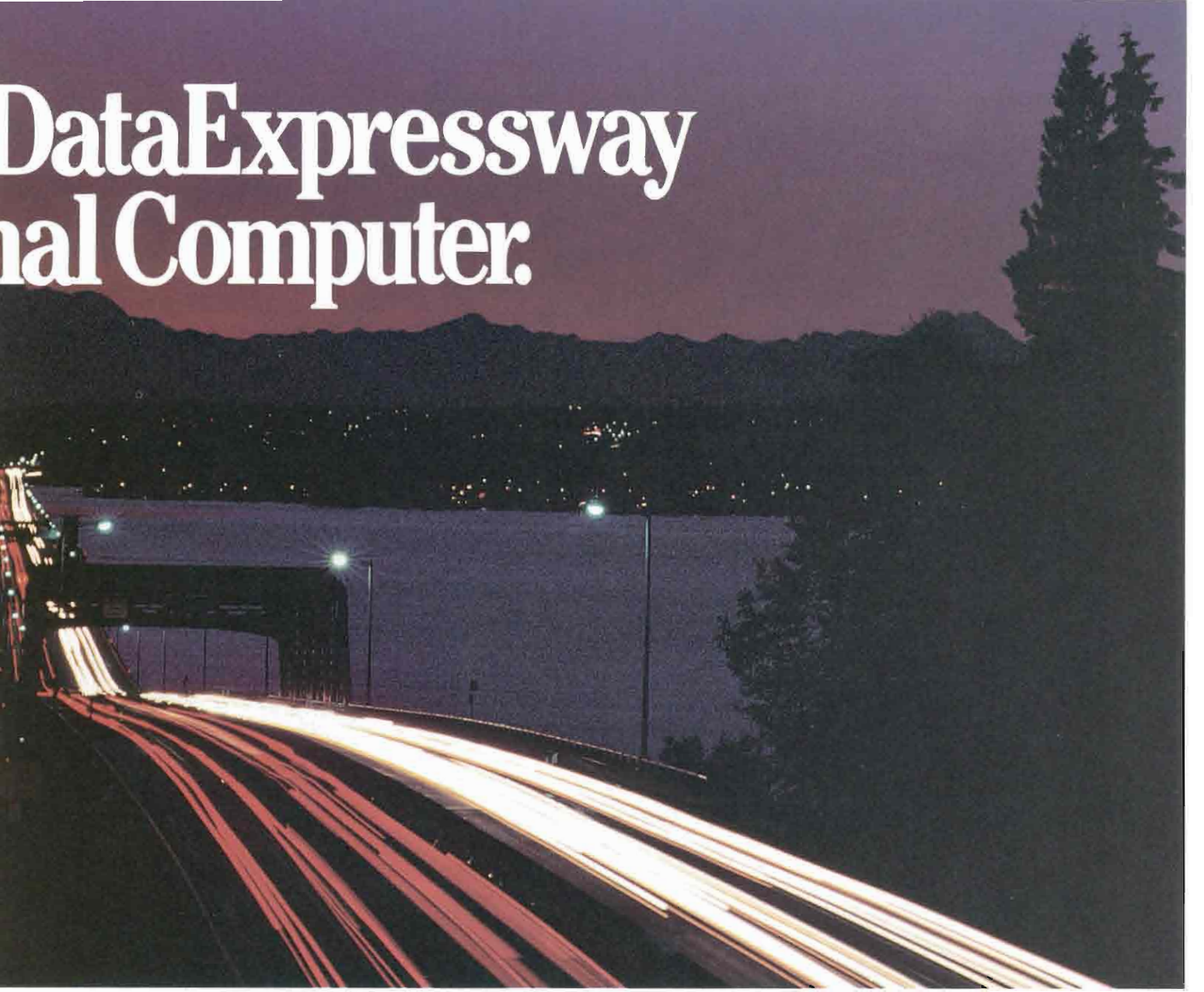

DataExpress is widely accepted as the most comprehensive application and data integration facility for the HP 3000 and PCs linked by Reflection.

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Designed for use by non-DP personnel, DataExpress allows a system administrator to control the capabilities of each individual user. The result is a simple yet sophisticated menu that guides you through the steps of data access, selection, computation, and reformatting.

ReportExpress – a companion product – provides end users with *ad hoc* and fully formatted reporting capabilities.

Together, Data Express and Reflection allow for easy, yet comprehensive information exchange from your HP 3000 to your favorite PC program.

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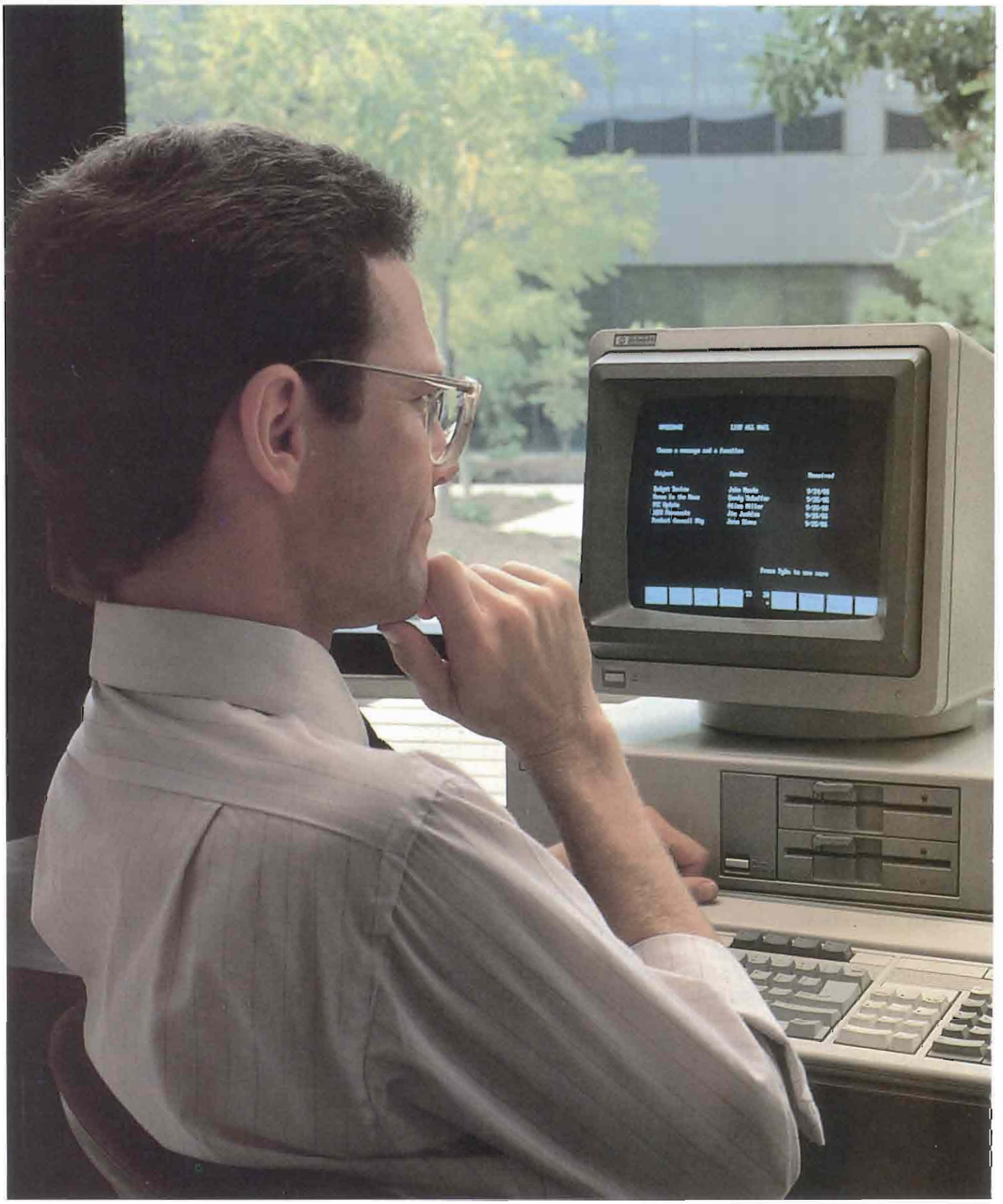

HP'S VECTRA RUNNING DESKMANAGER.

Personal Productivity Center Supports Berg Enterprises' Healthy Growth Rate

BUILDING A PPC

[BY JUDY KIMSEY]

Berg Enterprises, a wholly-owned subsidiary of American Can Company, consists of two major divisions: Margaretten Co., one of the largest mortgage originators in the country, and Berg Harmon, a property syndication company that purchases large real estate complexes, sells shares to investors and manages the property for those investors.

In 1982, Berg closed $234 million in mortgages, provided account servicing of $844 million and employed 335 people. For the nine months ending 9/30/86, closings reached $1.9 billion and mortgage servicing reached $2.4 billion.

A mortgage banking and real estate/property management firm, Berg Enterprises has doubled its growth every year since 1982, while the number of employees in the Computer Center to sustain this growth has remained proportionately low. HP's Personal Productivity Centers (PPC), implemented throughout the company's 62 offices, has helped the company manage the increased workload and has provided a quicker, more efficient means of communication between the offices.

Word and data processing, electronic mail and local area networking are all necessary to keep up with constantly changing regulatory agency requirements as well as client needs.

"We anticipated rapid growth before the process actually began,"

said Martin Gordon, vice president of Berg Enterprises. "Healthy growth always generates logistical problems for support staff. So, we began looking for ways to upgrade our computer system."

The original computer system became too small and the vendor's delivery schedule for new equipment was lengthy. As a result, an alternative solution was required. Gordon explains, "We wanted to avoid a conversion, but had to be sure that the new system from Hewlett-Packard could keep up with our anticipated growth."

> HP DeskManager has had perhaps the greatest impact on the way Berg Enterprises conducts business by providing rapid access to mortgage rate changes.

The new system had to provide Berg with the ability to upgrade from its existing processor with a minimal conversion effort. In addition, the company required increased performance and the assurance that it could grow with the HP solution.

Most of Berg's software (specific to the mortgage industry) was written in-house and HP worked closely with the staff to ensure a smooth migration.

"We ran a number of benchmarks with the HP 3000 business computer using our application software. In every case, the HP 3000 ran the online program 10-15 percent faster than the original system. We also obtained the flexibility required to talk with other computers, and the one-time conversion was accomplished quickly and easily," said Gordon.

With the conversion of its existing software applications accomplished, Berg turned towards evaluating new solutions to enhance the productivity of its internal communications, its document preparation and its data communications. HP's PPC was the answer.

OVER THE LAST FIVE years, HP's integrated business systems have kept pace. Today, there are two HP 3000 Series 70 minicomputers handling Berg's business applications.

One is dedicated to online use required for mortgage processing, and the other to providing daily business functions such as word processing, electronic mail and data communications between the personal computer network and the HP 3000.

An HP 3000 Series 37 compact, low-end system eventually will be used for remote laser printing.

Each Series 70 supports an HP 2680 laser printer. Prior to installation, extensive testing was done to ensure that the printers provided letter-quality output. A thorough cost justification was done as well to determine the cost comparison between standard high-speed impact printing and laser printing.

"The printers paid for themselves in a remarkably short time based on use," says Gordon. "For example, HP Word prints much company letterhead on the laser printer, eliminating the need for outside production costs."

Other HP equipment includes 30 printers of various types, 150 terminals and 100 personal computers comprised of HP Touchscreens and HP Vectra PCs. The HP 3000s are networked via LAN/3000. "We're an all-HP house now," says Mr. Gordon. "The PPC has proven its ability to grow with us. In 1983, we upgraded from a Series III to a Series 44. Over time, we continued to upgrade our system and by 1986 we made the move to our second Series 70. In all cases, the upgrade went smoothly and quickly and required minimal effort and expense."

Electronic Mail: A Major Impact

HP DESKMANAGER has had perhaps the greatest impact on the way Berg Enterprises conducts business by providing rapid access to mortgage rate changes.

In the past, the marketing department placed phone calls to update all branch offices whenever the rates changed, which often is twice daily. Now, the rates simply are entered into HP DeskManager and delivered to the branch office electronic mailbox.

In addition to saving time, Berg also has cut phone costs significantly.

While keeping up with the mortgage rates is a major function of HP DeskManager, it also is used extensively for day-to-day communication within the organization. Memos, statistics and other vital data are transmitted via DeskManager.

"This function is so transparent to the user, that it is taken for granted," says Gordon. "It has become a method for conducting business within the company and, if it were curtailed, we would have a lot of unhappy people."

Berg's monthly Management Report best illustrates the integrated nature of the PPC. First, a financial statement for approximately 100 properties is created on the HP 3000 and the summary numbers are transferred to an ASCII file. The property manager then downloads the information to either an HP Vectra PC or an HP Touchscreen.

Next, Lotus 1-2-3 running on the personal computer is used to create the Management Report figures from the information downloaded from the HP 3000, and HP Word is

used to create text. The information then is merged and printed on an HP DeskManager's electronic mail function.

"We currently are evaluating HP's Graphics Gallery Connection of software," says Gordon. "It will enable us to provide property managers and others requiring graphics with the ability to incorporate charts into the Management Report."

Graphics Gallery is a PC-based graphics application that runs on the Vectra and Touchscreen PCs.

BERG ALSO HAS ADDED new services, primarily "The Mortgage Place" installations in K-Marts throughout the U.S. This service, a new application for Berg, enables potential home buyers to predetermine the loan amount that they potentially qualify for before embarking on the house-hunting process.

When the prospective buyer enters the booth, a Berg representative asks a series of questions and enters the required information into an HP Vectra PC. The Vectra handles all computations and provides the buyer with a printout indicating loan amount and other pertinent data.

At night, the HP 3000 Series 70 automatically dials the Vectra PCs over standard telephone lines and picks up all data entered that day. A follow-up letter to generate new home mortgage business is generated automatically by the PPC and sent to the buyer.

For Berg, the project guarantees high visibility and identifies prospective clients. For mortgage seekers, the service makes buying a house less anxiety-driven and eliminates time wasted in visiting homes for which they cannot qualify.

During the day, the Vectra PCs linked with HP DeskManager enable the booth manager to communicate with the home office as necessary to conduct daily business activities.

"Our PPC has helped sustain our growth rate without requiring major increases in staff," says Gordon. "It helps us grow by adding new services, such as the Mortgage Place, and is an integral part of the way we do business at Berg." *—Judy Kimsey is a free-lance writer based in Oakland, CA.*

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Troubleshooting Datacomm

A Step-By-Step Guide To Pinpoint Problems Easily.

[By Glenn E. Hobbs]

It's 4:15 p.m. and you're getting ready to head home. Suddenly the phone rings. You reluctantly answer it. A frantic voice exclaims, "My terminal doesn't work!" Soon you realize that the user is calling from a remote site and you're not sure where to start.

Troubleshooting datacomm can be done easily by anybody with very simple and inexpensive tools, even if you have a network of multiplexers and dedicated circuits. I'll show you a step-by-step process of narrowing down the cause and, in most cases, correcting the problem. We'll take a look at both what to check for if the user is already logged into the system and what to do when the user is unable to get the prompt for logging on, the typical Monday morning situation.

Let's return to our frantic user. First, you should find out exactly what happened. Did the keyboard suddenly lock up? Was the user running a VPLUS/3000 application? Did any erroneous characters start printing on the screen? If the user wasn't running a VPLUS application, ask him to press CTRL Q. If that doesn't help, try resetting the terminal.

On 262X terminals, hit the SHIFT, CTRL, ESC and RESET at the same time. On 239X terminals, press SHIFT, CTRL and RESET. If you can get the colon prompt, make sure that the colons don't "stair-step" or go down the screen diagonally. If this happens, press SHIFT, ESC and : at the same time.

If the user was running a VPLUS application, you should first type "SHOWJOB;JOB = username.acctname" to determine if the user is still logged on. If you see the word QUIET associated with the session, the user is still in block mode, or at least the port is. In this situation, a terminal reset will clear up only half the problem, because the port still will be set to receive block mode. You now must abort the session from the console.

If your system has the option of "JOBSECURITY = LOW" set, you can log in at another terminal to the account manager's account and abort the session from there. If you still can't get the user logged on, take the steps that you might have to use on a typical Monday morning when the user turns on his terminal and can't get a prompt for logging on.

Sometimes it may seem like every Monday morning, someone can't log onto the system. These things can happen because of power failures/surges or equipment is bumped or accidentally turned off during the weekend. Usually resetting a modem or getting a pair of multiplexers back in sync will cure the problem, but first you must pinpoint the exact location of the problem. I'll explain step-by-step how to narrow down and pinpoint the cause, going from visual checks to checking each piece of equipment individually. It's not as hard as it may seem.

THE EASIEST WAY to narrow down a problem is to start at one end and work your way to the other by checking each datacomm link. The logical place to start is the user's terminal. HP terminals allow easy access to the configuration through the function keys and easy diagnostic tests to check out the terminal. As you go through the

configuration, I'll explain the terminology to you also.

First, check the modes configuration. On 262X terminals, press the MODES key located on the second row from the top on the left side. On 239X terminals, press the SYSTEM key in the middle of the top row and then press the F4 key.

Now look at the labels or "boxes" at the bottom of your screen. The label at the far left should read LINE MODIFY. Carefully look in the shaded area of each label to see if there's an asterisk. You should see one only in the REMOTE MODE label. If this is not the case, press the function key that corresponds to the appropriate label to either turn the asterisk off or on. If the terminal isn't in remote mode, it won't transmit to the host system and any key you press simply will be echoed back to the screen. The other modes keys alter the way data is sent or interpreted and can prevent you from getting a prompt.

Next, check the datacomm configuration. On 262X terminals, press the AIDS key and, on 239X terminals, press the SYSTEM key again. Then press the F8 key for the configuration keys and press F3 for datacomm configuration. The datacomm menu should appear on your screen. The cursor will be sitting in the baud rate field.

> Troubleshooting datacomm can be done easily by anybody with very simple and inexpensive tools . . .

Baud rate is the speed at which the data travels between your terminal and the host system. Typical baud rates are 300, 1200, 2400, 4800 and 9600. Lopping off the last zero of any one of these numbers gives you the actual speed expressed in characters per second. For example, 4800 is 480 characters per second.

Changes to the configuration are made through the use of the function keys. F1 is to save a configuration, F2 and F3 step through the available settings, and F4 sets the default or factory set values. The tab key moves the cursor to each setting.

The next field is for setting parity. Parity is used for checking the data for errors; in most cases, the parity should be set for zero. Next comes the ENK ACK enable field and it should be set to yes. ENK ACK is used to enable data to be sent at the proper time. The rest of the items, in most cases, should be left at the default values.

Your terminal's configuration is saved on RAM chips to allow for ease and flexibility in making changes to the configuration. Unfortunately, this will last only as long as the power is turned on; as soon as the power is turned off, the terminal will go back to its default settings. To overcome this, a small battery is inside the terminal to keep the memory working when there's no power. The battery usually will last for about five years. If you find you need to reset the configuration each time you turn the terminal on, the battery must be replaced. The batteries used are not common types (AA, C, D, etc.) but are available from most electronics dealers, such as Radio Shack.

On 262X terminals, the battery is located in a clip on the underside of the screen housing behind the pedestal. On 239X terminals, the clip is on the rear of the terminal at the bottom. To remove the clip, press the tabs on each side toward each other and pull it out. Make sure you note which way the batteries are facing.

THE MODEM ALLOWS DATA to be carried over distances that normal straight-through or hard-wired cabling can handle. It also allows you to send data over leased and regular phone lines. Most modems have lights on them that will allow you to diagnose the problem easily. *Figure 1* shows the front panel of a typical modem with some of the most common indicators used. Here's a listing of what each light means and whether it should be on or off; for some lights, I've indicated a name that other vendors might use.

TST This light should be off. The light indicates that the modem is in test mode or self check. Other names can be TD or simply TEST.

POWER Of course, if this light is off, no power is getting to the modem. Don't overlook the possibility of the modem being switched off.

CD (CARRIER DETECT) This light should be on. All modems put out a tone called a carrier. This means that your modem can "see" the other modem. Other names are CRX or MODEM READY.

DSR (DATA SET READY) This light should be on. This indicates that the modem is connected to a communications channel and not loopback. This indicates the connection to the leased line interface.

DTR (DATA TERMINAL READY) This light should be on to indicate that the connection between the terminal and the modem is good.

TX & RX (TRANSMIT and RECEIVE) In most cases, these lights are off. When data is being transmitted or received, these lights will flash on and off to indicate activity on line. Other names could be TD and RD or IN and OUT.

MULTIPLEXERS OR MUXES for short allow several users to share one leased line at the same time. Like modems, muxes have a counterpart at the other end. There also is a pair of modems between the muxes. *Figure 2* shows a typical network using muxes and modems.

Most muxes will have two types of indicators, one to indicate activity and the other to indicate trouble either through a series of lights or a digital display. Frequently, a problem can occur if the two muxes get out of synchronization, often a result of power outages. To restore the synch, reset the master (the one closest to or at the computer site) and then reset the slave mux.

Sometimes on older muxes you may have to reset the modems as well. If no reset button is available, turn the equipment off, wait five seconds and turn it on again. If you have to reset the modems as well, you may have to reset the muxes a second time to restore synchronization. In most cases, you should reset at the system end first.

So, that's how you do a visual check. Start at your terminal and work your way to the system, looking for some indication from the equipment that there's a problem. Ensure that all cabling is in place and secure, and that the baud rates of all the equipment match. One exception to this rule applies to the modems between the muxes; they may be set for a higher speed for better throughput. Here's how you verify that data is getting through at various points.

USING OUR NETWORK in *Figure 2*, we will do a series of loopbacks at several key points where problems could be occurring. A loopback is simply the process of causing data that is sent from your terminal to be echoed back to it. If you have a device set to loopback, you should be able to type something at the keyboard and see it on your screen.

To accomplish this, you need a few simple tools. First, straighten out a standard size paper clip and bend it so the two ends are facing the same direction at about 1/8 inch apart. Also, get a small flat blade screwdriver. If you can, it's nice to have

> . . . you can clear up more than 90 percent of datacomm problems . . .

two small alligator clips and a pair of cheap (mono) headphones.

Remove the jack from the end of the headphones and solder probes on both ends of the wires. This will allow you to listen to the phone line and, in most cases, detect any noise that might be preventing data from getting through. The headphones are a cheap alternative to using a several hundred dollar scope to detect phone line problems. In most cases, you aren't responsible for the phone line, but making a good case about the problem to the phone company usually gets quicker results.

Carefully study *Figure 3*. It shows what the connector of a standard datacomm cable will look like. Note where Pins 2 and 3 are. Some cables have all the pins numbered for you, while others merely number those at the end of each row. Pins 2 and 3 are the transmit and receive pins, the ones used for the loopback testing.

The first loopback will test the terminal and the cable that goes from it to the modem. At the modem end, loosen the locking screws on the connector hood. Don't unscrew them completely, just enough to pull the cable off.

Take the end of the cable and find Pins 2 and 3. In most cases, this will be a male connector (exposed pins). Take one of the alligator clips and clamp it around those two pins. If you don't have the alligator clips, press the blade of the

FIGURE 1

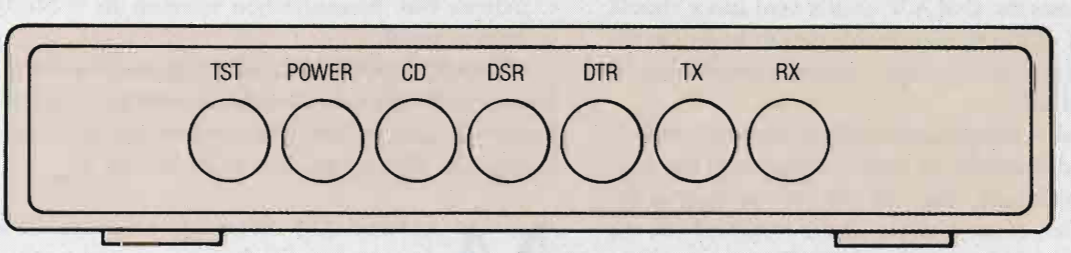

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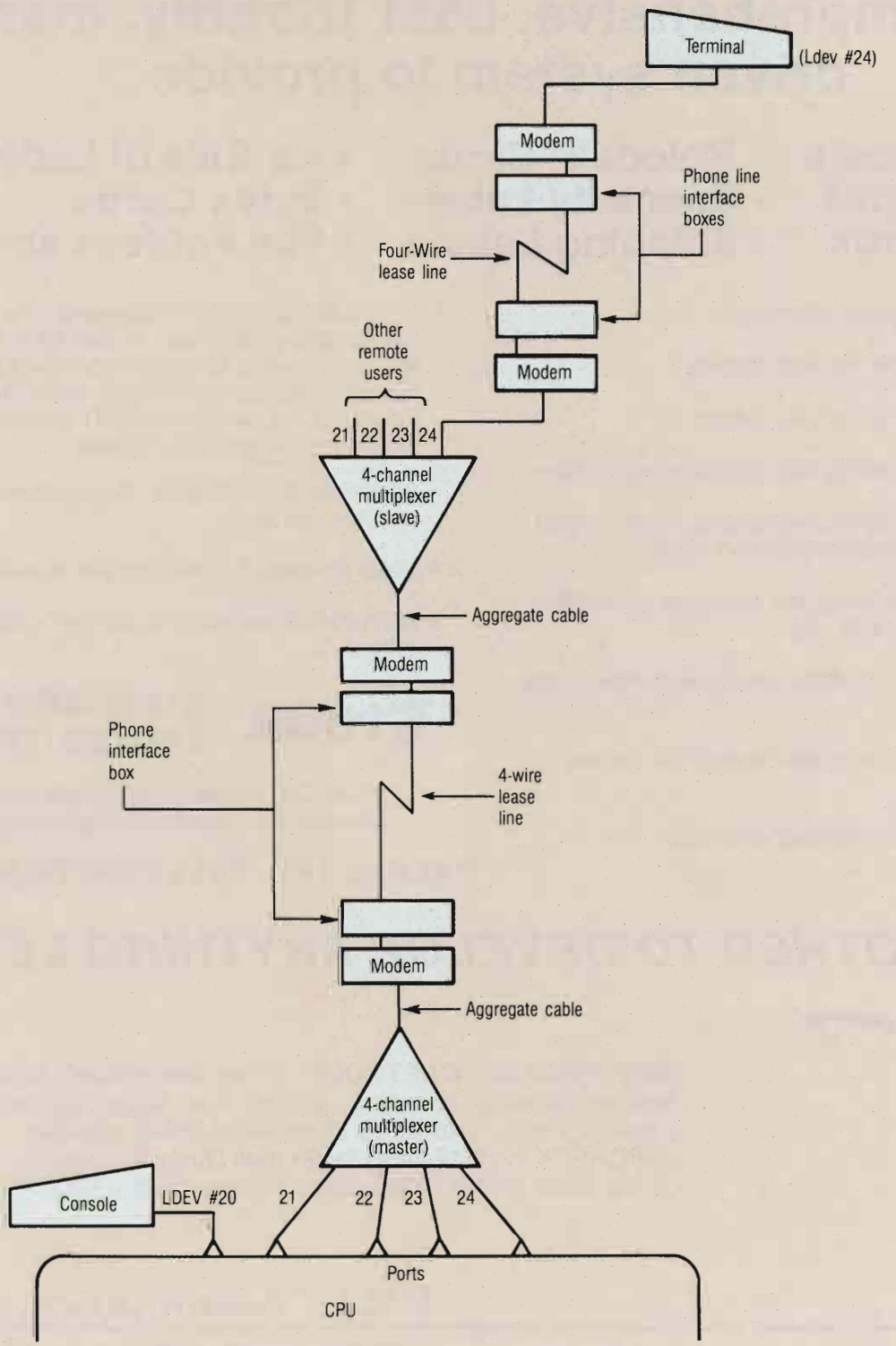
FIGURE 2


Terminal
(Ldev #24)
Modem
Phone line
interface
boxes
Four-Wire
lease line
Other
remote
users
Modem
21
22
23
24
4-channel
multiplexer
(slave)
Aggregate cable
Modem
Phone
interface
box
4-wire
lease
line
Modem
Aggregate cable
4-channel
multiplexer
(master)
Console
LDEV #20
21
22
23
24
Ports
CPU

screwdriver against these pins. If, by chance, the connector is female (holes), insert the two ends of the paper clip into the holes for 2 and 3.

Now go to your terminal and start typing something. If your typing appears on the screen, your terminal and the cable to the modem are in working order. If this isn't the case, then follow your terminal's documentation on self-testing. If your terminal checks out, the cable to the modem needs to be replaced.

Now check out the local modem. Most modems contain self tests; some even can test the modem at the other end. See your modem's documentation on how to do this. But let's assume that your modem doesn't have these capabilities or the documentation isn't available.

There should be another cable (usually a phone cord) running from the modem to the interface box to the phone line. On the outside of the box is usually a standard phone jack. Remove the locking screw(s) and pull off the cover. You should see four colored wires: red, green, black and yellow or white. Remove the four wires from the jack or, on older installations, the ends of the cable. Now take the two alligator clips to clamp the green and the yellow ends together and the red and the black ends together.

Try again now and see if your screen shows what you type at the terminal. Replace the wires and the cover to the jack. If you have the headphones, take the two ends and listen to the green and red wires and then the black and yellow wires. In both instances, you should hear a solid tone, the carriers of the modems. One tone should be louder than the other. If you can't hear the tone of the remote modem or if the tones don't sound very clear, you have a phone line problem.

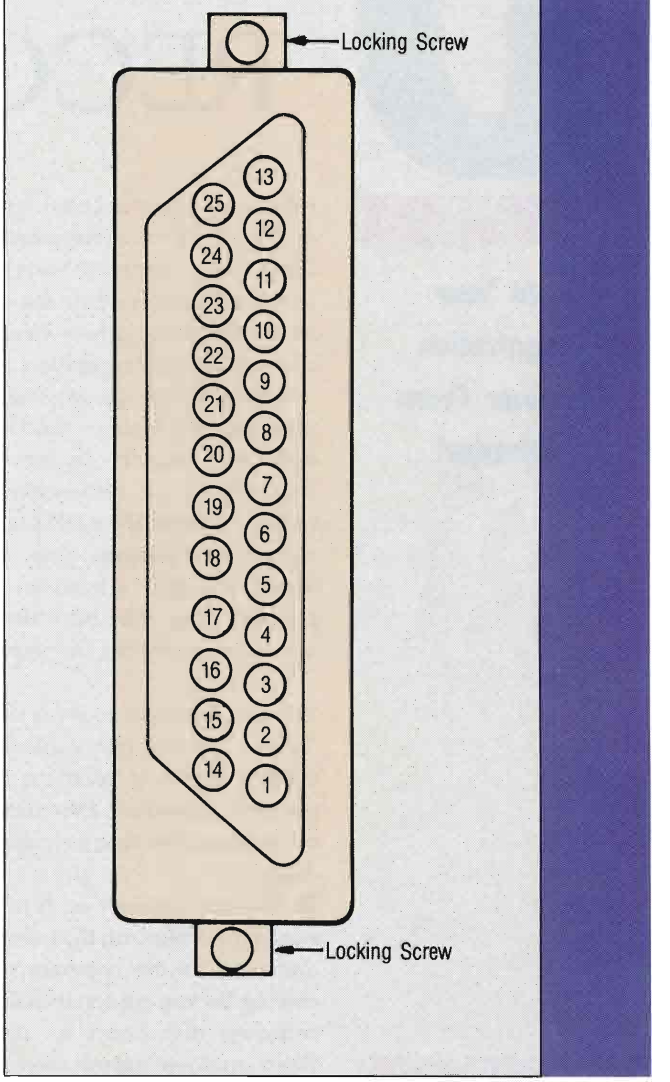
Now go to the remote modem and remove the cable that goes from it to the multiplexer at the modem end. On the back of the modem, connect Pins 2 and 3 together, like you did before, and see if you can loopback data from the terminal. Now replace the cable and remove the mux end, again loopback 2 and 3 and try your terminal.

At this point, you should have verified that your terminal, the pair of modems and the phone line are working. If all the other users on the mux aren't having any problems, check the following areas: The most common cause can be a hung channel on the mux. Resetting the mux will clear up the problem in most cases. Note that, on some multiplexers, resetting could affect the other users on the mux.

Another possibility could be a hung port on the system. Have the operator or system manager try "RESETIO ldev#" where "ldev#" is the troubled port. Also, he can run TERMDSM.PUB.SYS and check out the port. The cable from the CPU to the port also can be bad. Try one final loopback by removing the cable from the back of the CPU and test your terminal as before.

By following these simple steps, you can clear up more than 90 percent of datacomm problems, saving time and money. Remember to narrow down the problem to the specific area of where the problem is occurring. Don't overlook the obvious and visually check everything first. Are all cables tight and secure? Do any lights on any equipment indicate a problem? It's rare that equipment failure is the cause of the problem; usually it's something that you can identify easily. *—Glenn E. Hobbs works for Professional Computer Systems Inc., Mountain View, California.*

FIGURE 3



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DISASTER RECOVERY

Could Your Organization Recover From A Disaster?

SECURITY

Michael J. O'Malley

How would a severe earthquake, a bombing, or the act of some disgruntled programmer affect your computer service? How long would it take to replace the computer room, air conditioning, power equipment, cabling, communications equipment and computers?

Studies have shown that companies lose most essential business functions within three days of a computer disaster. Within 10 days they would be technically dead without backup. Statistically speaking, you would not recover as a business from a major disaster unless you had a realistic, tested, disaster recovery plan. The odds are overwhelming against recovery for the unprepared.

THE EASIEST THING to do is nothing. Play the "odds." Gamble that a disaster would never happen to you. In reality, it could happen to any of us tomorrow. I've compiled a short list of organizations that have experienced major disasters:

■ *Dismissed employee at Paycheck, Inc.* — An employee broke into the computer center and destroyed all the company's disk packs including backup copies. It took two weeks and countless man hours to manually re-enter 95,000 employee payroll records. Paycheck lost hundreds of clients in the process, because it was unable to process employee payrolls.

■ *10,000 gallons of water at Mazda* — The roof of the building housing Mazda's data processing center collapsed during a heavy Pacific rain storm and demolished the company's computers. The disaster brought to an abrupt standstill the data processing functions for Mazda's 31-state business.

■ *Fire at World Life And Health Insurance* — As the company entered the final stages of its conversion to a new computer, a weekend fire destroyed the firm's headquarters, which housed its computer facility. The company's computers were completely destroyed.

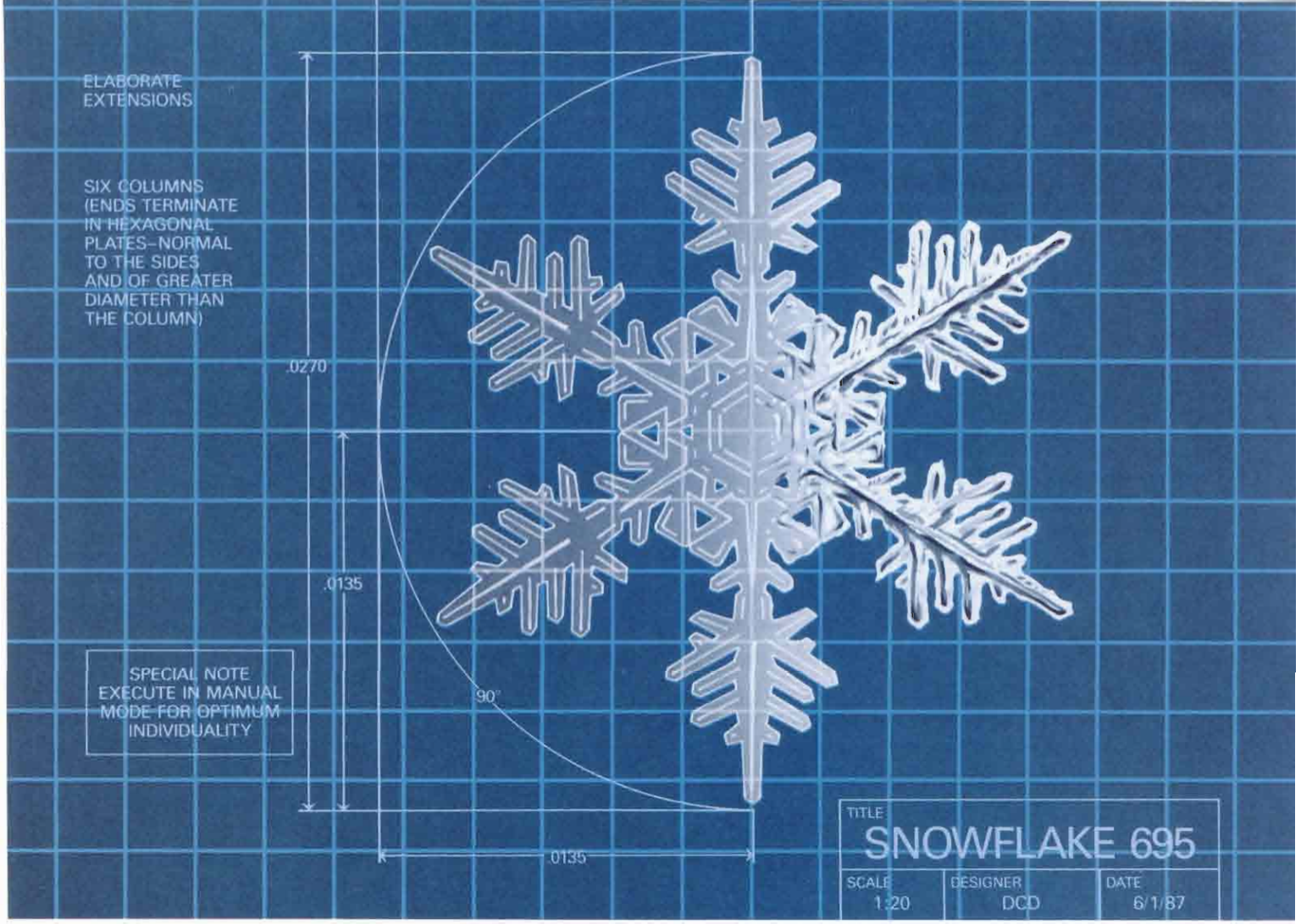
■ *Explosion at Wells Fargo* — A propane tank exploded in the basement of Wells Fargo offices in Denver on New Year's Day 1984. The fire quickly spread through the office building, destroying everything in its path.

Although most data processing managers and users agree that disaster recovery is something that should be done, few organizations actually have any kind of formal plan. It takes a considerable amount of time and effort to develop a disaster recovery plan. It's difficult to know where to start, and our day-to-day responsibilities often leave us with little time to devote to such a major undertaking. This article will outline in some detail the major components of a disaster recovery plan for your Hewlett-Packard computers and give some hints to get you started on a plan for your installation.

THE OBJECTIVE OF the project is to prepare a plan that provides for the continued operation of your data processing facility or other functional areas of your business in the event of an emergency. At minimum, the plan should address central computer operations. Optimally, it should address all aspects of the business including manual and automated functions.

The purpose of a disaster recovery plan is to increase the chances of survival and to decrease the amount of loss. It identifies how the critical computer-dependent services of the business will be restored to operation with the least disruption.

A full-fledged disaster recovery plan that addresses all aspects of the business, from telephone service to paper flow within all de-



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partments, requires the active involvement of your entire organization.

Start with a more manageable piece, the critical areas of the central computer operation. Initially, work on a computer contingency plan. Later, if you have the opportunity, expand the plan to address other business considerations.

Begin by identifying the scope of the project you're willing to undertake and the resources you're willing to commit to the disaster recovery planning process. Prepare an outline to focus on the scope of your project and available resources. Then consider how the completed plan will be printed and distributed.

Keep in mind that disaster recovery plans, in order to remain viable, must evolve as the business itself changes over time. Most managers will want to develop and maintain the plan on a computerized word processing system. Since the outline is the beginning of this document preparation, this is a good place to resolve these issues.

The Outline

The introduction to your disaster recovery plan should identify the objectives of your plan. Typical goals of the plan might include:

■ *To describe the correct course of action to follow during emergency situations.*

■ *To minimize confusion, errors and expense to the company.*

■ *To effect a quick and complete recovery of services.*

Let's look at the plan step by step.

■ *Section 1 — The Readiness Team*

The Readiness Team will consist of a group of people from within your organization. The Team will be responsible for "first response" actions in the earliest stages following a disaster. In outlining this group's makeup and responsibilities, you should include a statement of purpose, define the position of Emergency Coordinator, describe the general emergency procedures and name the responsible players.

This computer facility collapsed under heavy snow.

■ *Section 2 — Major services, users and key considerations*

The major services provided by your computer systems should be documented in this section of your plan. Summarize the nature of your critical applications. Document the users of these applications, critical work schedules and dependencies that may be inherent in processing these applications. Prioritize these major services. Not everything may be recovered immediately in an emergency if the company experiences a loss of processing capability.

This section should be organized by system. Each specific service or system should be available for quick and direct reference. Examples of major services are payroll, billing, production scheduling and order entry.

■ *Section 3 — Potential interruptions and general procedures*

Your disaster recovery should address two levels of recovery — from a "major" disaster with detailed procedures for switching operations to a contingency computer site, and from lesser emergencies, or simply interruptions of service, that may or may not require switching to a contingency site. This latter set of procedures will be more generalized, since you cannot prepare for an unlimited number of possible interruptions of service which might occur.

This section of your plan should address lesser emergencies and interruptions. It should be organized by the most serious and/or probable emergencies that might occur, such as minor fires, power outages, telecommunication failures and hardware failures. Included for each type of interruption should be the general procedures for handling the emergency, along with the detailed actions that vary from situation to situation. Your stated objective may be to operate in a less-automated fashion while restoring normal service as soon as possible.

■ *Section 4 — Policies for reducing risks*

Now you're ready to define policies for reducing risks relative to those emergencies. Although you may have most of these policies already in place, document them here for easy reference.

This section should be organized as a series of policies, such as protection of

data, protection of facilities, off-site forms storage, insurance, etc. Additionally, for each policy, two kinds of risk reduction should be addressed — reducing the risk of the interruption occurring and, if it does occur, reducing the risk of an inadequate recovery process.

Proceed as any good project manager would by being adaptable and remembering the real goal . . .

■ *Section 5 — Contingency site description*
This section should include a description of your contingency computer site for major disasters affecting your computer operation. It should state the location, names of contacts and telephone numbers. It should describe the contingency hardware, software and facilities, the accommodations for your organization's staff, scheduling considerations, limitations and procedures.

Selecting a contingency computer site is a very important part of the disaster recovery planning process. Some organizations develop a mutual backup arrangement with other organizations in the same city or general vicinity. Very few if any of these reciprocal agreements are really workable, so be careful with such an approach.

How many businesses really would be willing to severely limit their computer functions for another organization which has experienced a disaster? Alternating schedules generally aren't feasible because of conflicting configuration requirements and the substantial amount of time required to reload and reconfigure. What site possibly could have so much excess disk space to run two systems side-by-side?

Two alternative approaches are available: hot sites and cold sites. A hot site provides an unused computer that is ready and waiting in a working facility. A cold site provides only the facility and not the computer, in which case you have to obtain the computer from the manufacturer or some other source. I recommend that you choose a hot site if at all possible. It may take weeks to order and install the necessary hardware to recover your business using the cold site approach.

■ *Section 6 — Recovery procedures for a major disaster*
Now comes the main part of the disaster recovery plan: developing specific procedures for a major disaster that requires switching computer operations to a contingency site due to destruction of the data center or other factors.

This section should include definitions of emergency action teams and their responsibilities, procedures for activating contingency site operations, specific procedures for data processing operations and interface requirements for user departments. It also should include procedures for replacement of the data center and return to normal operations. This will be a lengthy portion of the plan and should be organized as a series of procedures listed by name in the table of contents.

■ *Section 7 — Testing and maintenance of the plan*
This section should contain policies and procedures for testing and maintaining the disaster recovery plan. You must be confident that the computer contingency site is workable, that the procedures don't have technical or other unforeseen problems and that key people understand the plan both in the general and specific cases.

Just as important, the plan must be reviewed and updated on a regular basis. It must evolve in parallel with your organization, since very little about a business remains static for any length of time. It must be reviewed and updated for organizational, technological and business environment changes.

■ *Appendices*
Finally, the plan should include as appendices all additional sources of vital information that may be needed to carry out the recovery procedures. Examples are directories of employee names, addresses and phone numbers, hardware and data center configurations, and so on.

HAVING A PROJECT SCHEDULE is always important to a project's success. Spend the time up front to prepare a project plan, including estimates of the resources that the project will require.

The project schedule breaks the project down into tasks and steps. For each task and step, estimate the levels of work effort and prepare a schedule to accomplish each task.

These guidelines should help you to develop a disaster recovery plan. The project consists of analysis, planning and documentation. Your project team needs to consist of good, general analysts.

Still, project plans usually aren't perfect. Things come up that change your expectations, the sequence of tasks and your time estimates. Proceed as any good project manager would by being adaptable and remembering the real goal, to develop a disaster recovery plan that will help your organization survive a computer disaster and keep its business successful. *—Michael O'Malley is president of Business Recovery Systems, Inc., Lakewood, CO.*

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COMPUTER-AIDED PUBLISHING

A True Understanding Of "Desktop Publishing."

Here's a quiz. True or false:

1. Desktop publishing systems really handle the full range of publishing activities.
2. Desktop publishing systems really will fit on top of your desk.
3. Desktop publishing systems take advantage of new computer hardware developments.
4. Desktop publishing systems represent significant new software developments.
5. Desktop publishing systems are the ideal tool for almost everyone who wants typeset quality output from a computer.

If you read (and believe) the advertising, you may think all the statements are true. The third statement is the only true one on the list.

A TYPICAL PUBLISHING cycle involves at least six steps:

- *writing*
- *editing*
- *typesetting*
- *paste-up*
- *printing*
- *distributing*

In theory, material clears one step before the next is started. (In practice, things never work that well.)

In the writing stage, the author collects material, organizes it and puts sentences and paragraphs on paper (or into a computer). Computerized word processing aids have been used by writers for a long time. Their use is becoming almost universal.

The editing process is handled by the author with the assistance (or interference) of an editor. (In this context "editor" is a person, not a computer program.) When the author and editor finish polishing the manuscript, it goes to a typesetter.

On the way from the author to the typesetter, someone makes design decisions. The typeface and typesize must be established for headings, subheadings and body types. If there are tables or lists, the style in which those will be set also is determined. Any other peculiar formatting is dealt with.

The typesetter takes the copy and the design specifications and translates that into typeset output. A very long time ago, that process was done with pieces of type. The letters were taken, one at a time, out of a tray and set in a form. When a page was finished, the form was clamped together and put in a press. The type was inked, a piece of paper went over the type, and then a roller over the paper produced the image.

A long history and many innovations moved typesetting to a photographic process which generated a strip of type called a "galley." Galleys typically are the width of one column of text.

The typesetter is run by a person, also called a typesetter, who types the text and intersperses font and size changes as indicated in the marked-up manuscript.

In the paste-up step, the galleys are cut apart and pasted onto boards. Diagrams, pictures, advertisements and other non-text material are pasted onto the boards in their proper place.

At the end of the paste-up process, the board is photographed and a plate is made. That plate is used with a printing press to produce multiple copies.

Finally, the copies are bound and the results distributed to stores, the post office or directly to the readers.

The desktop publishing packages address

DESKTOP PUBLISHING

Martin Gorfinkel

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

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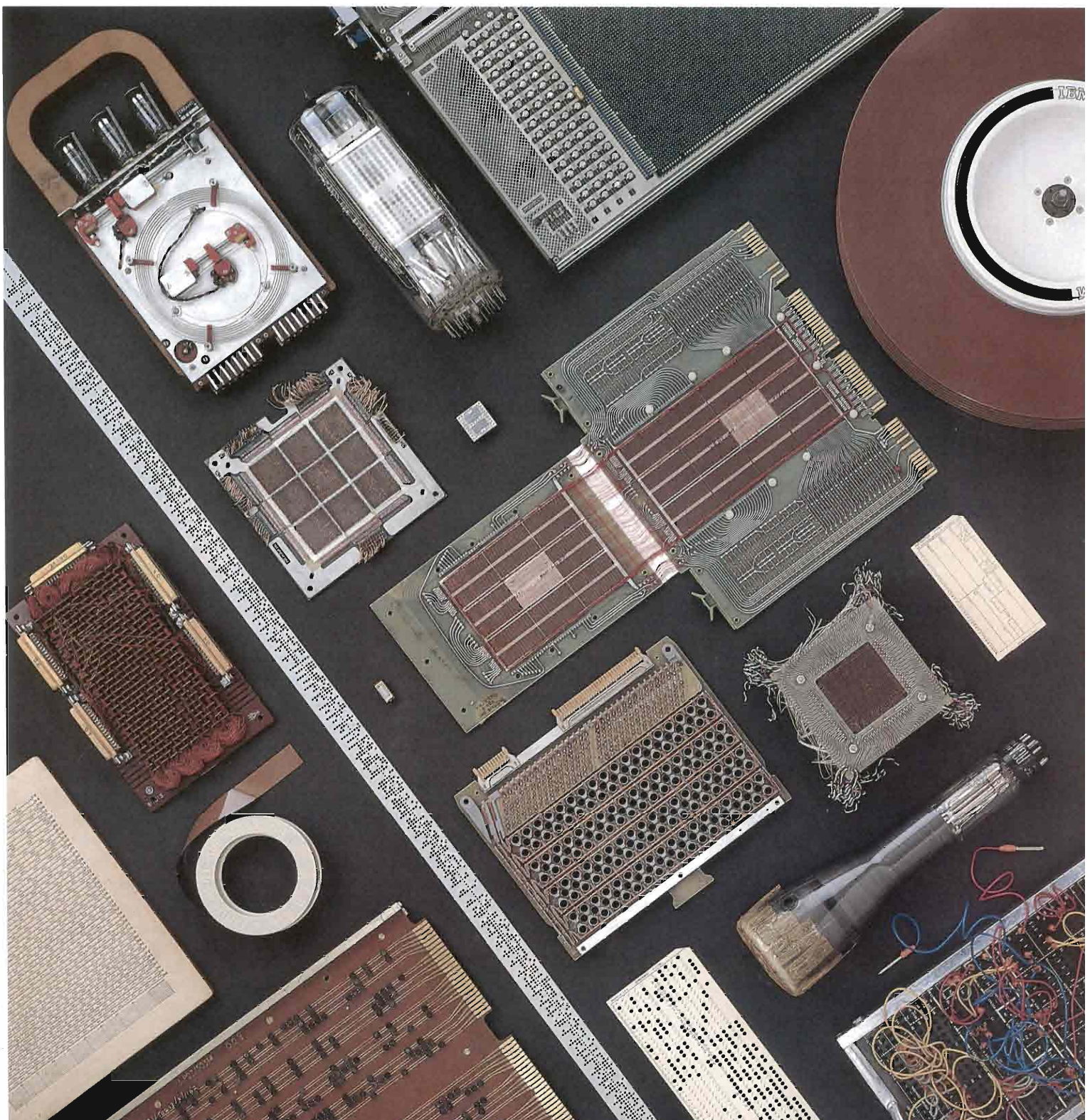

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only a portion of this process. They link with a word processing system to gather text and with a graphics system to gather diagrams and other non-text. Their function is to imitate the typesetting and paste-up portions of the task.

The input to desktop publishing software is the text and pictures for a document. Pages ready to go to a printing press are output from the system.

PROGRAMS TO FORM documents and source code listings have been around for more than 20 years. Word processing programs for the HP 3000 that allowed secretaries and clerks (as opposed to programmers) to generate good-looking typed output are more than 10 years old. Newspapers have been using computers to set type for a long time. Desktop publishing is just another step in the evolution of formatting software.

Typography is an art. If you want the output to look elegant, it will take time.

THE MINIMAL HARDWARE required for a desktop publishing system includes a microcomputer, keyboard, screen and a laser printer.

That equipment is certainly small enough to fit onto a normal sized desk, but there is no room left on the desk for normal clutter. On the other hand, that equipment is very much smaller than the traditional phototypesetting machines. Thus "desktop" makes an accurate comparison with the size of older equipment.

The small laser printer was the innovation that made desktop publishing possible. Large, expensive laser printers have been available for a long time. They could merge text and graphics and produce output at high speed. Those printers are still available and are used for high-volume applications.

The latest generation of laser printer is "desktop" size. The output is produced to finer resolution; the units cost about two percent of the price of the larger printers.

Output is slower from the newer, smaller printers. That's a minor detriment when the printer is used for a single master copy which then is reproduced at a print shop.

Output resolution of 300 dots per inch is available on the new printers. That's good enough to imitate typeset output under most circumstances.

At first formatting programs were accessible only to programmers and the output was generated on system line printers. The formatting software has developed in three directions:

1. The output devices have become more sophisticated.
2. The fields of applications have become wider.
3. The user population has become broader.

Desktop publishing and other word processing/formatting systems can be used by almost anyone who can manage typing on a keyboard. The output can be printed on a line printer, typing terminal, laser printer or phototypesetter. The systems are used for newspapers, research reports, magazines, interoffice memos, etc.

The desktop publishing systems have one feature separating them from earlier formatting systems. They incorporate the "paste-up" step in the publishing process. The user can preview a page on the screen and can move paragraphs or sections from one place to another on the page. This feature is extremely valuable when several small

articles are to be set on one page or when graphic (or other non-text) is to be fit with the text.

THANKS TO THE DESKTOP publishing boom, almost everyone involved with computers knows it's possible to generate typeset-like output from a computer. They also know that the process is not extraordinarily complex or expensive. Now potential users need to learn about the various possibilities. Desktop publishing is not the only way to go; for many users it will not be the optimal solution.

Desktop publishing is probably the best solution for production of newsletters. They are relatively short documents and often contain several articles on one page. The "page-up" capability of the desktop publishing system allows the user to move text and position articles on the page. Pictures, headlines and graphics can be sized and placed on the pages easily.

The newsletter publisher may be willing to spend time working with the text and the design. The desktop publishing system allows the publisher to avoid the expense of a typesetter and paste-up person.

At the other extreme is a user generating reports from data already stored on the computers. The reports are in a relatively fixed format. An alternative formatting system can provide the quality of typesetting/desktop publishing without requiring as much personnel time.

Typography is an art. If you want the output to look elegant, it will take time. Computer programs can help with a lot of the work. If the format of the documents is sufficiently well-structured, they can do all of the work. However, most typesetting applications include tables, headlines and other "non-standard" formatting which require special attention. — *Martin Gorfinkel is president of LARC Computing, Inc., Los Altos, CA.*

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MAKING PASCAL BEAUTIFUL

MJH SYSTEMS' *PASFORM*

Over the years, it has been claimed that the last functions to be automated are those performed by computer professionals. Fortunately, managers and software vendors are changing this.

One such vendor is MJH Systems with its *PASFORM* PASCAL-formatting product. *PASFORM* performs formatting and letter-casing functions on PASCAL source files much like a word processor performs justification and formatting functions on standard document files.

Imagine not having to spend time inserting and removing blanks to make your programs readable, changing caps to smalls and smalls to caps to meet standards, and being able to copy code from one place to another and an automatic way to make all the indention adjustments. Or maybe you have inherited a piece of code that proves even a structured language like PASCAL can be misused to generate spaghetti code.

MJH Systems founder, Michael Harris, found himself in a similar position in June of 1984. But instead of manually editing the source code to make it readable, he created the forerunner of *PASFORM*. From the start, *PASFORM* has evolved following two important design philosophies:

1. It will not change the functionality or corrupt any code in the files it transforms.
2. It will allow maximum flexibility in formatting and letter-casing standards in order to meet a wide variety of individual styles and standards.

SINCE *PASFORM* IS DELIVERED as a single file, it's easy to install. The system manager simply restores the program in any group or account where PASCAL programmers have execute access. Then they follow the execution examples in the "Getting Started" chapter of the manual to begin cleaning up their PASCAL programs. The general run statement is used:

```
:RUN PASFORM.<grp>.<acnt>;INFO=
'<inp file><out file> [<opts>]'
```

If a user makes an error, *PASFORM* provides clear and helpful error messages. I found the idea of separating file names and options in the run statement with spaces instead of the traditional commas or semicolons to be foreign in the HP 3000 environment, but quickly adapted to it. The "Getting Started" chapter includes suggested UDCs and a good introduction to the many options for formatting and letter-casing PASCAL source code. *PASFORM* parses and performs syntax-checking on code it transforms.

Once you start using *PASFORM*, it quickly

One of the many systems* PASFORM *runs on — the 9000 Series 350.

PASCAL

Doug Knapman

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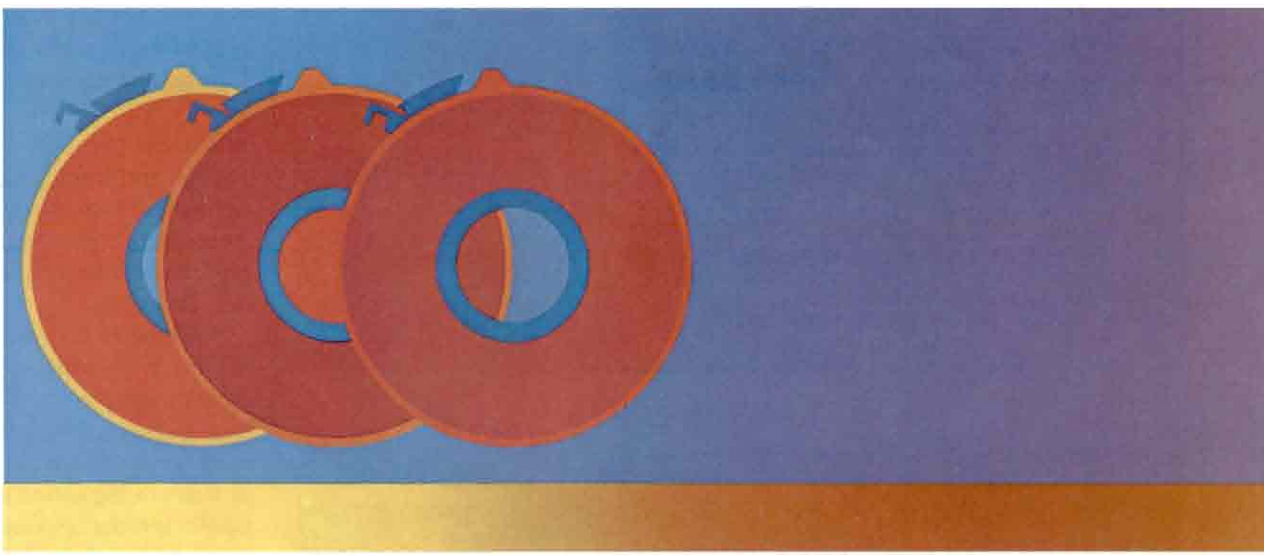

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Program 1.

```
Before EB enabled
IF (LD__FND__LSE(LSE, LDB, DLEASE) AND MB__DBGET(DB__CHAINED, LDB, DLEASE,
    DLEASE__LIST, DLEASE__BUF) AND (DLEASE__BUF.EF__DTE >=PRNT__DATES.GE__EF__DTE)AND
    (DLEASE__BUF.EF__DTE <= PRNT__DATES.LE__EF__DTE) AND ((DSECT__BUF.EXPIR__DTE < > 0)
    OR ((DSECT__BUF.EXPIR__DTE = 0) AND (DLEASE__BUF.EXPIR__DTE >=
    PRNT__DATES.GE__EXPIR__DTE) AND (DLESE__BUF.EXPIR__DTE <=
    PRNT__DATES.LE__EXPIR__DTE))) AND (DLEASE__BUF.DR__DTE >= PRNT__DATE.GE__DR__DTE)
    AND (DLEASE__BUF.DR__DTE <= PRNT__DATES.LE__DR__DTE)) THEN

With EB enabled (and letter-casing options used)

IF (Ld__Pnd__Lse(lse, ldb, dlease) AND
    Mb__Dbget(db__chained, ldb, dlease, dlease__list, dlease__buf) AND
    (dlease__buf.ef__dte >= prnt__dates.ge__ef__dte) AND
    (dlease__buf.ef__dte <= prnt__dates.le__of__dte) AND
    ((dsect__buf.expir__dte < > 0) OR
    ((dsect__buf.expir__dte = 0) AND
      (dlease__buf.expir__dte >= prnt__dates.ge__expir__dte) AND
      (dlease__buf.expir__dte <= prnt__dates.le__expir__dte))) AND
    (dlease__buf.dr__dte >= prnt__dates.ge__dr__dte) AND
    (dlease__buf.dr__dte <= prnt__dates.le__dr__dte)) THEN
```

Program 2.

Source file renumbering program I purposely scrunched and capitalized:

```
$LINES 66,USLINIT,GLOBAL,RANGE OFF$
$STANDARD__LEVEL 'HP3000',HEAP__DISPOSE ON$
$TITLE 'DCSTRNUM -Source Renumbering Program'$
PROGRAM DCSTRNUM(INPUT, OUTPUT, INFO); TYPE SOURCE__RECORD = PACKED ARRAY
[1..120] OF CHAR; VAR SOURCE : FILE OF SOURCE__RECORD; SOURCE__BUF :
SOURCE__RECORD; I, K, J, N : INTEGER; XI : STING[10]; INFO : STRING[28]; BLANK
: BOOLEAN;REC__LEN : -32768..32767; CONST CCG=0; CCL=1; CCE=2; PROCEDURE
FGETINFO; INTRINSIC; {********** END OF TYPE, VAR, CONST, AND EXTERNAL SECTION
****} $PAGE,TITLE 'DCSTRNUM *****: MAINLINE'$ BEGIN WRITELN; WRITELN(' *****
WELCOME TO SOURCE RENUMBERING *****'); WRITELN; OPEN(SOURCE, INFO);
FGETINFO(FNUM(SOURCE), , , , REC__LEN); {GET SOURCE FILE REC ORD LENGTH}IF
(CCODE < > CCE) THEN BEGIN WRITELN('*** FGETINFO failed'); HALT;END; IF (REC__LEN
< > -120) AND (REC__LEN < > 60) THEN{ABORT IF FILE DOES NOT HAVE OUR STANDARD
RECORD LEN}BEGIN WRITELN('**** RECORD LENGTH OF ', REC__LEN, ' for ',INFO, 'NOT
120 BYTES'); Halt; END; I := 1; WHILE (NOT Eof(source)) DO BEGIN k :=
POSITION(SOURCE); READ(SOURCE, SOURCE__BUF); BLANK := TRUE; FOR J := 113 TO
120DO BLANK:=(SOURCE__BUF[J] = ' ')AND BLANK; IF NOT BLANK THEN {ABORT IF NOT
BLANKS IN LAST 8 CHARACTERS}BEGIN WRITELN('*** Record:', K,
not blank in edit number positions'); HALT; END; XI := ''; STRWRITE(XI, 1, N,
'I:5); XI := STRRTRIM(STRLTRIM(XI)); XI := STRRPT('0', 5—STRLEN(XI)) + XI +
'000'; STRMOVE(8, XI, 1, SOURCE__BUF, 113); WRITEDIR(SOURCE, K, SOURCE__BUF); I
:= I + 1; END; CLOSE(SOURCE); END.
```

How I ran *PASFORM*:

```
RUN PASFORM.PUB.SYS;INFO=&
  'DCSTRNUM DCFTRNUM BI EB EI EP RU SLN UL COM:NC CON:UC RES:UC TYP:UF VAR:LC '
```

PASFORM's message and metrics output:

```
PASFORM — Pascal Formatter (Rev. 2.00) (c) 1987 MJH Systems

Reading : dcstrnum
Writing : dcftrnum
```

demonstrates its ease of use, reliability and good performance characteristics. For example, on our system, it will reformat a program in about 45 percent of the time it takes for the PASCAL compiler to compile it.

Developers realized no two installations would want their programs formatted or letter-cased in exactly the same manner. Therefore, they have provided a wide variety of formatting and letter-casing options: six options to specify *PASFORM*'s basic working parameters (see *Table 1*), 16 formatting options (see *Table 2*), seven token classes (see *Table 3*) each of which can have five letter-casing styles (see *Table 4*), and nine predefined letter-casing configurations (see *Table 5*).

While the first-time user may find the many choices overwhelming, the defaults are reasonable and allow the user to evolve his option selection to meet his specific needs. If a formatting or letter-casing option is included in the option list, the associated change from *PASFORM*'s default is enabled. Options are processed left to right, which is useful for altering just one token class from a predefined letter-casing set and other option-mixing. *PASFORM*'s flexible option plan makes it very versatile to meet each installation's needs and to change when needs change.

However, if you use more than a few of the available options, the option list gets long. In this case, you will need to create UDCs or some other method to specify your options. At CEMCO Integrated Oil Field Services, we've developed a programming environment master program that runs *PASFORM* to compile job streams it creates.

BESIDES MAKING PROGRAMS easier to read and understand, the product has some exceptional features we've found extremely valuable in developing and maintaining our PASCAL programs. The

Program 2 . . . CONTINUED

```
vvvvvvvvvvvvvvvvvv
>>>> WARNING 102 @ 0/0: Stripping 8 digits from the end of each line! >>>>
vvvvvvvvvvvvvvvvvv
^
>>>> WARNING 103 @ 0/0: Disabled SLN for Main file <<<<
vvvvvvvvvvvvvvvvvv

 0 Errors detected.
23 Lines read.
71 Lines written, (60 were code).
 7 Lines commented.
   File is 9.9% commented.

 0 Procedure(s) declared.
 0 Function(s) declared.
33 Statement(s) parsed.
 0 Goto statement(s) used.

The formatted and letter-cased output:

$LINES 66,USLINIT,GLOBAL,RANGE OFF$
$STANDARD_LEVEL 'HP3000',HEAP_DISPOSE ON$
$TITLE 'DCSTRNUM -Source Renumbering Program'$
PROGRAM dcstrnum(input, output, info);

TYPE
      Source_record = PACKED ARRAY [1..120] OF Char;

VAR
      source          : FILE OF Source_record;
      source_buf      : Source_record;
      i, k, j, n      : integer;
      xi              : String[10];
      info            : String[28];
      blank           : Boolean;
      rec_len         : -32768..32767;

CONST
      CCG             = 0;
      CCL             = 1;
      CCE             = 2;

PROCEDURE Fgetinfo;
      INTRINSIC;      {********** END OF TYPE, VAR, CONST, AND EXTERNAL SECTION
****} $PAGE,TITLE 'DCSTRNUM *****: MAINLINE'$

BEGIN
      Writeln;
      Writeln(' ***** WELCOME TO SOURCE RENUMBERING *****');
      Writeln;
      Open(source, info);
      Fgetinfo(Fnum(source), , , , rec_len); {GET SOURCE FILE REC ORD LENGTH}
      IF (Ccode <> CCE) THEN
          BEGIN
              Writeln('*** FGETINFO failed');
              Halt;
          END;
IF (rec_len <> -120) AND
      (rec_len <>60) THEN {ABORT IF FILE DOES NOT HAVE OUR STANDARD RECORD LEN}
      BEGIN
          Writeln('***** RECORD LENGTH OF ', rec_len, ' for ', info,
              ' NOT 120 BYTES');
          Halt;
      END;
i := 1;
WHILE (NOT Eof(source)) DO
  BEGIN
    k := Position(source);
    Read(source, source_buf);
    blank := TRUE;
```


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Program 2 . . . CONTINUED

```
    FOR j := 113 TO 120 DO
      blank := (source_buf[j] =' ') AND
               blank;
    IF (NOT blank) THEN       {ABORT IF NOT BLANKS IN LAST 8 CHARACTERS}
      BEGIN
        Writeln('*** Record:', k,
          ' not blank in edit number positions');
        Halt;
      END;
    xi := '';
    Strwrite(xi, l, n, i:5);
    xi := Strrtrim(Strltrim(xi));
    xi := Strrpt('0', 5-Strlen(xi)) + xi + '000';
    Strmove(8, xi, l, source_buf, 113);
    Writedir(source, k, source_buf);
    i := i + 1;
  END;
  Close(source);
END.
```

TABLE I

Option	Default	Range	Description
IND	2	1..130	The number spaces indention is incremented and decremented.
LEN	68	1..130	The target line length of the output file.
MAR	0	0..130	Specifies the left margin of output file.
POS	25	1..130	Position of first tab stop.
SLN	8	1..130	If input file has line numbers in the last x characters they will be removed. This option is not enabled unless specified in option list.
TAB	8	1..130	The number of spaces tabs are set from the first table stop specified POS option.

Operational Options

user has the ability to "protect" portions of his code from being disturbed by *PASFORM*. This is useful for sections of code that need to be formatted in his own special way.

Also, being able to specify a different letter-casing scheme for each token class makes programs easy to read, and each token class easy to recognize. A drawback we've found with the letter-casing is our editor (QUAD) doesn't ignore letter-casing when performing searches.

Several options are provided for formatting IF-THEN-ELSE construct in nearly every format imaginable, and the best part is they are all readable. *PASFORM* also does syntax-checking and metrics computations on the file it is transforming. The metric totals appear at the bottom of the error log and consist of the number of:

- *formatting errors*
- *input lines*
- *output lines (usually greater than input lines)*
- *lines containing comments*
- *user-defined procedures*
- *user-defined functions*
- *statements*
- *GOTO statements*

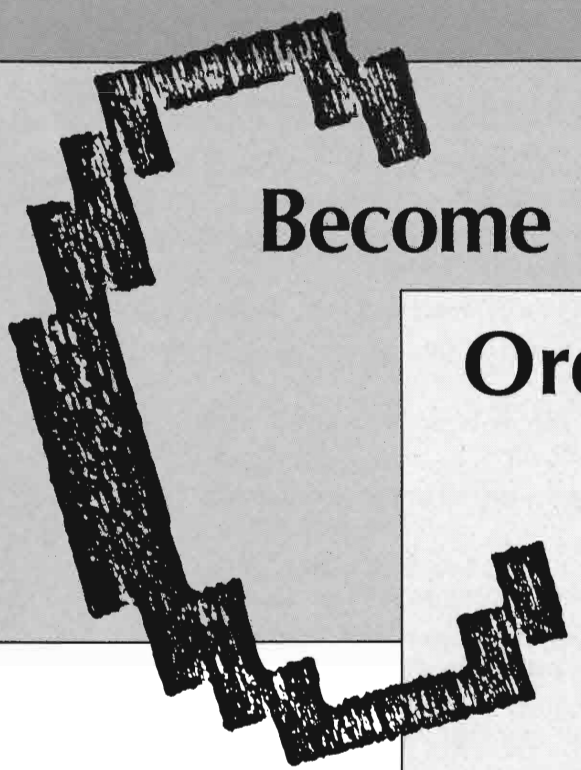
We've found the EXPAND BOOLEAN (EB) extremely useful in making complicated Boolean expressions easy to read and work with. *Program 1* shows how a complex Boolean expression is formatted with the use of the EXPANDED BOOLEAN (EB) option.

The product's weakest point for the HP 3000 is in the handling of EDITOR format numbered files. In order to format an input file, *PASFORM* must remove the line numbers [the Strip Line Numbers (SLN) option]. To maintain *PASFORM*'s basic principle of not altering code, it can not replace the line numbers.

In order to get around this problem, we wrote a PASCAL program that places EDITOR line numbers in the last eight positions of each record of *PASFORM*'s output file (see *Program 2*).

We also were disappointed that a predefined letter-casing option is not yet available to separate the token classes as much as possible, such as: Comments — no change, Constants — uppercase, Functions — upper and lowercase, Procedures — upper and lowercase, Reserve Words — uppercase, Types — uppercase first character, and Variables — lowercase (COM;NC, CON;UC, FUN;UL, PRO:UL, RES:UC, TYP:UF, and VAR:LC).

The documentation is easy to read and very useful. Sections are provided to give you a good overview of the product and other sections provide detail when looking into a specific option or operation. The manual is organized in a reasonable manner and has many examples that clearly define and illustrate design concepts.



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I've found MJH Systems to be very responsive to questions, willing to discuss possible enhancements, and making suggestions for improving our use of the product. With over 500 installations, *PASFORM* is a mature product that seems to be bulletproof.

BY USING *PASFORM*, we have reduced our program entry time by not having to worry about formatting or letter casing. Previously elusive mixmatched BEGIN-END pairs now can be easily corrected with our *PASFORM* formatted programs. We have reduced maintenance time with our easier to read and understand programs. By only reformatting source files when a listing is made, changes and additions performed since the last listing are easy to find.

Though each of our programmers program in his own style, we end up with a source we all can read. In my research for this review, I found we were spending approximately an hour per 1,000 lines of code manually formatting programs to make them readable. With *PASFORM*, this time and human error in the formatting has been eliminated.

If you're using PASCAL in your shop, *PASFORM* is an excellent companion product. For the occasional user, it makes PASCAL source code easier to read, and for the heavy user, it will save programming time and implement consistent formatting standards. It fulfills all the requirements for a good utility. It's easy to use, reliable in performing its designed task, flexible enough to meet each user's needs, well documented and well supported by the vendor.

PASFORM has good performance characteristics, and provides a cost-justifiable service. With a good product, you should perceive an increased benefit and appreciation for the product the more it is used. This is a product that meets this goal. *—Doug Knapman is systems manager at CEMCO Integrated Oil Field Services, Traverse City, MI 49685.*

TABLE 2

BC (Block Comments)—Indent Comments to current code block indention level instead of positioning comments as in original file.

BI (Begin Indent)—Indent Statement List with a BEGIN—END block instead of placing at same indention as the BEGIN—END.

BL (Blank Line Removal)—Remove unnecessary blank lines from output.

CA (Compress Arithmetic)—Compress spaces out of Assignment statements and expressions.

CB (Compress Begin)—Do not begin a new line for BEGINS in FOR, WHILE, and IF statements.

CO (Capitalize Only)—Capitalize only, no formatting or indenting of output file.

CS (Case Statement)—Place simple satements on same line as CASE option labels instead of placing on a new line with incremented indention.

EB (Expand Boolean)—Separate Boolean subexpressions by Boolean operators on separate lines and increment/decrement indention by parentheses level.

EI (Else If)—Place nested IF after ELSE on same line as ELSE.

EP (Expand Parameters)—Place each parameter declaration in function and procedure declarations on a separate line.

ES (Else Statement)—Place simple statements following ELSE on same line as ELSE instead of placing on new line in incrementing indention.

EV (Expand Variables)—Place each variable declaration on a separate line.

PI (Print Include Files)—Output and format contents of include files instead of just parsing them for declarations.

RU (Repeat Until)—Indent REPEAT and UNTIL clauses at the same level instead of placing UNTIL at same indention as statements in the REPEAT-UNTIL loop.

TL (Then Line)—Place THEN on a new line instead of placing on same line as the end of the Boolean expression.

TS (Then Statement)—Place simple statements on same line as THEN statement instead of placing on a new line and incrementing indention.

Formatting Options

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TABLE 3

Code	Description
COM	Comments-UF, UL not valid letter-casting options for comments.
CON	Constants
FUN	Functions
PRO	Procedures
RES	Reserve Words
TYP	Types
VAR	Variables

Token Classes

TABLE 4

Code	Description
LC	Lowercase
NC	No change
UC	Uppercase
UF	Upper first—first letter capitalized, all others in lowercase.
UL	Upper lower—first letter and first letters after underscore capitalized, all others lowercased.

Letter-Casing Variations

TABLE 5

Code	Default	C	F1	F2	F3	LC	NC	UC	UF	UL
COM	LC	LC	LC	LC	NC	LC	NC	UC	UF	UL
CON	UL	UC	UL	UL	UL	LC	NC	UC	UF	UL
FUN	UC	LC	UF	UC	LC	LC	NC	UC	UF	UL
PRO	UC	LC	UF	UC	LC	LC	NC	UC	UF	UL
RES	UC	LC	UC	UC	LC	LC	NC	UC	UF	UL
TYP	UC	LC	UC	UC	LC	LC	NC	UC	UF	UL
VAR	LC	LC	LC	UC	LC	LC	NC	UC	UF	UL

Predefined Letter-Casing Configurations

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PCs

Don Person

A Story Of "Third" Models

HP Says Goodbye To Its Apple II

HP is ready to say goodbye to its version of the Apple II, and perhaps set the stage for a bow out of the personal computer business altogether. While we all have witnessed HP concentrating its considerable resources on workstations and minicomputers, there is good reason to believe that it will have to abandon the personal computer segment of the market. HP has always had trouble competing effectively in what has become almost a consumer products business. Through action or inaction, HP is either moving or being forced out of personal computers.

While not exactly the goose that laid the golden egg, Series 80 computers really changed my life for the better. From what I see in Corvallis, it was a career booster for all the people concerned with the project. But now it is the end of the line for the 80s. I hate to see it happen, but it was inevitable given HP's corporate policy. Its imminent demise is oddly coincident with the company's retreat from the innovative operating systems that marked its products in this part of the market.

The history of the 80 series is symbolic of HP's greatest strength and its most visible weakness. Discontinuance has connotations of failure that Series 80 does not observe. Above all, I'm saddened to find that HP has no real replacement offering the amazing price performance ratio that the 86B represented.

Series 80 was and still is very much the engineer's Apple II given the timing of the model 85's release. Built-in language, CRT and mass storage combined to bring it all the feature that engineers, scientists and a surprising number of business people wanted at an affordable price. It was the first HP product that could honestly lay claim to the personal computer title, especially if you factor in the price. There was one big difference between HP and Apple's approach though. While the Apple Corp was busy telling the world how its box worked in as much detail as you cared to hear, HP went the closed route. The rest soon will be history.

From what I see in Corvallis, it was a career booster for all the people concerned with the project. But now it is the end of the line for the 80s.

FROM HUMBLE BEGINNINGS, the 80 line was filled in with improved computers and slotted hardware doo-dads spanning the range from option ROMs to speech synthesizers. To the chagrin of developers both hard and soft, system information remained inaccessible during what has turned out to be a rather formative time in the industry's history. HP churned out products on a sole source basis while holding the basic information needed to make accessories close to its chest. The ironic part is that HP never had anything to fear from cloners since all the key integrated circuits were made in-house! While inferior competing systems prospered, Series 80 made only modest gains almost exclusively in the company's traditional markets.

Getting information on the internal workings was impossible in the early days of the model 87. My first experience along those lines came when I unsuspectingly tried to order a service manual. After many phone calls I worked my way up the chain of command until I was met by a stern gentleman who told me that the legal department wouldn't OK it, and besides, "Did I know there was potentially lethal high voltage inside?"

I didn't quit, but getting the information I wanted took almost six months and had to be done via a "back door" route. You already know that Steve Wozniak was turned away when he offered to build the Apple II for HP, but while HP claimed in public that it wanted third-party software for the 80s, what it did in private was very different.

HP never officially released critical developer information on the operating system code for the machine, or the logical structure of its unique DOS. HP made it known early on that to get this level of information you had to:

1. Show established credentials or have software published that HP approved of.
2. Prove beyond a doubt that HP would profit by cooperating.

3. Never disclose anything you learned.
4. Beg, plead and wait.
5. Know somebody personally at HP or have worked there yourself.

In the typical developer interaction circa 1983-85, HP never gave a flat "no" to requests, but never said yes either, leaving the hardy souls who knocked on the door, waiting in the wilderness.

This still holds today should you be so foolish as to ask for choice internals documents from the guardians of the hallowed Rocky Mountain BASIC fortress.

With rare exception, HP continues to ignore some fundamental wisdom.

Software sells computers.

Actions that limit the variety and quantity of software kill hardware. The way to make a failed product is to set a standard and then hide the details from would-be developers or worse be overly selective about who learns what. The tilted playing field that CVD set up for Series 80 hamstrung outsiders while HP tried and failed to corner the core software market. This was one of the critical factors that led to the downfall of the 86 and 87 models in particular. HP's in-house attempts at word processor and database programs, while enhanced by access to inside information, were essentially created in a marketplace vacuum and not well received.

Without a third-party base privy to the same development information, the inevitable slide was on.

So you say, "But this can't happen with the rest of HP's personal products, can it?" The HP habit of releasing a product, then getting it right the third time around may be catching up with it. Compare these brief histories of other models for a look at where the rest of the line stands.

FIRST THE 80S. Released with a closed operating system, there is no developer support for internals and invisible promotion. HP tried to have all the marbles by limiting outside software that would compete in fundamental application areas while freezing the hardware add-on market by hiding every scrap of potential system information. Third parties were squeezed out at both ends of the market, and without a selection of software to fuel hardware sales, we have the sorry situation we face today. Third-party goods never materialized because HP wanted it that way.

The third model, the 86B was a good computer.

How about the 150? The closed AGIOS debacle was only the start. Another division doomed itself to repeat the mistakes the Corvallis division

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made. Result? Much the same, only the collapse came sooner. People who wanted real MS-DOS compatibility simply bought IBM and today's "touching" situation is all that's left. At least with the 80s, a solid language came built in. And what of the 150 today? Billed as an MS-DOS compatible, it's now just a pricey smart terminal.

The third model, Touch MAX was a good computer.

Then there were the 70s. Today most of the few series 70s sold are in use as glorified bar code readers. A fully open operating system was documented in full detail in the 71, but with a 450 kilohertz clock it was outrageously slow and *very* hard to work on at the assembly language level. The 71 is still stuck somewhere between the world of the 41 and all the rest of the true computers. A great product in search of a market. Watch it drop from sight soon, too.

The second model, the 71B, was not half bad. A third model might have been nice, but we'll never know.

How about the Integral? If HP could settle on a version of UNIX with true compatibility, this box could really go places. As it is now, it's the exact analog of the HP 85. It actually may be selling worse right now than the 85 for the same reasons. It's stuck with a non-standardized, incompletely documented architecture. And while it has ties to more powerful workstations and minicomputers, it is hobbled by minimal hardware. This was the model in which it was rumored that Cyril proposed adding a stereo FM receiver as an option. No joke. Don't expect to see it on the price list forever either.

The 71 is still stuck somewhere between the world of the 41 and all the rest of the true computers. A great product in search of a market.

Two more models from now, and maybe this one will come 'round right, too.

Let's not forget the Portable & Portable Plus. In their day, these were the closest HP came to having a real MS-DOS compatible. Being emasculated of disk support in true portable form, unless you count the clunky inefficient 9114, and cursed with a nonstandard screen size, it still managed to compete until fully compatible, completely equipped *fast* laptops appeared and sealed its fate. I wrote this on a Toshiba T1100+. The "almost compatible" 110 family is in grave danger of being pushed out of the market entirely as fully PC compatible, dual disk, full memory economical portables continue to batter its fragile market share. I don't expect the disk-equipped "compatible" Newport version due out late this year to improve the situation unless the price is a surprise.

HP is becoming famous for too lit-

[HP Discontinues HP-85, -86 PCs]

Effective November 1, 1987, Hewlett-Packard will discontinue the manufacture and sale of HP-85B and HP-86B personal computers.

"Since their introduction seven years ago, Series 80 computers have been the mainstay of HP's low-cost controller and technical-computer business," said Nick Fowler, marketing manager for the product line. "Eventually, though, even highly successful products become difficult to manufacture and are replaced by newer, more cost-effective technologies.

According to Fowler, HP introduced just last month a plug-in card for the Vectra PC and two IBM-compatible controllers that run HP's most advanced BASIC language and include many features common to HP's higher-priced Series 300 workstations.

Orders for the HP-85B and HP-86B computers will continue to be accepted, per HP policy, through November. The more popular Series 80 enhancements and accessories will continue to be available for one year after that date, until November 1, 1988. These include memory modules, CRT displays (12"), ROMs and popular I/O interfaces, such as HP-IB, serial (RS-232), GIPO and BCD.

The discontinued products will be placed in five-year support life by HP, so that parts and service will be fully available for a period of five years, until November 1, 1992.

Migration Path For Series 80 Customers

HP has introduced a plug-in language processor card, the Model 82300A, and two IBM PC/AT-compatible computer systems, Model PC-308 Controllers, that

tle too late, but then the Newport will be the third release in this line. Cross your fingers.

If you happen to be a fan of the mighty 200 series, I wouldn't smile too broadly either. Before Vectra, computers like the 216 were touted as the powerful cost effective 68000-based alternative. The Apple MAC took a lot of wind out of those sails. The same kind of closed system approach that's now taking its toll on the 80s is hastening the demise of the 216. When you analyze the parts cost in a 216 and a MAC PLUS with *much* more memory, there's little excuse for the pricing structure of the HP computer.

Don't smirk abut the fate of the 80s, because I predict that the 200/98xx line of dinosaurs is next in line for a swim in the tar pits. Like it or not, BASIC 5.0 is only minimally stalling the inevitable. The used market prices for 98xx computers are falling faster than the Series 80. That should tell you something.

WHAT IS LEFT as a real upgrade path for my much loved and sadly lamented 80s? A bit more history would be instructive.

After it was obvious that HP's native core software was not so hot, with the 86 already out the door, some folks at CVD decided that the way to make the product more acceptable was to add a CP/M processor so that "standard of the industry" code could be run. We are offered just the same deal today in the guise of the Viper BASIC coprocessor board. Like the CP/M board (in reality a complete 64K computer using the 86 as a smart terminal), the Viper too demands that you dedicate a Vectra to exactly the same duty. Adding insult to injury, the Viper only works with Vectra and no other AT compatible unit. But more than anything else, I must stress that the Viper BASIC coprocessor is no more an upgrade path than the CP/M module was in its time. What about cost effectiveness? You must buy a processor that costs as much as an 86 on top of the considerable cost of the Vectra. The suggested upgrade path can set you back four to five times the cost of the 86 we're told it replaces. That there is any parity here at this great an increase in cost is arguable to say the least.

I feel that it's no upgrade at all, rather an unwitting invitation to find low cost computing power through newer languages elsewhere. This is not a good prospect for loyal HP fans, but the choices have slimmed for those of us who want a personal HP computer, but haven't got a spare seven or eight thousand bucks kicking around.

What should HP do then about the 80 series? Its very simple. Drop the "dog in the manger" routine and do what should have been done back in 1983. Make system information freely available. There is no good reason why the old 1000 tapes and assorted code on disk could not be put together on a multiple disk set and distributed, even for a price. But at least it would finally be open, even if on the point of death. What harm can it do now?

They may soon be gone from the company price list, but there are several hundred thousand little tan boxes from Oregon out there and they won't go away overnight. How many friends could be won back by a final magnanimous act? The way to find out is to try, and the time is *now*. —*Don Person is an independent consultant based in Albany, NY.*

run HP's powerful instrument control BASIC as a task under the MS-DOS operating system.

Software Transportability

To aid in porting Series 80 programs to Rocky Mountain BASIC, HP has made available a Series 80 Software Porting Kit, S80PORT, through its Users Library. This kit, available for $75, provides porting document and a variety of utility programs and may be ordered by calling or writing the Series 80 Users Library, 1000 N.E. Circle Blvd., Corvallis, OR 97330; (503) 750-3885.

For users who have substantial amounts of Series 80 software to translate, a program available from Oswego Software (Oswego, IL), *TRANSLATE 80*, will be useful.

Series 80 Discontinuance Schedule:	
Discontinuance of Series 80 mainframes:	November 1, 1987
Discontinuance of Series 80 software:	November 1, 1987
Final orders accepted for Series 80:	December 1, 1987
Discontinuance of sales of accessory products (ROMs, interfaces and memory):	November 1, 1988
Expiration of HP-87 support life:	December 1, 1989
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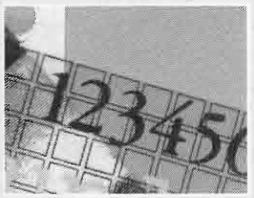

HP 3000

Data Center Management

James F. Dowling

In spite of a frequently restated goal to create a paperless Information Systems Environment, data processing continues to be list oriented. In the worst case, we have online systems recording transactions during the day, and at night we print all of the transactions, as well as most of the contents of the database just in case a transaction changed something. The closest that we seem to have gotten to paperless systems are those that put the lists on a CRT screen instead of printing them. These systems require a lot of note paper or local (terminal attached) printers to keep track of the reported data, thereby only moving the problem and requiring more computer power to boot. Until we can deliver systems that can be trusted to process all transactions properly, that can make informed decisions that direct peoples' activities, and that prevent people from making data entry mistakes, we'll continue to manage printed reports.

Printed Report Management has been a consistent problem of data processing managers since computers emerged from the lab and into business. There are three reasons why the problem persists: First, there are many variables that must be addressed to get a report generated correctly and on time. Second, most of the variables change constantly. Third, folks don't invest much money or time to bring them under control. *Figure 1* shows a list of the steps that are required to successfully deliver a printed report. The remainder of this article will deal with each step in that process.

THE CONTENTS of any report will consist of two types of data. Stored data will come from databases (I use the term in a generic sense to describe data that is stored online or offline, regardless of file type or format). Derived data is created by the report writer process from a combination of stored data, runtime parameters and programmed algorithms. A report typically will display data in row and column form in some sorted order and with a sequence of subtotals and break points. Managing all of these parameters is the responsibility of the programming group and generally presents little concern to the operations group.

Reporting databases generally will require custom programming . . .

One system design consideration that does affect the ability of the operations group to successfully deliver reports involves the source of the data. The simple approach to report design is to "point a program" at the live database and let it extract data to produce the report. This is extremely inefficient for several reasons. High (programmer) performance report writers generally are not very effective at database access, whereas efficient data extraction tools can much more effectively create the desired subset of the databases that the report writer will use. Runtime performance issues are important, but an even more important consideration is to provide rerun capabilities. Once transaction processing begins against a database, it is often impossible to rerun a report without rolling back the database. This is always troublesome and often impossible.

Strip Files and reporting databases create an opportunity for improved runtime performance as well as providing inherent rerun capabilities. Strip Files can be created from the production databases by using high performance data extraction tools or custom programs.

Reporting databases generally will require custom programming to extract and cross-load data from one database to another. In both cases, the report writer program is "pointed at" data that will remain constant until the next time it is cross-loaded or stripped from the production data. This technique allows more than one report writer program to access the same subset of data, thereby eliminating the data extraction step for the second and subsequent processes.

An additional benefit of this technique is that it can allow for simultaneous transaction processing and report generation once the extraction step is completed, thereby increasing system availability.

THE PROGRAMMING GROUPS can help to keep printer management under control. Special forms such as invoices, purchase orders and sales orders often will be designed using rather complex formats. The forms often are composed of "snap sets" causing fat edges from the set gluing. The forms often are of odd shapes. Multipart forms usually employ multiple carbon sets. Sometimes special character fonts are used to enhance the

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** END OF REPORT **

#J100; #O10356 * INVRPTS,OPERATOR.INV; IN006R01 * THU, JUL 2, 1987, 9:56 AM
#J100; #O10356 * INVRPTS,OPERATOR.INV; IN006R01 * THU, JUL 2, 1987 9:56 AM
#J100; #O10356 * INVRPTS,OPERATOR.INV; IN006R01 * THU, JUL 2, 1987, 9:56 AM

#J100; #O10356 * INVRPTS,OPERATOR.INV; IN006R01 * THU, JUL 2, 1987, 9:56 AM
#J100; #O10356 * INVRPTS,OPERATOR.INV; IN006R01 * THU, JUL 2, 1987 9:56 AM
#J100; #O10356 * INVRPTS,OPERATOR.INV; IN006R01 * THU, JUL 2, 1987, 9:56 AM

#J100; #O10356 * INVRPTS,OPERATOR.INV; IN006R01 * THU, JUL 2, 1987, 9:56 AM
#J100; #O10356 * INVRPTS,OPERATOR.INV; IN006R01 * THU, JUL 2, 1987 9:56 AM
#J100; #O10356 * INVRPTS,OPERATOR.INV; IN006R01 * THU, JUL 2, 1987, 9:56 AM

printed material on the form.

Each of these variances from stock multipart forms will add to the complexity of getting them printed correctly. The following guidelines might help to minimize problems. Always use 11-inch long forms to avoid special vertical forms control loops or downloading. Avoid exceeding five-ply forms,

Specifying report recipients is the most troublesome aspect in the life cycle of a report.

especially if snap sets are required. This will reduce the likelihood of jamming forms in the printer, increase the clarity of the copies and to help with forms stacking. Do not design forms that can be printed on only one of your printers. Do try to employ departmental printers for special forms such as purchase orders, receiving reports, sales orders and invoices.

When using special forms, it's best to employ physical forms alignment procedures in conjunction with a set of alignment copies of a report page. Computer operators generally will place a piece of tape on the printer in the platen area then mark the tape to indicate the top of the form for each different form they use. The programmer always should assume that the form is mounted at line 1. Printing three to five pages of alignment tests then would be sufficient to ensure proper registration. Special forms are expensive and generally have long lead times. Try not to waste them.

Except under special circumstances, the computer operations group should be allowed to choose the standard forms ply count to get the printer throughput. As few form types as possible should be used. I recommend using only one- and

FIGURE 1

	14 Steps to Report Production
1	Specify Report Contents
2	Select/Design Printer Forms
3	Specify Report Recipients
4	Create the Report Writer Procedure
5	Create the Report Writer Batch Job
6	Schedule the Print Job
7	Install Run Time Parameters
8	Execute the Print Job
9	Ensure That the Print Job Worked
10	Mount the Proper Forms
11	Print the Reports
12	Burst/Decollate the Forms
13	Break Down the Reports
14	Distribute the Reports

Steps 7 through 14 are repeated for the life of the report.

FIGURE 2

```
01/01/87 @ 18:04        Report Distribution List                Page : 1

Job : #J100       INVRPTS       Inventory Control Nightly Reports

Report ID: Occurrence  Forms     Recipient            Copies Delivery
========== ==========  ========  ==================== ====== ==========
IN006R01          1     S1PLY     COLLINS, MARY P.          1   PICKUP
                  1     S1PLY     HARRIS, PAUL Q.           2   PICKUP
                  1     S1PLY     YARROW, PETER R.          1   MS#123

IN006R02          1     S5PLY     YARROW, PETER R.          2   MS#123
                                  ** DO NOT DECOLLATE OR BURST **


SUMMARY:
    2   REPORTS;  4   RECIPIENTS;  2   FORMS;  6   COPIES; 13  PLYS

**END OF REPORT**
```

Sample Report Distribution List.

five-ply forms. One-ply forms would be used for all short (50 pages or less) reports regardless of copy count. Five-part forms would be used for longer reports with copy counts in excess of eight.

SPECIFYING REPORT RECIPIENTS is the most troublesome aspect in the life cycle of a report. Recipients change, they move, and the number of copies that they require will change. Because of the dynamic nature of a report's distribution list, it is critical that it be kept current. One way to do this is to print the report distribution list when the report writer job is executed. This way, the computer operator will know what to expect from the job as well as to whom the reports are to be distributed.

Several shops have implemented a Reports Distribution Database to keep track of the lists. These systems employ a Report Distribution report program that is executed at the start of every batch job to produce the distribution list for all expected outputs. This distribution database also forms the basis for more advanced management functions that will be described below.

The key requirement for any report distribution list management scheme is report identification. A report is defined as the contiguous output from an execution of a program within a job. Special cases exist where a program execution may generate more than one report in a single output file, where a report must be broken down into sections for distribution, and where multipart forms must be decollated and distributed. These exceptions to the rule must be handled through printed documentation and, if possible, the distribution should be performed in the user area.

Figure 2 shows a sample report distribution list identifying the job, program, program occurrence, forms used, number of copies and report recipients. The computer operator would use this report to verify that all reports were generated and distributed. If a report is not produced, if a job fails, or if insufficient copies are produced, the operator would deliver a "Missing Report" form to the expecting recipient and to the responsible programmer.

FIGURE 3

Missing Report

Operator: _____ Date: _____ Time: _____
(Operator's Name) mm/dd/yy hh:mm

Recipient: _____
(Last, First MI)

For job _____; _____; _____
(#JXXX) (Job Name) (Job Title)

We could not distribute the following report(s) for the reasons stated.

Report ID	Occurrence	Forms	Copies	Reason/Problem

Please contact your Information Systems Representative to determine when the report(s) will be available.

We apologize for any inconvenience that this may cause.

_____
Computer Operations

Missing Report Form.

Figure 3 shows a sample "Missing Report" form. If a job must be rescheduled, the report distribution list program can be run interactively to produce a listing from which Missing Report forms can be drawn up.

This procedure handles all cases except where the distribution list is wrong. This remains a manual effort, but in practice we find that only a small percentage of the distribution problems fall into this category.

CREATING THE REPORT WRITER and Batch Job also is a problem for the programming groups, but there are a few things that could be taken into consideration to improve the chances of long term success. The MPE File System provides a powerful feature called File Independence. This feature makes it possible to delay the specification of an output file or device until just before the file is accessed. Along with the specification of a target file for the program output (a report in our case), the printer, forms used and number of copies also can be delayed affording us the ability to alter any of these parameters without changing the program. By moving the maintenance effort to the job stream, the pro-

FIGURE 4

```
 1  !JOB INVRPTS,OPERATOR.INV
 2  !COMMENT
 3  !COMMENT  Generate the Report Distribution List
 4  !COMMENT
 5  !RUN RPTDIST.PUB.UTILITY
 6  !COMMENT
 7  !FILE IN006R01=S1PLY;DEV=LP,8,4
 8  !FILE IN006R02=S5PLY;DEV=LP,4,2
 9  !RUN IN006P
10  !COMMENT
11  !TELLOP **********************************
12  !TELLOP ** INVRPTS ** SUCCESS COMPLETION!!
13  !TELLOP **********************************
14  !EOJ
```

Sample Batch Job Stream File Using Explicit File Equations.

FIGURE 5

```
 1  !JOB INVRPTS,OPERATOR.INV
 2  !COMMENT
 3  !COMMENT  Generate the Report Distribution List
 4  !COMMENT
 5  !RUN RPTDIST.PUB.UTILITY
 6  !COMMENT
 7  !RUN RPTEQUATE.PUB.UTILITY;INFO="IN006R01\1"
 8  !RUN RPTEQUATE.PUB.UTILITY;INFO="IN006R02\1"
 9  !RUN IN006P
10  !COMMENT
11  !TELLOP **********************************
12  !TELLOP ** INVRPTS ** SUCCESS COMPLETION!!
13  !TELLOP **********************************
14  !EOJ
```

Sample Batch Job Stream File Using Derived File Equations.

gramming group need not get involved in simple report copy changes.

Figure 4 shows a sample batch job stream that generates two reports from the same program. The reports (IN006R01 and IN006R02) are generated from program IN006P, which is executed from within job INRPTS. Note the file naming conventions. "IN" specifies a family of programs, jobs and reports. "IN006P" specifies "P"rogram number 6 of the family and "IN006R01" specifies the first report from the program IN006P. Such file naming conventions improve system maintainability and provide a minimal level of self-documentation. The job statements are:

```
!RUN RPTDIST.PUB.UTILITY
```

This will execute the report distribution list print utility program.

```
!FILE IN006R01=S1PLY;DEV=LP,8,4
```

This "equates" the file known to the program as IN006R01 to a new file called "S1PLY" which will be targeted to a device with a class name of LP (system printer). Four copies will be queued to print at a priority of eight.

```
!FILE IN006R02=S5PLY;DEV=LP,4,2
```

This equates the file known to the program as IN006R02 to a new file called "S5PLY" which will be targeted to a device with a class name of LP. Two copies will be queued to print at a priority of four.

Several comments are in order: The use of "S1PLY" and "S5PLY" as "actual file designators" equated to the "formal file designators" IN006R01 and IN006R02 respectively is another naming convention. When the computer operator requests a list from the system of files that are ready to print, the formal file designator will be displayed. This allows the operator to mount forms, then send the appropriate reports to print before changing forms. MPE provides another method for this called "Forms Messages," but the technique is cumbersome and unnecessary.

The directive ";DEV=LP" instructs the file system to locate a device that has been configured with the device class name of "LP" and to direct the output to it. If no such device exists, the program will fail. If more than one device has that class name, the one that has been least recently used will be chosen.

The directive ";8,4" in the first file equation specifies an output priority of eight and four copies. In the second file equation, an output priority of four is requested for two copies. The output priority is used to establish regions within the spooler's first-in first-out queues. On most systems, a minimum priority of eight (this is configurable) is required for an output to be sent automatically to the printer. Therefore, priorities less than eight will form queues of deferred reports that will require operator intervention before printing.

We chose eight for the first report since it was to print on standard one-

ply paper which normally would be mounted on the printer. We used four for the second report to give the computer operator a chance to mount the stock five-ply paper and then manually send the report to the printer.

If the programming team and the computer operations group can get together to set up report and forms-naming conventions, establish print priorities for the various forms and select specific printers for different forms, a good deal of the work in maintaining an effective report management system will be accomplished.

An enhancement to the Report Distribution Database that was described above can automate forms selection, copies calculation and printer designation. As shown in *Figure 5*, the two file equations are replaced by the execution of a program once for each report file. This program uses the parameters provided (i.e., ;INFO="reportid / occurrence") to look up the report identifier in the database and determine the form, printer and calculated number of copies. This technique allows us to change report distributions up to the instant that the file is opened by the report writer program by requiring only a database entry change rather than a program recompilation or a job stream file change. I refer to this integration of the distribution lists and the actual program action as "Executing the Documentation." The distribution database is accurate by definition. No listings of its contents are necessary nor are they even useful to keep it accurate. That's paperless. *UNISPOOL* from Holland House and *P'EQUATE* from Volz Associates, Inc., provide this type of file level control of report copies, forms and printers.

AS WITH MOST other batch processes, it's essential that all prerequisite operations be performed on the database before reports are generated from it. Some reports are run before batch updates and others are executed after. Therefore, some form of job sequencing should be employed to avoid reruns.

A further breakdown of reports can be quite useful in a busy environment or when machine resources are being strained. Reports should be classified as Critical and Non-Critical. These classifications then can be used when creating the batch production schedule.

Schedule the critical jobs to run first before updates, followed by the non-critical prerequisites. The updates run next, followed by the critical report jobs that succeed them, and finally the non-critical report jobs. If time gets short, or you're recovering from a disaster, the non-critical group of report jobs can simply be skipped. See *Figure 6* for a more complete classification scheme.

FIGURE 6

Report Classification Codes

Code	Description
A	Audit report. This report is used to ensure the integrity of the database. The report must be created and stored as specified in the Production Run Book.
C	Control report. This report is used to ensure that some batch process(es) executed properly. The report must be generated, verified and distributed or stored as specified in the Production Run Book.
D	Detail report. This report is used for reference by some business function. The report must be generated and distributed as specified in the Production Run Book.
I	Information report. This report displays some general information from a database. This report must be generated and distributed as specified in the Production Run Book.
R	Register report. This report records a journal of transactions for auditing or problem resolution. The report must be generated and distributed as specified in the Production Run Book.
S	Status report. This report displays the status of some aspect of a system. This report must be generated and distributed as specified in the Production Run Book.
Each of the above codes shall be qualified by suffixing an urgency code from below:	
BC	Business Critical. These reports support a critical business function.
DC	Department Critical. These reports support a critical function within a department that is not critical to the business as a whole.
DS	Department Support. These reports support some non-critical function within a department.
PS	Personal Support. These reports support some individual or work group activities that are not critical to department or business function.

Suggested Report Classifications.

The urgency codes shown in *Figure 6* dictate priority of access to the machine. Business Critical reports go first, Department Critical jobs next, then, if time/resources permit, Department Support and Personal Support jobs will run.

THE BEST APPROACH to installing run-time parameters is to avoid it. The next best choice is to automate the procedure through a batch production scheduler or through your own programming techniques. Most of the batch production scheduling systems on the market have parameter substitution modules. When selecting such a package, be sure to list all of the parameter substitutions that you will require and verify that the potential systems can support your needs. In general, date calculations are supported with a good deal of flexibility whereas non-date-oriented selection parameters are not supported as well.

Pay particular attention to the date calculation leveraging point. Some systems use "Current Date" whereas you probably would prefer to use "Scheduled Date." The difference between the two comes when a job is run late or early; for example, when you run Friday's schedule on Sunday, July 5, because Friday and Saturday are holidays. Using current date (July 5) is wrong; July 3 was the scheduled date, therefore, it should be used as the basis for date-relative calculations.

If you are going to perform your own parameter substitution, establish a set of parameter names and definitions and use only those in your job streams. This will reduce operator errors greatly and it will prepare you for conversion to an automated system in the future. See *Figure 7* for a table of date substitution names.

By using a commonly defined set of substitution strings, the computer operators can look up or calculate all of the required dates and perform the substitutions much more easily than if each had to be calculated over and over again. When some automated date substitution scheme is installed, you then need only define the calculation process or install the appropriate calculated dates into the system's substitution table.

Another suggestion is to code into your systems a set of default date substitutions such as current date, yesterday, etc., and support these with a library of date calculation routines. See *Figure 8* for some examples. The table shows the primitives only. Many more functions could be written, but almost all possibilities can be derived from these routines. Note that one could convert a program/job stream combination that employed substitutions as shown above into one that accepts the substitu-

FIGURE 7

Date Parameter Substitution Tokens

Token	Description	
mm/dd/yy	Current date in month/year/day format	(12/15/87)
mm/>>/yy	Last day of current month	
mm/<*/yy	First day of current fiscal month	
mm/*>/yy	Last day of current fiscal month	
mmddyy	Current date in month day year format	(121587)
mm>>yy	Last day of current month in mmddyy	
mm<*yy	First day of the current fiscal month	
mm*>yy	Last day of the current fiscal month	
yymmdd	Current date in year month day format	(871215)
yymm>>	Last day of current month	
yymm<*	First day of the current fiscal month	
yymm*>	Last day of the current fiscal month	
yyddd	Current date in yyddd format	(87350)
yy>>>	Last day of the current month	
yy<**	First day of the current fiscal month	
yy**>	Last day of the current fiscal month	
mnth	Current month name	(DEC for December)
mnth#	Current month number	(12 for December)
nmnth	Next month name	(JAN for December)
nmnth#	Next month number	(01 for December)
pmnth	Previous calendar month name	(DEC for January)
pmnth#	Previous calendar month number	(12 for January)
fmnth	Current fiscal month name	(DEC for December)
fmnth#	Current fiscal month #	(06 for December)
nfmnth	Next fiscal month name	(JAN for December)
nfmnth#	Next fiscal month number	(07 for December)
pfmnth	Previous fiscal month name	(DEC for January)
pfmnth#	Previous fiscal month number	(06 for January)

FIGURE 8

Date Calculation Library Routines

```
  1  JUL2YMD(YD,YMD)              Julian to yymmdd conversion
  2  JUL2MDY(YD,MDY)              Julian to mmddyy conversion
  3  JUL2DMY(YD,DMY)              Julian to ddmmyy conversion
  4  ADDSLASH(S1,S2)              Add delimiting slashes
  5  DELSLASH(S2,S1)              Delete delimiting slashes
  6  YMD2JUL(YMD,YD)              yymmdd to julian conversion
  7  MDY2JUL(MDY,YD)              mmddyy to julian conversion
  8  DMY2JUL(DMY,YD)              ddmmyy to julian conversion
  9  JUL2NUM(YD,NUM)              Julian to day # conversion (see below)
 10  JUL2DAY(YD,DAY,D?)           Julian to day name & number
 11  JUL2MON(YD,MON,M?)           julian to month name & number
 12  NUM2JUL(NUM,YD)              day # to julian
 13  JUL2JUL(YD,YD1,Y#,M#,D#)     julian date difference
 14  ADD2JUL(YD,OFF,YD1)          julian date offset
 15  ADD2YMD(YMD,OFF,YMD1)        yymmdd date offset
 16  ADD2MDY(MDY,OFF,MDY1)        mmddyy date offset
 17  ADD2DMY(DMY,OFF,DMY1)        ddmmyy date offset

All parms are PIC X(8) and blanks means current date or zero offset.

YD          Julian format e.g. JAN 1,1987 would be 87001.

YMD         Year, Month, Day format e.g.  DEC 1, 1987 = 871201

MDY         Month, Day, Year format e.g.  DEC 1, 1987 = 120187.

DMY         Day, Month, Year format e.g.  DEC 1, 1987 = 011287.

S1 & S2     Are any of the 'YYMMDD', 'MMDDYY' or 'DDMMYY' formats.

NUM         'NUM' represents a day number based from an imaginary
            first day of the calendar. This day number is imaginary
            because of the number of calendar adjustments that have
            been made. 'NUM' is useful because it facilitates simple
            arithmetic date difference and offset calculations.

DAY         Day name abbr. SUN, MON, TUE, WED, THU, FRI & SAT.
MON         Month name Abbr. JAN, FEB, MAR, APR, MAY, JUN, JUL,
            AUG, SEP, OCT, NOV & DEC.

D?          Number of the day of the week 1..7 = SUN..SAT.
M?          Number of the month 1..12 = JAN..DEC.

Y#          Number of years between two dates.
M#          Number of Months between two dates.
D#          Number of days between two dates.

OFF         Offset for calculation. +100 or 100 indicates
            add 100 and -100 means subtract 100. e.g. In YMD
            format; 0/+1/-10 means: Add 0 years; Add 1 month and
            subtract 10 days.
```

tion string, then invokes a date function interface that will determine the appropriate functions that will convert "mnth" say into "DEC".

Another important feature of parameter-driven report generators is that the parameters are displayed within the report. It can be quite confusing to a report recipient who can't figure out what selection criteria was used to create the report. This confusion often will result in the generation of another copy of the report "just to be sure."

It suffices to say that many avoidable report execution errors involve the substitution of improper date and other runtime parameters. Take special care to minimize the use of parameter substitutions, and where the practice can not be avoided, take care to prevent errors.

EITHER AN AUTOMATED batch scheduler or a manual system will get the job launched, but it's often left up to the computer operator to determine whether or not the job worked. In my experience, there is only one sure fire way to determine whether a job failed: Read the listing from top to bottom and know every possible error message that every program could emit and know when each message is telling the truth.

I've seen programs that emit "MASTER FILE FULL" once, then continue to run losing data each month. I've seen others that have run for years emitting "ERROR ** ORDER NOT FOUND" with the programming group saying "that's OK from that program at month end."

The phrase "Remainder of Job Flushed" at the end of the job listing is the only clear message that an operator should look for. I suggest that computer operators use this simple rule: If it made it to EOJ it worked. Programmers have any number of techniques available to them to ensure that a job will not reach EOJ unless everything went as planned. These techniques should be included in any set of coding standards.

A relatively new product on the market provides an automated process for examining job listings to detect errors. *JOBRESQUE* from NSD will scan all job listings as they become available looking for any message that you define to be an indicator of a program failure. By using such a tool, more subtle error messages that particular programs might emit can be set up as triggers to notify the computer operator of a program failure.

IF THE PROCEDURES described above are employed, all reports that print on standard one-ply paper will print on their own as they become ready. All reports that require special attention should be "deferred" (use output priority less than seven), so the computer operator can handle them manually. The MPE "SHOWOUT" command will display all reports that are waiting to print. The procedures detailed above suggest that form names be standardized so that the SHOWOUT display will let the computer operator know which forms are required for each report.

There are several print file management systems available to assist the computer operator with report management. The products range in complexity from simple printer managers that route like forms to printers as directed by the computer operator, to very complex systems that will manage printers through multiple HP 3000 system networks. *S'MANAGER* from Volz Associates, Inc., provides automated printer management for local system printers. *SPOOLER ASSISTANT* from Data Fax Computer Services, Inc., provides a set of online assists for local and remote printers. *OMNISPOOLER* from Carolian Systems International, Inc., *UNISPOOL* from Holland House and *ESPUL* from RAC Consulting provide automated control of local, remote and networked printers.

The best approach to installing run-time parameters is to avoid it. The next best choice is to automate the procedure through a batch production scheduler . . .

BURSTING AND DECOLLATING reports are manual tasks that can be assisted with mechanical devices. High-speed bursters will split reports at the perforations producing sheets from continuous feed paper. These machines can be configured with optional slitters to cut the perforated edges from the continuous forms and to slit the forms lengthwise in the center if desired.

Mechanical decollators can be as simple as a gravity-fed tabletop device that will decollate a multipart form into two sections on each pass (two-part paper will require two passes) or as powerful as a motorized multistation device that can decollate five-part paper in one pass.

The cost and floor space require-

ments of motorized decollators and bursters dictate that only very high volume requirements could justify such an investment. You'd probably be better off buying another printer for medium work loads or a laser printer if the work load is more severe.

The manual task of breaking down the reports sometimes can comprise the majority of a computer operator's work schedule. Given a two-foot tall stack of paper, the computer operator must sort through it and isolate the reports, identify each, locate its distribution list and prepare the reports for delivery to the proper recipient.

In *Figure 2*, the Report Distribution list displays the identification number of the job that produced the report. Each report that is printed will carry a banner header and trailer as shown on page 69. The computer operator can separate the reports easily by Job Number. The next step is to identify the reports. The ban-

FIGURE 9

```
Company Name.............   Report Name.................          PAGE : Page#
REPORT ID : ReportID                                             RUN : RunDate
INDEX : Index Info.....                                        AS OF : AODate
SELECTED FOR : Selection Criteria.....................................................
SORTED BY : Sort/Breakpoint Criteria..................................................
================================================================================
Column Headers
   :      :
================================================================================


                              ===  Report Body  ===


** Breakpoint Notification **
** End of Report Notification **

Notes:
   1) Company Name begins in column 2 for 16 characters.
   2) Report Name is centered on the page and is 30 characters long.
   3) The actual Page Number is in column 73 for 4 characters.
   4) The Report ID is in column 14 for 8 characters.
   5) The Run Date in is column 73 for 8 characters.
   6) Index Information begins in column 10 for 16 characters.
   7) As Of Date is in column 73 for 8 characters.
   8) Selection Criteria begins is in column 17 to the end of line.
   9) Sort/Breakpoint info begins in column 14 to the end of line.
  10) The As Of Date may be substituted with a From date on line 3 and
      a To date on line 4 aligned in column 73 for 8 characters.
  11) Multi-line column headings are allowed.
  12) Each breakpoint occurrence should be noted on the report.
  13) End of report notification should be printed on the report.
  14) Narrow reports should not exceed 79 columns.
  15) Total report length should not exceed 55 lines.
```

Report Header Format.

Carolian Systems International
3397 American Drive, Suite 5
Mississauga, Ontario L4V 1T8
(416) 673-0400
Enter 608 on Reader Card

Data Fax Computing Services
P.O. Box 703
Kankakee, IL 60901
(815) 939-4576
Enter 609 on Reader Card

Holland House
P.O. Box 1749
Beeville, TX 78102
(512) 287-3417
Enter 610 on Reader Card

NSD, Inc.
1670 S. Amphlett Blvd, Suite 103
San Mateo, CA 94402
(415) 573-5923
Enter 611 on Reader Card

RAC Consulting
P.O. Box 10099
Olympia, WA 98502
Enter 612 on Reader Card

Volz Associates
34 Undine Ave.
Winthrop, MA 02152
(617) 846-3837
Enter 613 on Reader Card

ner pages carry the report name also; in this case, Job #J100 and report IN006R01. The operator now locates the proper entry on the distribution list and assigns the copy to a recipient.

Since it's possible to have reports become separated from their banner pages, it's important that the report pages carry the report identifier. *Figure 9* describes a report header layout that would provide for quick identification of a report from any printed page. This layout is provided as a guide for your designs. Please note several features: Variable data in the header always will be located in fixed positions.

Selection and Sort criteria are specified, as are breakpoint levels (the (P) indicates a Page Break at that level). Breakpoints and Report Terminations are noted on the report to help the operator and recipient make sure that no sections are lost or distributed to the wrong person. Use 79 print positions on narrow reports, so they can be displayed easily on CRT screens. Note that both the "Run Date" and the "As Of Date," or "Run Date" along with "From" and "To" dates are displayed on the reports to help distinguish between versions of the same report. The page number and date information would be moved to the right margin for a wide carriage report.

When subsections of a report are to be distributed individually, this header layout becomes even more important. The field marked "INDEX" is provided to contain information useful in identifying a particular section of the report. Note that page one of the sample report is indexed "AA" and pages two and three are indexed "AB." If this report were to be broken down further to give AA to one buyer and AB to another, the required information would be available and easily located.

Reports that are created using this standard header layout can be processed by two very powerful yet simple user-written procedures. The first procedure is an indexer. This program reads through a report file and creates an index of "INDEX" information, report page number and file record number. This program can create an index page for large reports, making them much easier to work with. The second program called the burster would read the index file in conjunction with a distribution table to create packages of specific pages in user-specified order from the large report. This technique can help to reduce report copies, eliminate wasted paper and, most of all, it can improve the productivity of the report users.

Another application of the standard report header format is to generate microfiche. If the report program output is directed to a magnetic tape drive instead of a printer, the tape can be sent to a service bureau for microfiche generation.

Since all reports would be in the same format and the indexing information already has been extracted from the data, the microfiche generation program will be identical for all fiche jobs. This eliminates job setup charges and reduces production costs. In fact, the fiche generation program can be set up to cause a fiche break and to reset the fiche number each time the "REPORT ID" data changes, thereby allowing more than one report to be written to the same tape, again reducing processing costs.

Report management begins when the report is being designed and continues through the programming and job scheduling procedures.

As the man with the slicer and dicer says, that's not all you can get from a simple report header standard. Very large reports sometimes can cause system distress by consuming a lot of disk space. In some cases, program failures will occur due to lack of sufficient disk space to hold the report. With a standard header format, the report can be routed to a magnetic tape, then copies can be sent to the printer later. A Tape-to-Spooler copy program can be written to copy the report to the spooler in small pieces and as disk space becomes available.

THE IDEAL SITUATION for the data center manager would be to have each person's reports print at a printer within his

work group and to have the breakdown and distribution handled by the users. Software tools are available to pull this off if the money is available for the software and hardware required.

The second choice is to have the recipients pick up their reports at the data center. This will speed up the handling and delivery cycle as well as provide some level of security. This method also can be a valuable portion of an overall report management program as will be described in a future installment.

A last choice is mailing or shipping reports to the recipients. The transportation delays cause problems for everyone concerned. If a report is wrong or indicates a problem with a database, the delay will increase the difficulty of correcting the problem. If a report is missing, the recipient has little or no time to compensate for the lack of data. Finally, the more people that handle something, the more likely it is to get lost.

Report management begins when the report is being designed and continues through the programming and job scheduling procedures. Continuous work is required to maintain distribution lists, print, burst, decollate and distribute the paper. Because of the constant attention and manual effort required to support them, and the machine resources necessary to produce them, reports are probably the most expensive product of the Information Systems department. This installment addressed the mechanics of report management. A future installment will deal with the issues of user satisfaction and cost minimization aspects of report management.

As always, please feel free to share your thoughts on these or other issues in data center management. The next installment will deal with batch job scheduling. *—James F. Dowling is manager of computer services for Bose Corporation, Framingham, MA, and technical director of Volz Associates, Inc., Winthrop, MA.*

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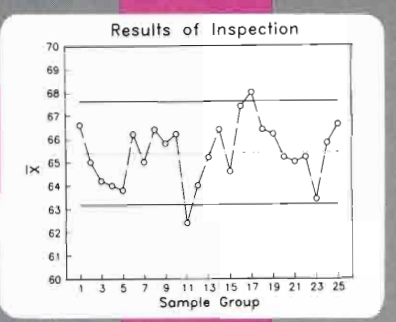

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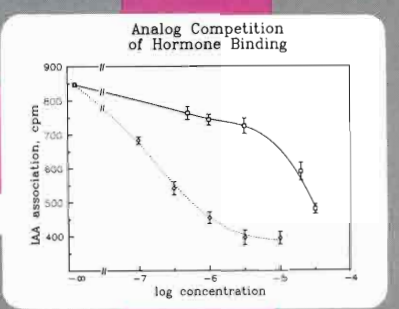

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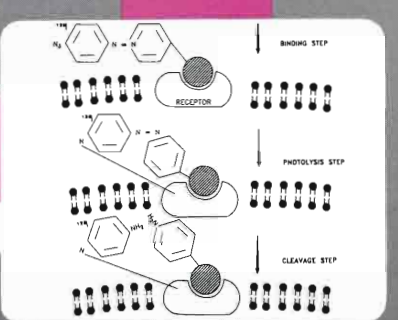

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PROGRAMMING

Milton Beychok

Is Your Printer Turned On?

Since acquiring my HP 87 computer, I've probably sent text to my printer a zillion times . . . only to find that my printer had not been turned on. What happens then is that the text disappears into thin air! To say the least, that's very frustrating, especially if the text has not been copied to a disk. The reason for such mishaps is that the Series 80 operating system transmits printer text without first checking to see if the printer is turned on.

After losing my text the umpteenth time, I decided that enough was enough and developed a binary program that checks the status of my printer. The binary program (see *Program 1*) is named CHKPRTR. It creates a new BASIC language function "PRINTER ON?" which does these things:

■ *It checks the validity of the currently specified printer address.* If the address is not valid, the binary generates Error 246: BAD PRINTER ADDRESS or NOT HP-IB DEVICE.

HP-IB interface printer addresses have three or four digits. The last two are the device address, with a valid range from 0 to 31. The first one or two digits are the interface select code with a valid range from 3 to 10. Thus, printer addresses like 205 or 1100 are invalid, because select codes 2 and 11 are not valid, and printer addresses like 632 and 740 are invalid because device addresses 32 and 40 are invalid.

The binary also generates Error 246 if a valid address such as 903 is specified when there is no installed interface with a select code of 9, or if there is an installed non-HP-IB interface with a select code of 9.

■ *It checks to see if the printer is turned on.* If it is, the binary returns a value of 1. If the printer is not on (or the online switch is not on), the binary returns a value of 0.

If a valid address such as 710 is specified, but the printer is actually at 701, the binary checks to see if there is a printer on at 710. Finding none, the binary returns a value of 0.

Thus, the CHKPRTR binary makes it possible to use statements such as this in your BASIC programs:

```
IF PRINTER ON? = 0 THEN ....
```

which lets you program a corrective warning or action if the printer is not on and ready to receive text.

THE SERIES 80 OPERATING SYSTEM stores the currently specified PRINTER IS address in RAM byte 100222 named PS.C. and logs the select codes of the installed interfaces at RAM byte 101140 named IOBITS. The binary checks the validity of printer addresses by examining and comparing the PS.C. and IOBITS bytes.

The HP-IB interface has a dedicated microprocessor which includes seven 8-bit status registers. One of the status registers (SR2) monitors the status of the HP-IB control lines. Normally, only bit 6 of SR2 is on, which means that the REN line is the only control line in the "high" state. Thus, the SR2 status byte normally has a value of 64. If a print instruction is sent to the printer and the printer is not on, the SR2 status byte is 64. However, if a print instruction is sent to the printer and it's on, the SR2 status byte is 66 (indicating that the REN and NDAC control lines are both high).

After losing my text the umpteenth time, I decided that enough was enough and developed a binary program that checks the status of my printer.

The "PRINTER ON?" function finds out if the printer is on by sending a printer instruction and then reading the SR2 status byte. If the byte is 64, the printer is not on and the binary function returns a value of 0. If the byte is not 64, the printer is on and the function returns a value of 1. The instruction sent to the printer calls for printing a null character without a carriage return or line feed. Thus, if the printer is on, nothing happens other than the NDAC line going high and the SR2 status byte value becoming 66.

The CHKPRTR binary was written for the HP 86 or HP 85. Also, since the binary determines if the printer is on by checking the status of the HP-IB control lines, it will work only for printers on an HP-IB interface.

I don't have an HP 83, HP 85 or any interface other than the HP-IB, so I can't develop similar binaries for those ap-

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plications. Perhaps this article will motivate someone out there to do so.

The complete source code for the binary is shown in *Program 1*. Here is a brief explanation of the code:

Lines 1000-1075

This section of the code is the so-called "shell" of the binary program. Note that the labels for the RUNTIME and PARSE tables overlap the previous tables, because the usual dummy bytes at the head of those tables have been deleted. It may not look right, but it works and it saves a few bytes of code.

Lines 1080-1250

This is the main runtime routine for the "PRINTER ON?" function. It uses the I/O processor in the HP-IB interface. To understand this section of the source code, you first must become very well versed with HP's *Assembly Language I/O Reference Manual* (HP's part number 00085-90818). However, here's a brief explanation:

Line 1085 specifies the function's attributes, designating it as a numerical function with no arguments or parameters.

The I/O processor (IOP) creates two 1-byte windows in RAM, through which the CPU communicates with the IOP. One of the bytes is used for protocol and handshake communications, and the other is used for data or text transfers between the CPU and the IOP. In HP's *Assembly Language I/O Reference Manual*, the two bytes are called the CCR/PSR and the OB/IB bytes. In my code, they are more simply called the IOR and IOB bytes (the I/O Register and the I/O Buffer).

The RAM addresses of the IOR and IOB windows vary with the select code for the interface. Thus, line 1095 first sends the main program to the CHKADDR subroutine which, among other things, finds the IOR and IOB byte addresses as well as the printer's address.

Upon returning from CHKADDR: the IOR byte address is in the CPU's registers 24-25, the IOB byte address is in registers 26-27, and the printer's Listen Address is in a RAM location named PLAD. (More about the CHKADDR subroutine later).

Lines 1100-1165 communicate these instructions via the IOP:

- *Unlistens all devices on the HP-IB interface by sending a UNL command.*
- *Designates the CPU to be the only talker on the interface by sending the CPU's MTA (My Talk Address).*
- *Designates the printer as the only listener on the interface by sending the printer's LAD (Listen Address).*
- *Sends a null character to the printer by sending CHR$(0).*

Lines 1170 and 1175 provide a time delay of 167 milliseconds for the null character to reach the printer and, if the printer is on, for the NDAC line to be set high which, in turn, will set the HP-IB

Program 1.

```
1000           NAM 210,CHKPRTR          ! BINARY IS NAMED: CHKPRTR
1005           DEF RUNTIME
1010           DEF KEYWORDS
1015           DEF PARSE
1020           DEF ERMSG
1025 RUNTIME   DEF INIT
1030           DEF CHECKP.
1035 PARSE     DEF CHKP.
1040           BYT 377,377
1045 KEYWORDS  ASP "PRINTER ON?"        ! KEYWORD # 1
1050           ASP "CHKPRTR"            ! KEYWORD # 2 (RETURNS BINARY IDENTIFIER)
1055           BYT 377                  ! END OF KEYWORD TABLE
1060 ERMSG     BYT 200,200,200,200,200,200,200,200,200 !      UNUSED ERROR MSGS
1065           ASP "BAD PRINTER ADDRESS or NOT HPIB DEVICE" ! ERRN 246D
1070           BYT 377                  !                     END OF ERMSG TABLE
1075 INIT      RTN
1080 ! ************  RUNTIME FOR "PRINTER ON?"  ******************************
1085           BYT 0,55                 ! NUMERICAL FUNCTION WITH NO PARAMETERS
1090 CHECKP.   LDMD R14,=BINTAB         ! LOAD BINARY'S BASE ADDRESS
1095           JSB X14,CHKADDR          ! TRAP ERRS & GET IOR ADDR,IOB ADDR,"LAD"
1100           LDB R34,=260             ! PUT "SEND A CMD" IN R34
1105           JSB X14,DIRCMD           ! TELL IOP TO "SEND A CMD"
1110           LDB R35,=77              ! PUT "UNL" CMD BYTE (UNLISTEN) IN R35
1115           JSB X14,SENDBYT          ! SEND "UNL" CMD BYTE
1120           LDB R34,=105             ! PUT "SEND MTA" (MY TALK ADDR) IN R34
1125           JSB X14,DIRCMD           ! TELL IOP TO "SEND MTA"
1130           LDB R34,=260             ! PUT "SEND A CMD" IN R34
1135           JSB X14,DIRCMD           ! TELL IOP TO "SEND A CMD"
1140           LDBD R35,X14,PLAD        ! PUT "LAD" CMD BYTE (PRTR LISTEN) IN R35
1145           JSB X14,SENDBYT          ! SEND "LAD" CMD BYTE
1150           LDB R34,=240             ! PUT "SEND DATA" IN R34
1155           JSB X14,DIRCMD           ! TELL IOP TO "SEND DATA"
1160           LDB R35,=0               ! PUT CHR$(0) DATA BYTE IN R35
1165           JSB X14,SENDBYT          ! SEND CHR$(0) DATA BYTE
1170           LDB R30,=10D
1175           JSB =CNTRTR              ! WAIT 167 MILLISECONDS
1180           LDB R34,=2               ! PUT "READ STATUS OF SR2" IN R34
1185           JSB X14,INTHS            ! TELL IOP TO "READ STATUS OF SR2"
1190           JSB X14,IBF?             ! WAIT FOR IB TO BE FULL
1195           LDBD R57,R26             ! GET SR2 STATUS BYTE IN R57
1200           LDB R37,=4               ! SET CED IN SCRATCHPAD
1205           STBD R37,R24             ! SET CED IN IOR
1210           JSB X14,OBF&B?           ! WAIT FOR IOB TO BE EMPTY AND NOT BUSY
1215           JSB X14,INTCHK           ! TERMINATE THE INTERRUPT TYPE HANDSHAKE
1220           CMB R57,=64D             ! COMPARE SR2 STATUS BYTE TO 64 DECIMAL
1225           JZR NOT-ON               ! JIF SR2 STATUS BYTE=64
1230           LDM R44,=377,1,0,0       ! ELSE LOAD ANSWER = 1 (PRINTER ON)
1235 PUSHANS   PUMD R40,+R12            ! PUSH ANSWER ONTO R12 STACK
1240           RTN                      ! DONE
1245 NOT-ON    LDB R44,=377,0,0,0       ! LOAD ANSWER = 0 (PRINTER NOT ON)
1250           JMP PUSHANS
```

register SR2 at a value of 66.

Lines 1180-1220 tell the IOP to read the SR2 status byte and to send it to the CPU via the IOB byte. The status byte is then read from the IOB byte, stored in CPU register 57, and compared to the decimal number 64.

In lines 1225-1250, the function is programmed to return a value of 0 if the status byte is equal to 64. If it is not equal to 64, the function is programmed to return a value of 1.

Lines 1255-1520

These lines include various subroutines for protocol and handshaking between the CPU and the IOP. These are best understood by studying the *Assembly Language I/O Reference Manual.*

Lines 1645-1885

This is the CHKADDR (check address) subroutine which does these functions:

Line 1655 gets the last specified PRINTER IS address from the RAM byte called PS.C.

Lines 1660-1685 extract the device address from the last specified PRINTER IS address and store it in CPU register 46.

Lines 1690-1705 check the validity of the device address. If it is larger than 31, it is invalid and the binary returns control to the CPU's operating system after generating the custom error message 246: BAD PRINTER ADDRESS or NOT HP-IB DEVICE.

If the device's address is valid (less than 32), it is stored in RAM at a location labelled PLAD after being converted to a printer Listen Address (the octal value of the device address plus 40 octal).

Lines 1710-1740 extract the interface select code from the PRINTER IS address and store it in CPU register 46. If it is less than 3, it is invalid and control is returned to the CPU's operating system after the binary generates error message 246. Otherwise, the binary proceeds.

Lines 1745-1780 compare the extracted select code against the log of installed interface select codes obtained from RAM byte IOBITS. If the extracted select code is not logged in IOBITS, it

Program 1 . . . CONTINUED

```
1255 ! ******  SUBROUTINE FOR TELLING IOP PROTOCOL BY INTERRUPT METHOD  *******
1260 INTHS    LDB R37,=1              ! SET INT BIT IN SCRATCHPAD
1265          STBD R37,=GINTDS        ! DISABLE ALL INTERRUPTS
1270          STBD R37,R24            ! SET INT BIT IN IOR
1275 INTHS1   LDBD R37,R24            ! READ IOR
1280          ANM R37,=10             ! MASK OFF PACK BIT
1285          JZR INTHS1              ! WAIT FOR IOP TO SET PACK BIT
1290          STBD R37,=GINTEN        ! RE-ENABLE ALL OTHER INTERRUPTS
1295          STBD R34,R26            ! SEND INSTRUCTION TO IOP VIA OB (R26)
1300          LDBD R37,R26            ! EMPTY THE IB
1305          LDB R37,=2              ! SET CMD BIT & CLR INT BIT IN SCRATCHPAD
1310          STBD R37,R24            ! SET CMD BIT & CLR INT BIT IN IOR
1315          JSB X14,OBF?            ! WAIT FOR OB TO BE EMPTY
1320          CLB R37                 ! CLEAR CMD BIT IN SCRATCHPAD
1325          STBD R37,R24            ! CLEAR CMD BIT IN IOR
1330          RTN                     ! SUBROUTINE DONE
1335 ! *********  SUBROUTINE FOR TERMINATING INTERRUPT HANDSHAKE ************
1340 INTCHK   LDBD R37,R24            ! READ IOR
1345          ANM R37,=10             ! MASK OFF PACK BIT
1350          JNZ INTCHK1             ! JIF PACK=1 TO TERMINATE INTHS
1355 INTRTN   RTN                     ! ELSE IT'S DONE ALREADY AND WE ARE DONE
1360 INTCHK1  LDB R37,=1              ! STROBE THE INT BIT IN SCRATCHPAD
1365          STBD R37,R24            ! STROBE THE INT BIT IN IOR
1370          JSB X14,INTRTN          ! WASTE SOME TIME
1375          CLB R37                 ! CLEAR INT BIT IN SCRATCHPAD
1380          STBD R37,R24            ! CLEAR INT BIT IN IOR
1385 INTCHK2  LDBD R37,R24            ! READ IOR
1390          ANM R37,=10             ! MASK OFF PACK BIT
1395          JNZ INTCHK2             ! WAIT FOR PACK=0
1400          RTN                     ! SUBROUTINE DONE
1405 ! *******  SUBROUTINE FOR TELLING IOP PROTOCOL BY DIRECT METHOD  ********
1410 DIRCMD   JSB X14,OBF&B?          ! WAIT FOR OB TO BE EMPTY AND NOT BUSY
1415          LDB R37,=2              ! SET CMD BIT TO 1 IN SCRATCHPAD
1420          STBD R37,R24            ! SET CMD BIT IN IOR
1425          STBD R34,R26            ! SEND PROTOCOL CMD BYTE TO OB FROM R34
1430          JSB X14,OBF?            ! WAIT UNTIL OB IS EMPTY
1435          CLB R37                 ! CLEAR CMD BIT IN SCRATCHPAD
1440          STBD R37,R24            ! CLEAR CMD BIT IN IOR
1445          RTN                     ! SUBROUTINE DONE
1450 ! ***********  HANDSHAKE SUBROUTINES  **********************************
1455 OBF&B?   LDBD R37,R24            ! READ IOR BYTE INTO SCRATCHPAD BYTE
1460          ANM R37,=202            ! CHECK OBF AND BUSY BITS
1465          JNZ OBF&B?              ! JIF THEY ARE NOT BOTH ZERO
1470          RTN                     ! RTN IF OB EMPTY AND NOT BUSY
1475 OBF?     LDBD R37,R24            ! READ IOR BYTE INTO SCRATCHPAD BYTE
1480          JNG OBF?                ! JIF OBF BIT=1 (OB FULL)
1485          RTN                     ! RTN IF OB EMPTY
1490 IBF?     LDBD R37,R24            ! READ IOR BYTE INTO SCRATCHPAD BYTE
1495          JEV IBF?                ! JIF IBF BIT=0 (IB EMPTY)
1500          RTN                     ! RTN IF IB FULL
1505 ! ***********  SUBROUTINE FOR SENDING A BYTE FROM R35  ******************
1510 SENDBYT  STBD R35,R26
1515          JSB X14,OBF&B?
1520          RTN
1525 ! ***********  SUBROUTINE FOR "CHKPRTR" (IDENTIFIER KEYWORD  ************
1530          BYT 0,56                ! STRING FUNCTION W/NO PARAMETERS
1535 CHKP.    BIN
1540          LDM R43,=14D,0          ! LENGTH OF STRING TO RETURN
1545          DEF MSG                 ! ADDRESS OF STRING TO RETURN
1550          BYT 0                   ! MAKE IT A 3-BYTE ADDRESS
1555          ADMD R45,=BINTAB        ! MAKE IT AN ABSOLUTE ADDRESS
1560          PUMD R43,+R12           ! PUSH LENGTH & ADDR ONTO R12 STACK
1565          RTN                     ! DONE
1570          ASC "2BM012 RTRPKHC"    ! THE STRING TO BE RETURNED
```

Program 1 . . . CONTINUED

```
1575 MSG      BSZ 0                  ! PLACE HOLDER FOR STRING
1580 ! *********  SYSTEM ROUTINES AND RESERVED RAM LOCATIONS  **********
1585 PLAD     BSZ 1
1590 REM10    DAD 52533
1595 ONEB     DAD 12153
1600 INTDIV   DAD 54601
1605 BINTAB   DAD 104070
1610 CNTRTR   DAD 13245
1615 ERRBP#   DAD 103371
1620 ERROR+   DAD 10220
1625 GINTDS   DAD 177401
1630 GINTEN   DAD 177400
1635 PS.C.    DAD 100222
1640 IOBITS   DAD 101140
1645 ! **********  SUBROUTINE FOR CHECKING "PRINTER IS" ADDRESS  **********
1650 CHKADDR  BIN
1655          LDMD R70,=PS.C.        ! GET CURRENT "PRINTER IS" ADDRESS
1660          PUMD R70,+R12          ! PUSH IT ONTO R12 STACK
1665          PUMD R70,+R12          ! AND AGAIN. R12 STK NOW: PS.C., PS.C.
1670          LDM R74,=255D,0,1,0    ! GET 100 DECIMAL
1675          PUMD R70,+R12          ! R12 STK NOW: PS.C., PS.C., 100D
1680          JSB =REM10             ! FIND REMAINDER (THE PRINTER DEVICE ADDR)
1685          JSB =ONEB              ! GET DEVICE ADDR IN R46-47
1690          CMB R46,=32D           ! COMPARE IT TO 32 D
1695          JCY ADDRERR            ! JIF >= 32D
1700          ADB R46,=40            ! ELSE CONVERT IT TO LISTEN ADDRESS
1705          STBD R46,X14,PLAD      ! SAVE IT IN RAM
1710          LDM R74,=255D,0,1,0    ! GET 100 DECIMAL AGAIN
1715          PUMD R70,+R12          ! R12 STK NOW: PS.C., 100D
1720          JSB =INTDIV            ! FIND SELECT CODE (SC) PART OF ADDR
1725          JSB =ONEB              ! GET SC IN R46-47
1730          SBM R46,=3,0           ! CHANGE THE RANGE
1735          JNG ADDRERR            ! JIF SC=0 or 1 or 2
1740          STM R46,R24            ! STORE SC-3 IN R24-25
1745          LDB R21,=1             ! SET MASK BIT 0 (SC3 POSITION IN IOBITS)
1750          DRP R46                ! INITIALIZE THE COUNTER AT SC-3
1755          JMP LOOP               ! BUILD IO BIT MASK
1760 MASKLOOP LLB R21                ! SHIFT THE SET BIT IN THE MASK
1765          DCB R46                ! DECREMENT POSITION COUNTER
1770 LOOP     JNZ MASKLOOP
1775          ANMD R21,=IOBITS       ! COMPARE IOBITS WITH SC MASK
1780          JZR ADDRERR            ! JIF IOBITS DOESN'T VALIDATE SC
1785          LLM R24                ! R24-25 NOW HAS 2*(SC-3)
1790          ADM R24,=120,377       ! R24-25 NOW HAS IOR ADDR=PSRBAS+2*(SC-3)
1795          STM R24,R26            ! COPY IT INTO R26-27
1800          ICM R26                ! R26-27 NOW HAS IOB ADDR=IOR ADDR+1
1805          JMP HPIB?              ! SEE IF ITS HPIB TO AVOID SYSTEM HANG-UP
1810 ADDRERR  POMD R76,-R6           ! TRASH A RTN BECAUSE I'M IN A SUBROUTINE
1815          LDB R76,=210           ! LOAD BPGM# DEFINING CUSTOM ERROR MSG
1820          STBD R76,=ERRBP#       ! TELL SYSTEM WHERE TO FIND DEFINITION
1825          JSB =ERROR+
1830          BYT 246D               ! ERRN 246: BAD ADDR or NOT HPIB
1835 HPIB?    CLB R34                ! PUT "READ STATUS OF SR0" IN R34
1840          JSB X14,INTHS          ! TELL IOP TO "READ STATUS OF SR0"
1845          JSB X14,IBF?           ! WAIT FOR IB TO BE FULL
1850          LDBD R77,R26           ! GET SR0 STATUS BYTE INTO R77
1855          LDB R37,=4             ! SET CED IN SCRATCHPAD
1860          STBD R37,R24           ! SET CED IN IOR
1865          JSB X14,OBF&B?         ! WAIT FOR IOB TO BE EMPTY AND NOT BUSY
1870          JSB X14,INTCHK         ! TERMINATE THE INTERRUPT TYPE HANDSHAKE
1875          CMB R77,=1             ! IS IT HPIB? (IS SR0 STATUS BYTE = 1?)
1880          JNZ ADDRERR            ! JIF NOT
1885          RTN                    ! ELSE IT IS HPIB AND RTN TO MAIN PROGRAM
1890          FIN
```

is not valid and the binary returns control to the CPU's operating system after generating error message 246.

Bits 0-7 in the IOBITS byte correspond to a log of any installed interfaces with select codes 3 through 10. For example, bits 0 and 4 are set to a value of 1 if interfaces with select codes 3 and 7 are installed.

Lines 1690-1705 check the validity of the device address.

Lines 1785-1800 convert the validated select code to the addresses of the IOR and IOB window bytes, and store them in CPU register pairs 24-25 and 26-27.

Lines 1835-1890 determine whether or not the interface of the validated select code is an HP-IB interface. If it is not, the binary returns control to the CPU's operating system after generating the error message 246. Otherwise, the subroutine is finished and we return to the main runtime routine.

The binary determines the type of interface from the status of the SRO register in the interface's dedicated microprocessor. If the interface is an HP-IB interface, the value of the SRO status byte will be 1.

Lines 1525-1575

This section of the code is the runtime routine for the binary's identifier keyword CHKPRTR.

Lines 1580-1640

This section lists the binary's reserved RAM needs and the addresses (DADs) of the system routines used by the binary.—*Milton R. Beychok is a consulting engineer based in Irvine, CA.*

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"DBGENERAL's approach is sensible" — Recent evaluation by Fortune 500 company

SECTION 5: IMAGE DATABASE STRUCTURAL CHANGES

DBGENERAL's Section 5 permits any conceivable valid changes to be made simultaneously to the structure of an IMAGE or TurboIMAGE database. Hundreds of structural changes may be queued up in advance and, upon execution, the database and all of its contents are transformed to the new structure—in a single pass. This method requires the minimum possible time and effort, and provides the greatest convenience for several reasons:

- **Changes are queued up in shared access mode while users are accessing the database.**
- **All data is preserved in the transformation, including numeric fields whose data types are changed.**
- **Changes may be activated at any time when exclusive access to the database is available, either on-line or from a batch job.**
- **DBGENERAL can rename a field in a dataset but not in all its occurrences in the database, and can redefine a single field as multiple fields and properly reassign the data contained in it.**
- **All reblocking and pointer adjustment is done as necessary.**
- **Either DBGENERAL can be used to queue up the changes, or the changes can simply be made directly to the schema and the new schema can be fed into DBGENERAL as the blueprint for the new database structure.**
- **If several databases require the same structural changes, DBGENERAL can restructure all of them from one set of changes. And if the databases are located at different sites, each one can be given a common schema from which DBGENERAL can transform all the bases.**
- **The changes can be played out on a test database (which you can easily build with DBGENERAL's Section 6 Copying Functions.)**

ITEM CHANGES

Permits you to add new items to the database; change the type, length, or table size of existing items; move items to new positions in the item list; delete items from the database; and rename items currently in the database. In changing an existing item, all live data is preserved, and data type conversions are supported.

DATASET CHANGES

Allows you to add new datasets to the database; move datasets to new positions in the dataset list, delete datasets from the database; rename existing datasets; and change a manual master dataset into an automatic master and vice-versa.

SET-ITEM CHANGES

Lets you add new items into a dataset; move items to new positions in the dataset item list; and delete items from a dataset.

PATH CHANGES

Permits you to add, change, and delete paths between master and detail datasets; allows an unsorted path to be removed or included; lets an item in a master dataset be defined as the search item; and permits the primary path in a detail dataset to be redefined.

PASSWORD CHANGES

Allows additions, changes, and deletions of passwords to be made, thereby maintaining proper security levels through timely alterations of passwords.

BLOCKING CHANGES

Allows an entire database to be reblocked to a new block size, and permits reblocking of individual datasets.

DBGENERAL has been changing the structures of IMAGE databases since 1984 and TurboIMAGE databases since March 1986. It is tried-and-true at hundreds of HP3000 sites, time after time, on both IMAGE and TurboIMAGE databases.

We provide technical support 24 hours a day, 7 days a week, on everything from structural problems to performance concerns to broken chains, defective keys, invalid bit maps, and erroneous user labels.

And this is only Section 5 of DBGENERAL—there are 6 in all which include diagnostics and recovery for quick repair of broken chains and other critical problems, automatic capacity changes, regular diagnostic and maintenance routines, and test database creation functions.

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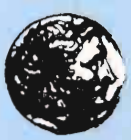

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Automating The Training Function

OPINION

Don Mitchell

What is your attitude toward computer-based training (CBT)? If you have suffered through an ill-designed course or two, you probably are equally excited by CBT and, say, salmonella. If you've seen the burden a good course can lift from the shoulders of a beleaguered EDP staff, you may be a staunch adherent. Most people are somewhere in between; intrigued by the possibilities, but wary.

Wouldn't it be nice if your users could sit down to a software simulation that exposed them to the most typical processing situations (and the most typical exceptions) in a teaching mode?

The users would be seeing the same screens or prompts, would be responding in exactly the same way as in the "live" system, only the error messages would be customized to teach and "shape" the input until it is correct, and the consequences of errors would be minimal. Users could practice as long as necessary to achieve basic competence (quality could be measured and standards enforced, if necessary) before working with good data. Your programming staff could return from the training rooms (where *their* training and expertise are of little help to them) and sit back down to the code you hired them to handle.

CBT promises much, if not all, of this utopian dream. But if you ask anyone who has waded into CBT, you will be advised that courses take time and resources to develop, and that people having both training skills and the savvy to code CBT are few and far between. You might not want to jump into a full-scale development project with both feet, unless you've got resources to burn.

A more prudent approach might be to acquire some CBT off-the-shelf, to teach subjects of generic importance and perhaps to serve as models for training you might build in-house. Here again there are pitfalls; here again the experiences of others may guide your selection of appropriate courseware.

First, let's clarify what CBT means.

Wouldn't it be nice if your users could sit down to a software simulation that exposed them to the most typical processing situations (and the most typical exceptions) in a teaching mode?

Computer-based training is software that provides interactive, instructional experiences leading to measure attainment of specified skills or understanding. CBT is an online learning experience, in which the contingencies and adjustments of ordinary teaching have been anticipated and structured into the software, such that students can select and/or test out of appropriate content, can move quickly or slowly as needed, can practice as long as necessary to achieve competence and comfort, and can take initiative and responsibility for their own learning.

CBT is not a book online — not pages to be turned by pressing the RETURN key. Such products (and many claim to be CBT) are ineffective teachers because they aren't meaningfully interactive.

THEY ARE BORING.

They lack the strong points of a book (decent print, layout and illustration) *and* they disregard the strengths of the computer (interactivity, contingent presentation of material, complex answer judgment, instantaneous feedback, measurement, analysis of learning). Each new course of this type sets serious CBT back another few years.

CBT is not online documentation (like MPE's HELP facility). Such products assume a familiarity with the jargon and the style of processing. Online HELP is a valuable software product, make no mistake about that. But it is intended for and beneficial to the experienced user. It is not training.

There are good reasons why CBT has not blossomed in accordance with its promise as the training methodology of the information era. Decent courses are hard to build. A CBT course is (let's face it) a system. Like any other system, a course is only as good as the care, the design, the sweat and the testing that went into it.

CRACK PROGRAMMERS are notoriously poor at teaching other people their software; nothing in a programmer's training prepares him or her to do so, and the creator's view of the system (from

"within") is a difficult perspective from which to coach others on the outside.

Your staff can and should, however, be of great help in the *evaluation* of CBT products coming from outside vendors. Here are some signposts that will steer your reviewers toward effective teaching software and away from the page-turners. Interactivity is important, of course, but consider also these indices:

■ *Clarity of intent.*

Any course (CBT or otherwise) which does not openly state its objectives at the beginning of each instructional unit is immediately suspect. Odds are, the designers don't know where the instruction is going.

■ *Spatial orientation.*

A CBT course is not like a book — you can't see the amount you've completed and the amount left to do. There should be frequent cues letting you know where you are, markers to show where you've been, time estimates to let you plan.

■ *There should be plenty of optional practice.*

Unlike a human teacher, a computer has infinite patience. There is no excuse for short-changing a learner who wants another example. There must be bypasses, of course, for people who are ready to move on.

■ *There should be testout capabilities.*

There's nothing worse than being dragged by a computer through a sequence of instruction you could have written yourself. It's downright inhuman.

■ *There should be measurement.*

If people are going to commit time and energy to CBT, their efforts and attainments are worth documenting for their benefit. This measurement must be up-front, non-punitive and confidential unless openly declared to be otherwise.

■ *There must be easy access and departure.*

You shouldn't have to wait for a question, a summary or a menu to get out. When you come back in, you ought to be able to pick up right where you left off.

■ *Courses should be menu-driven, to allow onsite tailoring for different audiences within the shop.*

■ *Courses should be delivered by simple, unobtrusive drivers, so as not to drain system resources from other productive work..*

Tough standards? Hardly. A CBT course is a system; we demand good design in systems and we ought to demand it in CBT. When the courses begin to measure up, the computer becomes a powerful resource in the effort to train users. *—Don Mitchell manages SIMULEARN Incorporated and has specialized in computer-based training for Hewlett-Packard 3000 users for seven years.*

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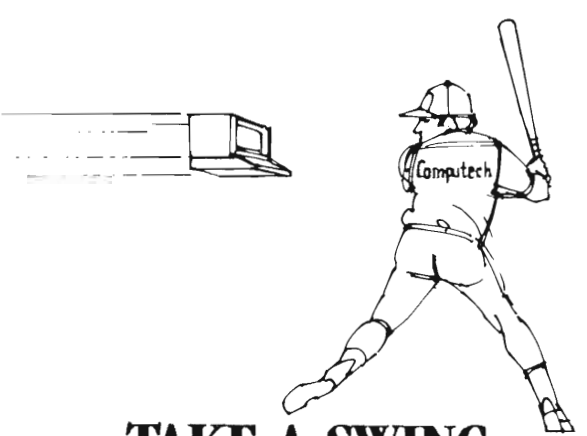

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Continued from page 25.
tegrated easily with existing applications.

Font management provides the user with the ability to maintain a library of electronic fonts. Features include online directory of electronic fonts, font and form grouping, automatic font downloading, global font change and compatibility with all fonts available for the HP printers and European font characters.

Form composition provides for the design and maintenance of electronic forms on the HP 3000 for printing on the laser printers. Libraries of electronic forms may be maintained and downloaded individually or en mass.

Data merging allows electronic forms to be integrated into existing software environments. Data can be mapped into several different forms simultaneously.

The Lasersoft/3000 system retails for $2,995. A demo is provided for $100 for a 30-day period.

For more detailed information, call or write Business Systems International Inc., 20942 Osborne Street, Canoga Park, CA 91304; (818) 998-7227.

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Information Network Offers RISC Handbook

The Information Network has published "RISC: Applications, Strategies and Markets," which analyzes the benefits, drawbacks and impact of Reduced Instruction Set Computer (RISC) Architecture.

Priced at $495, this 108-page book identifies the computer system market segments where RISC-based systems are most likely to achieve a successful penetration. The degree of penetration into each segment and into the overall market is forecasted through 1991.

Contact International Planning Information, Inc., 465 Convention Way, Suite 1, Redwood City, CA 94063.

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Seventh Maestro Announced By Unison

Unison Software Inc. has announced the availability of version B.03, the seventh release of its Maestro batch job scheduling package. Maestro runs on all models of the HP 3000, including the new Spectrum series.

Enhancements include the addition of two new keywords into Maestro's scheduling language. There is also a new program called Chorus that permits bulk loading of job definitions. And starting with this version, users will have the option of running the regular privileged mode or the non-privileged mode version of Maestro.

Maestro automatically schedules and manages job processing according to calendars and operating rules specified by the user. It is sold standalone or in a network version that offers an option to integrate batch processing on any number of linked computers.

Version B.03 is available at no charge to Maestro users who are covered under Unison's Software Update Service.

Contact Unison Software, 415 Clyde Avenue, Mountain View, CA 94043; (415) 968-7511. TWX/Telex: 510 100 4050 CCCMV.

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Accelerator Speeds CRT Graphics

DTACK Systems has introduced a graphics accelerator software enhancement binary for series 200/300 computers running BASIC. The accelerator (named GXL300) has been specifically designed to facilitate CRT graphics line draw commands, with speed improvements ranging between 1.5 and four times.

The BASIC commands affected include: DRAW, MOVE, IDRAW, PLOT, RPLOT, IPLOT, PLOT(*), RPLOT(*), IPLOT(*), LABEL POLYGON, POLYLINE, RECTANGLE and GRID. Commands using the FILL option will be accelerated only during the draw line portion of their execution.

The GXL300 doesn't require special hardware to operate. Floating point hardware isn't required and programs don't need modification to take full advantage of the new software.

The GXL300 is loaded identical to HP language extension binaries already found in the BASIC system and requires only 10 KB of additional memory. All series 200/300 displays are supported.

Shipments began in July for BASIC 4.0 and 5.0. Single quantity pricing has been set at $295.

To learn more, contact DTACK Systems Inc., 23441 South Pointe Drive, Suite 170, Languna Hills, CA 92365; (714) 458-2244.

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Computer Associates Announces Business-Graphics Package

Computer Associates International Inc. announced SuperChart, a comprehensive PC business-graphics software package that generates high-quality charts for presentations and reports.

The package transforms data from popular spreadsheets such as Computer Associates' SuperCalc 4 or Lotus Development's Lotus 1-2-3 into bar, line, pie, area or scatter charts. Or users may create charts from data entered on a keyboard.

As an add-on product to SuperCalc 4 or Lotus 1-2-3, SuperChart enables users to generate standard corporate chart formats to display data from anywhere within their organizations, thereby giving corporate charts a consistent appearance. All chart elements — titles, legends, colors, fonts and axis types — may be customized to conform to graphics-presentation standards.

SuperChart also serves as a graphics-development station. With SuperChart, users can generate charts and graphs on a microcomputer, then use a standard file-transfer facility to upload the charts and graphs to the host computer for output to hundreds of devices.

SuperChart supports the most widely used microcomputer output devices, including HP, CalComp, Epson, IBM, Nicolet, Tektronix, Diablo and Xerox. It supports mouse input and all keyboard controls. SuperChart has been designed for easy installation and learning. An online help facility and full documentation are supplied with the system. It is part of the company's integrated microcomputer graphics system, including SuperImage, a drawing package used to create freehand drawings and wordcharts and to edit charts and graphs.

The license price for a single copy of SuperChart is $395. SuperChart and SuperImage are available together for a license price of $595. Hardware requirements for SuperChart are an IBM PC, XT, AT or compatible running DOS 2.1 or higher, with a minimum 360K double-sided disk drive and IBM-compatible hard disk.

Computer Associates International Inc. is located at One Tech Drive, Andover, MA 01810-2497; (617) 685-1400. Telex: 475-8093.

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BDT Product Line Expands Laser Printer Market

BDT Products introduced its LaserMate 550A and LaserMate 550B hardware controllers for laser printing. These new products create a full line of laser printer controllers that allow major standalone word processing systems to upgrade from daisy-wheel printers to laser printers.

The LaserMate 550A makes available

laser printing capabilities to an estimated 80,000 NBI word processing systems, at a cost savings of thousands of dollars over alternative solutions. Adding the LaserMate 550A to these NBI systems provides the only complete system compatibility to laser printers from HP, Canon, QMS, Ricoh, Xerox and Philips.

The LaserMate 550B adds the option of keeping the original impact printer on the system, while also bringing compatibility to the same laser printers as those offered by the LaserMate 550A. Unlike the 550A, the LaserMate 550B supports a variety of word processing systems, including those from CPT, NBI, Philips, Vector Graphics and AES Lanier.

Both the LaserMate 550A, retailing for $1,825, and the LaserMate 550B, retailing for $2,195, are compatible with BDT's sheet feeders for laser printers and are available at BDT dealers.

To obtain more information, contact BDT Products Inc., 17152 Armstrong Avenue, Irvine, CA 92714; (714) 660-1386.

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Mitchell Humphrey Has Fund Accounting System

Mitchell Humphery & Co. (MH&Co.) annouces the release of its Fund Accounting System, a new member of the FMS-80 family of Financial Software. The Fund Accounting system is designed to address the management and reporting requirements of Fund Accounting organizations.

Features of the new system include comprehensive fund accounting capabilities, complete encumbrance accounting and reporting, advanced financial planning, online inquiry and end user control.

The Fund Accounting system can be installed on existing HP hardware, if available, or MH&Co. can provide a total solution of software and hardware. Each financial system module can be purchased standalone or as part of a fully integrated Fund Accounting system.

For information on the system, contact Mitchell Humphrey & Co., 2029 Woodlawn Parkway, St. Louis, MO 63146; (800) 237-0028. In Missouri, call collect (314) 991-2440.

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New Dbaudit Sorts Before Printing

Robelle Consulting Ltd. released version 1.7 of Dbaudit, a software tool for analyzing HP 3000 database transactions by reading Image logfiles. The Dbaudit user can obtain summary reports showing activity by base, dataset, logon device, user and program plus detailed dumps of transactions in a readable format.

The new version contains the ability to sort transactions before printing them. The report may be sorted by user, program, base, dataset, logon device, logid and even by database field values such as Part-Number. Dbaudit supports up to five sort keys per report, including three different database field values.

Dbaudit version 1.7 extends its support of TurboIMAGE based on user feedback. You now can rename logfile sets and still report them with Dbaudit. Also, you can start Dbaudit part way into a logfile set if you know that there were no users active at that time.

The User Manual and online help have been updated to reflect these improvements and are available on the same tape as the program files. All users of Dbaudit covered by service will receive an update tape automatically.

For more information or a no-charge trial tape, contact Robelle Consulting Ltd., 8648 Armstrong Road, R.R. No. 6, Langley, B.C., Canada V3A 4P9; (604) 888-3666.

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Breakthrough Software Offers Time Line Graphics

Breakthrough Software Corp. announced Time Line Graphics, an add-on to its Time Line project management product. It turns Time Line schedules into full-color presentation quality graphs using a plotter as an output device. Graphs in three formats are produced: Time-scaled PERT, standard Gantt, and Actual vs. Plan Gantt.

Able to support A-sized (8½ x 11) through E-sized (34″ x 44″) plotters, and eight pen colors, Time Line Graphics extends Time Line's reporting capabilities for project managers who need project data presented in a colorful, easy-to-read format.

The Time-scaled PERT graph offers a combination of the two most popular project management charts. It improves the traditional PERT chart format by combining the flowchart features of the PERT with the time structure of the Gantt chart. The Gantt graph combines a horizontal bar chart with selected columns of text, such as WBS number, task duration, start date, etc. The Actual vs. Plan graph uses a Gantt format to compare the original plan with actual data.

Paired task bars, showing the timing differences between two schedules, appear

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alongside text information such as duration or end date. Like Time Line's Actual vs. Plan report, any two schedules may be compared, giving the manager an historical perspective for more accurate project planning in the future.

Priced at $195, Time Line Graphics is scheduled to ship September 1.

Contact Breakthrough Software Corporation, 505 San Marin Drive, Novato, CA 94947; (415) 898-1919.

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QMS Enhances Laser Printer

QMS Inc. introduced the QMS-PS 800 II PostScript-based laser printer at COMDEX/Spring in Atlanta.

Based on the eight-page-per-minute Canon CDX print engine, the QMS-PS 800 *II* features 500-sheet input/400-sheet output paper handling and a 10,000-print-per-month duty cycle. These features are useful for higher volume and multiuser environments. Users can specify face-up or face-down output and take advantage of the dual input bin design for "first sheet/second sheet" printing applications.

QMS-PS supports PostScript page description language as well as HP LaserJet+, HP-GL and Diablo emulations. A variety of interfaces gives instant connectivity with most operating environments, including IBM PCs and Apple Macintoshes.

QMS-PS is priced at $6,495. OEMs and VARs interested in private labeling should contact QMS.

Contact QMS Inc., P.O. Box 81250, Mobile, AL 36689; (205) 633-4300.

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I/O Mate Speeds Access To Image

RunningMate has taken the "NO-SOURCE-CODE-CHANGE" installation technique developed for ReportMate and extended this slam-dunk approach to eliminating disk I/O bottlenecks to all file access methods. I/O Mate speeds access to Image through both serial and chained reads and accelerates reading and writing to MPE files. The next release of I/O Mate will include reading KSAM files as well.

RunningMate products run on HP 3000 systems using MPE IV-V up to UB MIT. ReportMate and 3000e incorporate Multi-record, no-buff I/O technology and ReportWriter that do extensive serial reads of Image data sets. SortMate will speed standalone

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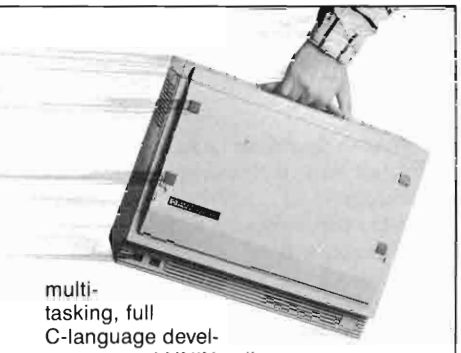

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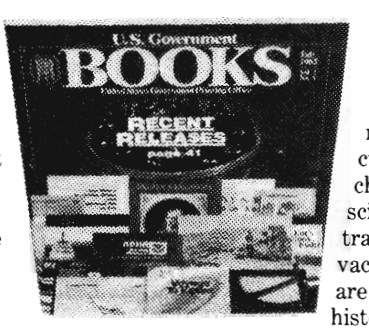

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sorts two to three times faster than Sort/3000, and also uses multirecord, no-buff I/O technology.

I/O Mate is priced at $3,500 for the first copy license, with 50 percent discounts for additional CPUs.

For further information regarding free trial tapes and purchase, contact RunningMate, 3001 I Street, P.O. Box 160488, Sacramento, CA 95816; (800) 824-9046 or in California (800) 628-8030.

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HP LaserJet Emulation Added To Talaris 810

Talaris Systems Inc. announced the enhancement of the Talaris 810 laser printer to include HP LaserJet emulation. It also emulates Epson FX-80, QUME Sprint and Diablo 630 ECS.

The Talaris 810 has 256 KB of graphics memory, compared to the HP LaserJet's 59 KB. Because Talaris has included all the HP LaserJet commands in emulation, the extra memory permits the use of device drivers that support the LaserJet Plus high-density output for most applications. The Talaris 810 can support low-density LaserJet Plus device drivers in almost all cases.

The standard font size for the Talaris 810 has been updated to be compatible with the LaserJet emulation. There are 12 fonts available to Talaris 810 users within the emulation. Three Epson FX-80 fonts also come standard in the Talaris 810, but are not available within the HP LaserJet emulation.

The new Talaris 810 is priced at $3,450 and is available with a Centronics interface for IBM PC users or an RS-232 for DEC VAX/VMS users. Talaris customers who purchased a Talaris 810 after September 1986 may upgrade their printers by purchasing a firmware upgrade (T810-FIRMUP+) for $250, which includes the Talaris 810 standard font set in HP LaserJet compatible format and the HP LaserJet emulation firmware.

For further information, contact Talaris Systems Inc. 6059 Cornerstone Court West, P.O. Box 261580, San Diego, CA 92126; (619) 587-0787.

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Tymlabs Offers Upgrade For Mac2624 Users

Tymlabs Corporation has released Version 2.1 of Mac2624, its HP terminal emulator for the Apple Macintosh. Tymlabs plans to provide this upgrade free of charge to all registered users of Mac2624. With the new version, the speed of screen display has been boosted by 75 percent and the file transfer rate has doubled. Mac2624's printing and logging facility can now send output to the Laserwriter as well as the Imagewriter, and printer output is spooled automatically.

Mac2624 now offers complete support for the 8-bit (Roman 8) character set, the 7-bit character set, and the bold, italic math and line drawing alternate character sets. Tymlabs has enhanced its support for Macintosh international keyboards and added support for the new Mac II and SE keyboards.

Version 2.1 also provides several enhancements to the Mac2624's Macintosh-standard user interface. For instance, while control characters can be generated from the keyboard just as they are on a terminal, Mac2624 now also provides on-screen buttons for control character entity. These buttons are activated by clicking with the mouse.

Version 2.1's built-in file transfer facility includes support for MacBinary file transfer protocol (useful for transmission to and from Compuserve and other public networks).

Mac2624 is available for $199; discounts are provided for multicopy orders.

To learn more, contact Tymlabs Corporation, 211 East 7th Street, Austin, TX 78701; (512) 478-0611.

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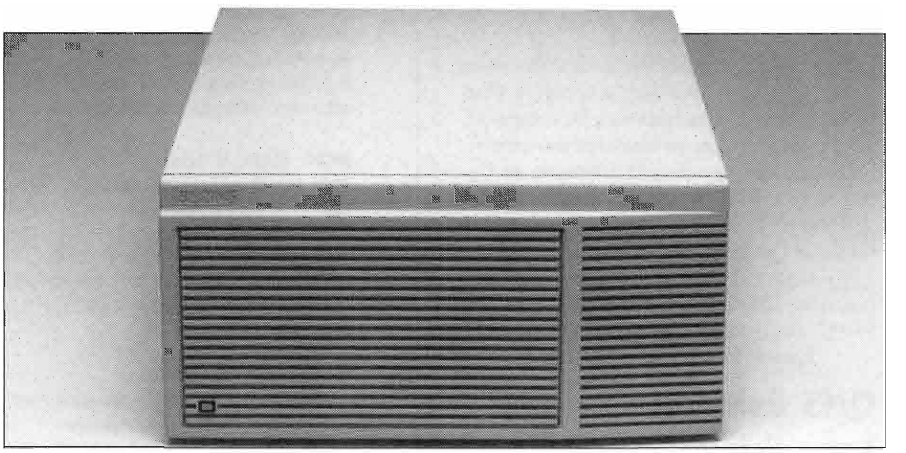

Bering Industries' EconoPac mass storage subsystem.

Bering Industries Offers EconoPac Mass Storage

EconoPac, a new, high-capacity, high-performance family of mass storage subsystems is now available to HP computer users from Bering Industries. EconoPac subsystems are available in 280-MB, 130-MB and 95-MB capacities.

The EconoPac offers lower cost per MB storage. For example, the 130-MB model is priced $2,600 less than HP's 130-MB drive.

With average disk access time of 27 ms, EconoPac subsystems can handle the frequent random access requirements of most multi-user systems, real-time applications and HP-UX.

All EconoPac subsystems are fully hardware and software compatible with HP computers using CS/80 and SS/80 command sets, including HP 9000 Series 200/300/500, HP 1000 and HP 3000 computers. All EconoPac models are packaged in the same enclosure as the Series 5000, meeting HP's ITF footprint specifications. They also support the SRM networking environment.

The EconoPac subsystems are priced as follows: $9,490 for the 280-MB, $5,390 for the 130-MB, and $4,190 for the 95-MB.

To find out more, contact Bering Industries, 260 Technology Circle, Scotts Valley, CA 95066; (408) 438-8779.

Enter 920 on reader card

MDSS Enhances Software Package For Manufacturers

Manufacturing Decision Support Systems Inc. (MDSS) announces two features to enhance user productivity. In its software system developed for manufacturers, it provides security and easy transportation through MDSS.

With the security feature, users are routed to MDSS screens based on the user's individual identification. If, for example, a user is concerned with accounts payable, the user's sign-on code would allow automatic transfer to the vouchering screen. Those interested in order entry could move to the basic order entry screen. This type of user code obviates the need to walk through all the system menus.

MDSS system supervisors decide which password users have and where they can go throughout the system.

Regarding transportation through the system, three levels provide ease of transportation through the MDSS system.

Menu-driven, the menus guide the first-time or casual user through the applications.

MDSS has a series of default transfer screens using soft screens. If the user is on one screen and wants to move to another, he can push a soft key and go there directly without going through the menu.

A special MDSS feature gives each user an alternative transfer capability for the soft keys. Users who don't use the menu nor the soft keys can use the Direct Transfer feature. Users can type the name of the screen they want to access and the system automatically will cycle to that screen.

MDSS is an integrated, menu-driven system. It runs on the HP Micro and Mini 3000 series.

Contact MDSS Inc., 300 East Ohio Building, 1717 East 9th Street, Cleveland, OH 44114; (216) 861-8100.

Enter 919 on reader card

Plexus Computers Offers P/95

Plexus Software recently announced P/95, a sophisticated UNIX computer system. The P/95 supports up to 128 users and provides two to three times the performance of its previous high-end product.

The P/95 is based on the 32-bit MC68020 microprocessor running at 25 MHz. The system features up to 48 MB of main memory and up to 6.7 gigabytes of high-speed magnetic storage.

Customers who purchase the P/95 can grow this system to include the new Extended Data Processing (XDP) capabilities. Plexus XDP Systems merge a P/95 and relational database with personal computer workstations, document scanners, omnifont optical readers, facsimile machines, laser printers and optical disks to provide "Mixed-Mode" data processing capabilities for image, text and alphanumeric data.

For additional information, contact Plexus Computers Inc., 3833 North First Street, San Jose, CA 95134; (408) 943-9433. TWX/Telex: 910 338 2223.

Enter 922 on reader card

MagicFont Starts Laser Font Revolution

Computer EdiType Systems recently introduced MagicFont, a program to design fonts and symbols to suit a person's individual taste.

With MagicFont and a word processing program, a user can create special symbols at will. MagicFont includes easy-to-use templates, so users can create and edit fonts and symbols with their own word processing programs by filling in the blanks. MagicFont converts user-created symbols into downloadable fonts for HP LaserJet Plus-compatible laser printers. The new fonts can be used with any application program that uses soft fonts.

System requirements are a word processor that generates ASCII files, such as

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Word Star, New Word, MultiMate or DisplayWrite 3 and an HP LaserJet Plus-emulating laser printer such as Quadram's QuadLaser. MagicFont doesn't require a graphics card or color monitor.

MagicFont retails for $59 and is available in both MS-DOS and CP/M versions.

For more information, call or write Computer EdiType Systems, 509 Cathedral Parkway, Suite 10A, New York, NY 10025; (800) 251-2223.

Enter 921 on reader card

Interactive Releases Version 4.1 For HP 1000

Interactive Computer Technology announces the release of CONNECT Revision 4.1 for HP 1000 computers.

CONNECT is now fully compatible with the new Revision "D" MUX firmware on RTE-A release 4.1, as well as with the previous "B" and "C" MUXes on both RTE-A and RTE-6/VM.

CONNECT provides virtual-terminal and file-transfer capability between the HP 1000 and any remote system having ASCII RS-232 ports. CONNECT makes the HP 1000 look like a terminal on the remote, so no special software is needed for file transmission or reception.

A KERMIT protocol program is supplied with CONNECT, providing error-checked file exchange with any system having a KERMIT program.

CONNECT features several data-pacing methods, automatic configuration and online help.

Contact Interactive Computer Technology, 2069 Lake Elmo Avenue North, Lake Elmo, MN 55042; (612) 770-3728. Telex: 650 211 1023.

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ETA/HCR Proceed With Development Project

HCR Corporation and ETA Systems confirmed that HCR's contract to develop a C compiler and port UNIX System V with Berkeley 4.2 networking enhancements is continuing. Software milestones have been met including a preliminary full C compiler, several operating system modules and selected UNIX utilities.

The ETA, unveiled recently, can have up to eight processors, as much as two gigabytes of shared memory, 256 MB of central processor memory and peak speeds of 10 billion floating point operations per second. It will run a variety of operating systems including VSOS and UNIX.

To address a wide range of market requirements, ETA Systems is developing in-house another version of UNIX that is specifically designed for smaller hardware configurations.

Contact HCR Corporation, 130 Bloor Street West, 10th Floor, Toronto, Ontario, Canada M5S 1N5; (416) 922-1937. Telex: 06-218072 HCR TOR. FAX: (416) 922-8397.

At ETA, call or write ETA Systems Inc., 1450 Energy Park Drive, St. Paul, MN 55108; (612) 642-3400.

Enter 926 on reader card

Quicksilver Enhancement Released By WordTech

WordTech Systems announced the availability of Quicksilver Release 1.1.

Besides speed improvements, Release 1.1 offers compatibility with some previously unsupported dBASE III Plus commands, new commands and functions brought to the dBASE language by dBXL, and complete overlay capability. New compiler commands also are provided.

Current registered users of Quicksilver 1.0 can obtain this update for a $25 handling fee.

To learn more, contact WordTech Systems Inc., P.O. Box 1747, Orinda, CA 94563; (415) 254-0900.

Enter 923 on reader card

IEM Introduces DRAFTOOL 9000

IEM introduces DRAFTOOL 9000, a two-dimensional CAD drafting package for HP Series 200/300 computers. DRAFTOOL lets you create drawings using four components: points, lines, arcs/circles and text. Components can be assigned a number of attributes, such as color, line style or layer. The automatic dimensioning capabilities make it easy to add extra meaning to a drawing.

DRAFTOOL features an online calculator that allows user-defined variables; the ability to store all or part of a drawing, or to merge drawings together; area measurement; the ability to move, copy, rotate, reflect or rescale parts of a drawing; a fully recursive menu system; the ability to lock files, to prevent unauthorized deletion or alteration; the ability to define new angular/length units of measure; and easy editing of text items or entity attributes.

DRAFTOOL supports keystroke log files that let you record the process of creating a drawing in the form of the keystrokes sequences that were used. A query function permits a keystroke log file to be set up so that it will pause during replay, display a user-defined prompt, allow the user to enter data and continue. For more advanced users, DRAFTOOL can be customized.

The package sells for $995 and comes complete with all necessary documentation.

For further information, contact IEM Inc., P.O. Box 8915, Fort Collins, CO 80525; (800) 321-4671.

Enter 925 on reader card

SystemsExpress Offers DBreport

SystemsExpress (Sherman Oaks, CA) offers :DBreport, its user-sympathetic Image/3000 report writer.

Currently, it's available in two versions, the T Version, $1800, generates sorted, selected tabular reports from up to four datasets at a time.

The LT Version, $2400, also generates address labels, rolodex card formats and the tabular reports.

Enter 929 on reader card

Spell Checker From WardBrook

The newest Spell/880 Plus version from WardBrook Systems (Candia, NH) is now fully compatible with all HP 86/87 text editors.

Version 1.3, $125, includes a quick search and replace editor and the use of Edisc and double-sided 3.5-inch disks.

Enter 928 on reader card

CDS/Scan Designed For HP 3000

CDS/Scan is a new online report display system from Chestnut Data Systems (Philadelphia, PA).

Specifically for HP 3000 computer systems and terminals, CDS/Scan offers users immediate access to information on line — an attractive alternative to sites that provide only hardcopy or microfiche reports. With CDS/Scan, $2200, reports can be conveniently catalogued and accessed.

Enter 930 on reader card

Explain/3000 Offers On-line Documentation

Pertaine Systems (Redwood City, CA) now offers an on-line documentation package for the HP 3000 that addresses the problems of manual creation and cumbersome use.

Explain/3000 costs $5000 for the 3000 series and $500 for the Touchscreen and Vectra computers.

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[CALENDAR]

[SEPTEMBER]

16: OKRUG dinner meeting. Topic to be announced. Contact Tracy Wilson, (918) 592-0694.

20-25: Interex North American Conference, Bally's Grand Hotel, Las Vegas, NV. Contact Interex, (408) 738-4848.

23: CINMUG (Cincinnati Regional Users Group) one-day meeting. Location and topic to be determined. Contact Philip Landwehr, (513) 621-2850.

[OCTOBER]

4-6: CAP International's 1987 Small Business DataTrack Service Conference, Grand Hyatt Hotel, New York, NY. Contact Jean O'Toole, CAP International, One Snow Road, Marshfield, MA 02050; (617) 837-1341.

18-22: Interex Conference, San Jose, CA. Contact Interex, (408) 738-4848.

22: GHRUG (Greater Houston Regional Users Group), Hobby Hilton, Houston, TX. Contact Phil Curry, (713) 331-6111, ext. 255.

22-23: MARUG (North/South Carolina, Virginia). Fall quarterly meeting, Ocean Dunes Hotel, Myrtle Beach, NC. Conference theme centers on financial management systems. Contact Stephen Day, (804) 569-4857.

[NOVEMBER]

2-4: SuperGroup Users Conference-East, Washington Hilton, Washington, D.C. Contact The Producers, Riverwalk, 360 Merrimack St., Lawrence, MA 01843 (617) 683-5622.

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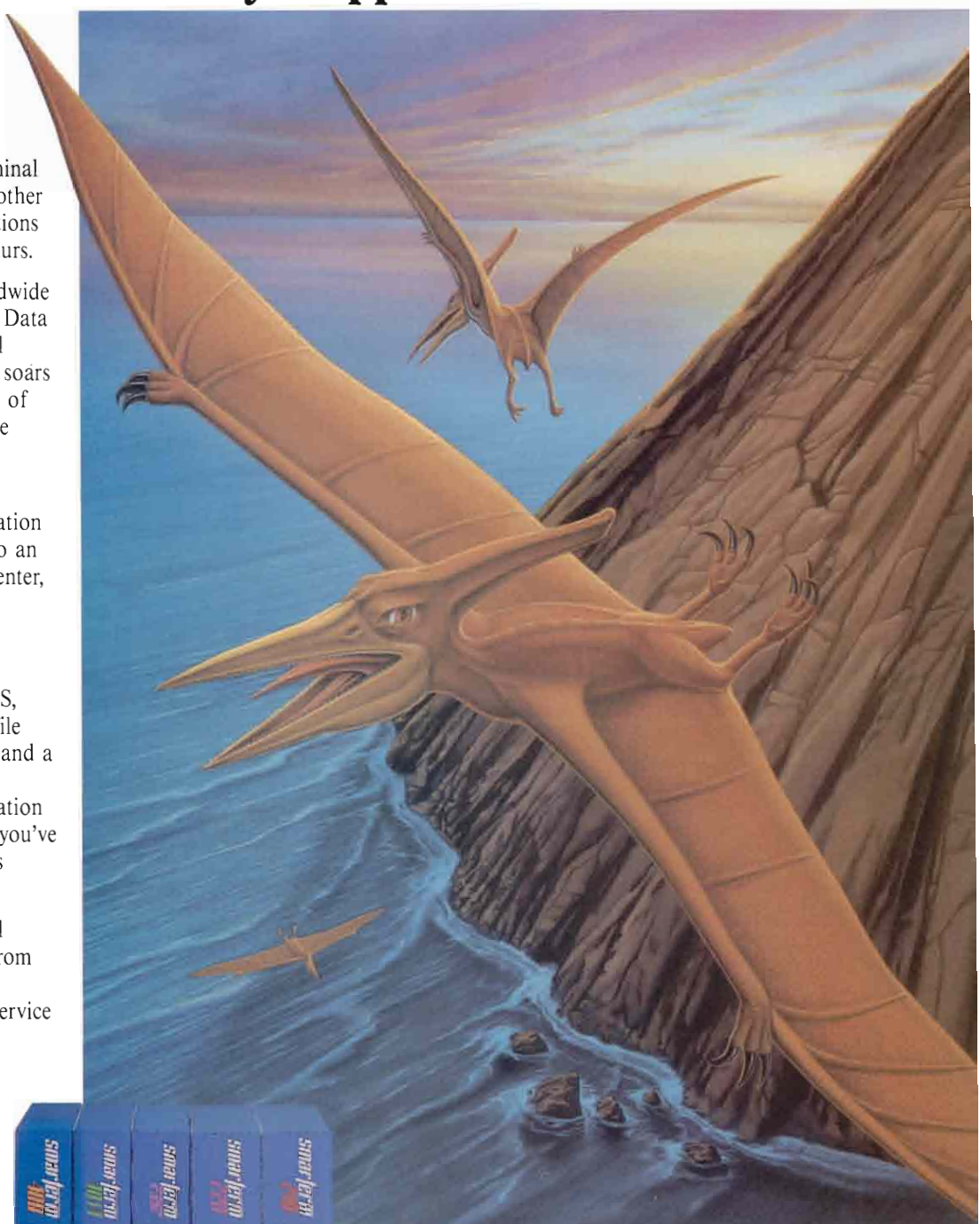

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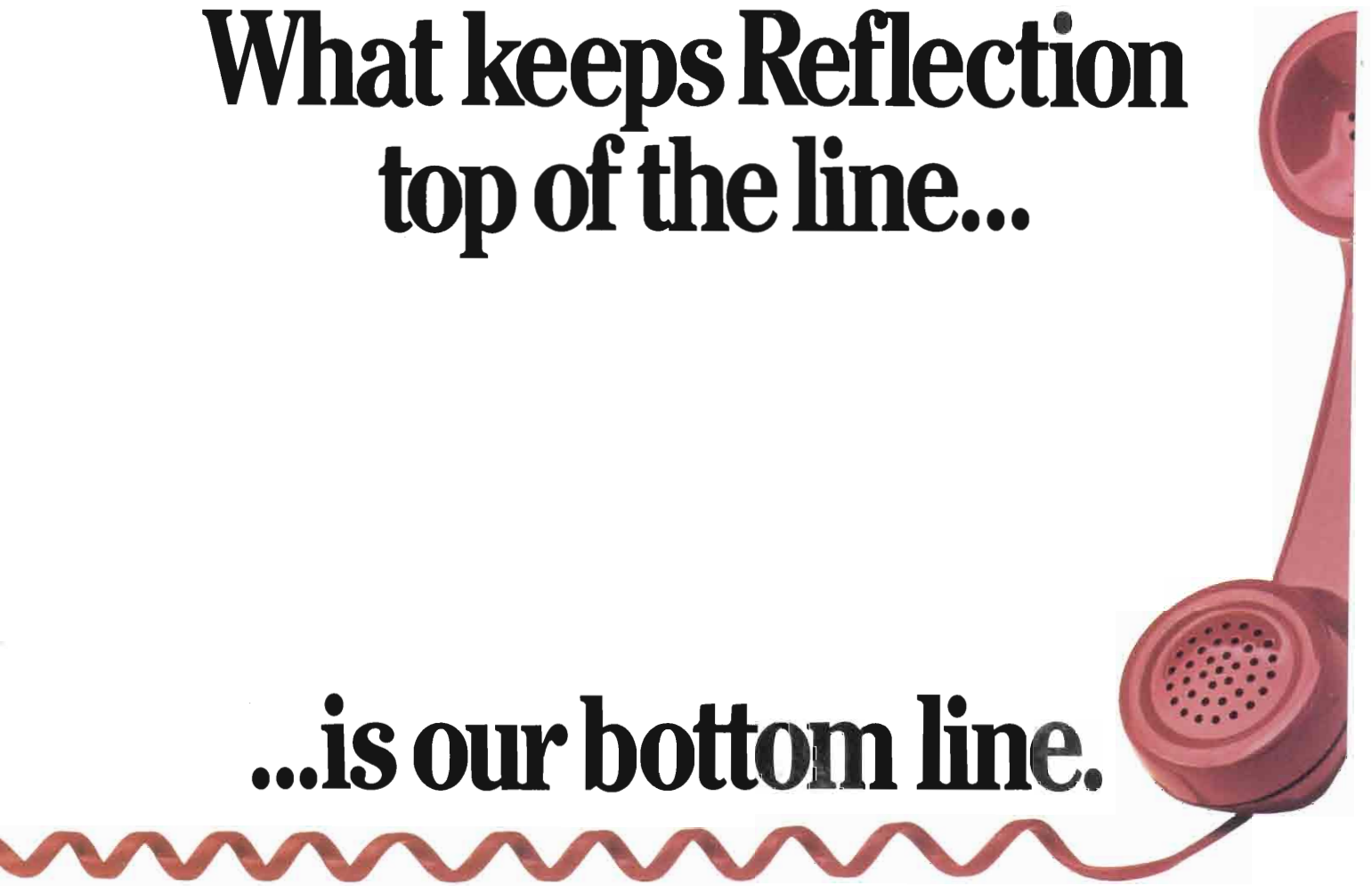

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