

COMPUTER DECISIONS

OCTOBER 1984

THE MANAGEMENT MAGAZINE OF COMPUTING

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Volume 16 Number 13

Copies Printed: 170,955

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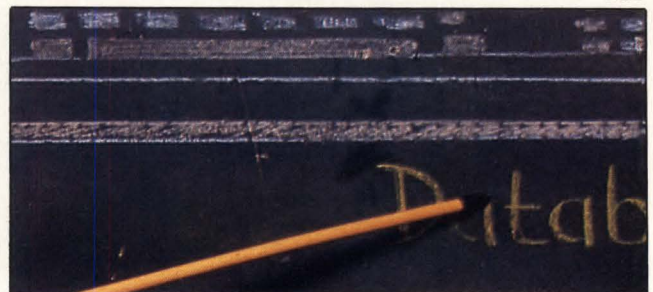
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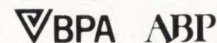
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COMPUTER DECISIONS (USPS 771-040 ISSN 0010-4558) is published 16 times a year for \$35 per year by Hayden Publishing Co., Inc., 10 Mulholland Dr., Hasbrouck Hts., NJ 07604. Second-class postage paid at Hackensack, NJ 07602, and additional mailing offices. POSTMASTER: Send address changes to COMPUTER DECISIONS, P.O. Box 1417, Riverton, NJ 08077. James S. Mulholland Jr., President and Treasurer, and Philomena DiMeo, Secretary. Printed at Brown Printing Co., Inc. All rights reserved. New subscriptions: COMPUTER DECISIONS is issued free of charge to qualified executives with active professional and functional responsibility in organizations that use computers and computer-based services and among computer manufacturers. Please fill out completely the Subscriber Qualification Form in the magazine. The publisher reserves the right to reject nonqualified requests. Subscription Rates: Qualified subscribers in the U.S. and Canada Free; Nonqualified in the U.S., Canada, Mexico, and Central America \$35. Single copies \$3.00. All other countries \$45. Single copies \$4.00. Limited quota of subscriptions available for persons outside the field served. Change of address: Fill out completely the Subscriber Qualification Form in the magazine, being sure to attach old mailing label in the space provided. Send correspondence with regard to editorial matters to address listed above. Unsolicited manuscripts will not be returned or acknowledged unless submitted with self-addressed envelope bearing sufficient postage for return. Address all other correspondence to COMPUTER DECISIONS, P.O. Box 1417, Riverton NJ 08077. Copyright © 1984 Hayden Publishing Co., Inc. All rights reserved.

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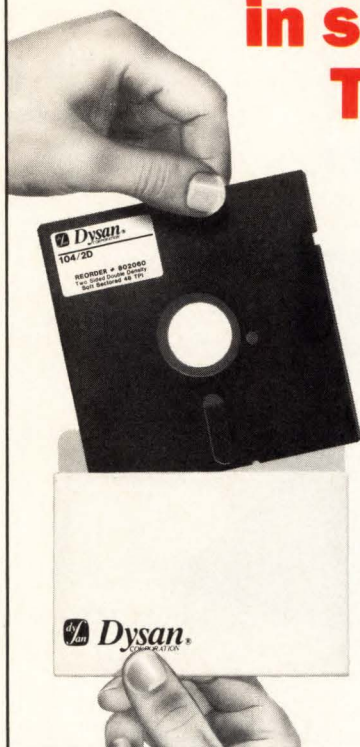
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INSIGHT

Technology that refuses to die

Big Blue will close the last of its printing plants for punched cards by the end of this year. This reminds us that good technology is difficult to kill off.

Punched cards paved IBM's entry into the business arena in the early decades of this century. IBM stopped making the keypunch machines that use those cards in 1972. But although IBM no longer offers either the cards or machines, there still are suppliers that offer them. Further, I suspect that some of the clattering machines will be in service decades from now, if only to tangibly demonstrate the meaning of *anachronism*.

In the same vein, Mohawk Data Sciences continues to maintain 950 of the 30,000 Data Recorders (data-entry machines) made between 1965 and 1973—one year after IBM stopped making the machines the Data Recorder was supposed to render obsolete. These, I'm sure, are utilized to their maximum by those who are steadfast in their belief that hay is still cheaper than gasoline.

Apple Computer still makes Apple II machines in volume, even though the 1976 design has, in effect, been technologically displaced by far more advanced micros, including several made by Apple.

What does the longevity of these old machines and technologies indicate? That a technology persists far longer than anticipated because the alterna-

tives usually are not all that much better.

On paper, suppliers of new technology do some nifty calculations that "prove" an advanced machine or system is, let's say, 20 percent faster than the old. Perhaps this conclusion would be accurate if company support and users were equal to it. Soon, word gets around that the new technology takes much longer to pay off than projected. And fast payoff is what attracts attention in the business world.

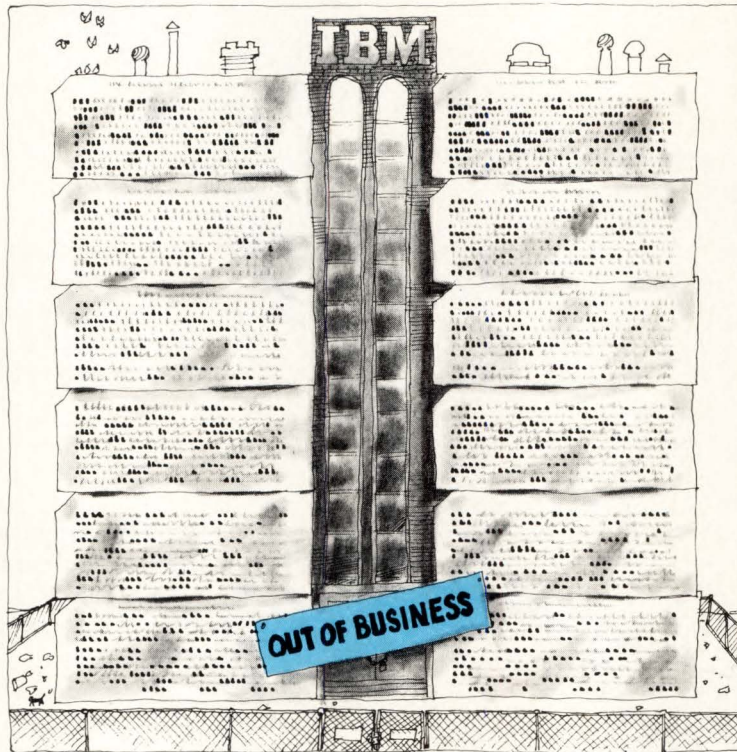
Another important obstacle to the acceptance of new technology is the requirement of a big change in the day-to-day methods of doing business. I believe this is why two highly touted and attractive technologies—microforms and the related computer-output-microfilm (COM)—have not yet lived up to their oft-repeated promises. Optical-character-recogni-

tion equipment most likely suffers from the same preclusions. Yet the more capable word processor appeared some ten years earlier than the electronic typewriter. This is technology's version of having an uncle who is young enough to be your son before you are ready for marriage. In this way technology, not unlike people, becomes viable at its own unpredictable pace.

Among executives, there's the fear of machine failure, a particularly sticky problem with new hardware. As one highly placed MIS executive told me recently, "We prefer to be on the trailing edge of technology."

Before you advocate the introduction of new technology in your organization, make sure that you have studied the situation and can meet, if not easily overcome, the obstacles.

mel Mandell



tion equipment most likely suffers from the same preclusions.

But the major obstacle to the replacement of old technology is people—those who are using it. Once employees grow comfortable with a system, it's not easy to supplant it. People don't want to see their hard-won skills become unmarketable.

That's a strong argument for my *raison d'être* for the electronic typewriter. Logically, it should have preceded the visual-display word processor. The electronic typewriter would seem to be the natural successor to the electric typewriter in the onward develop-

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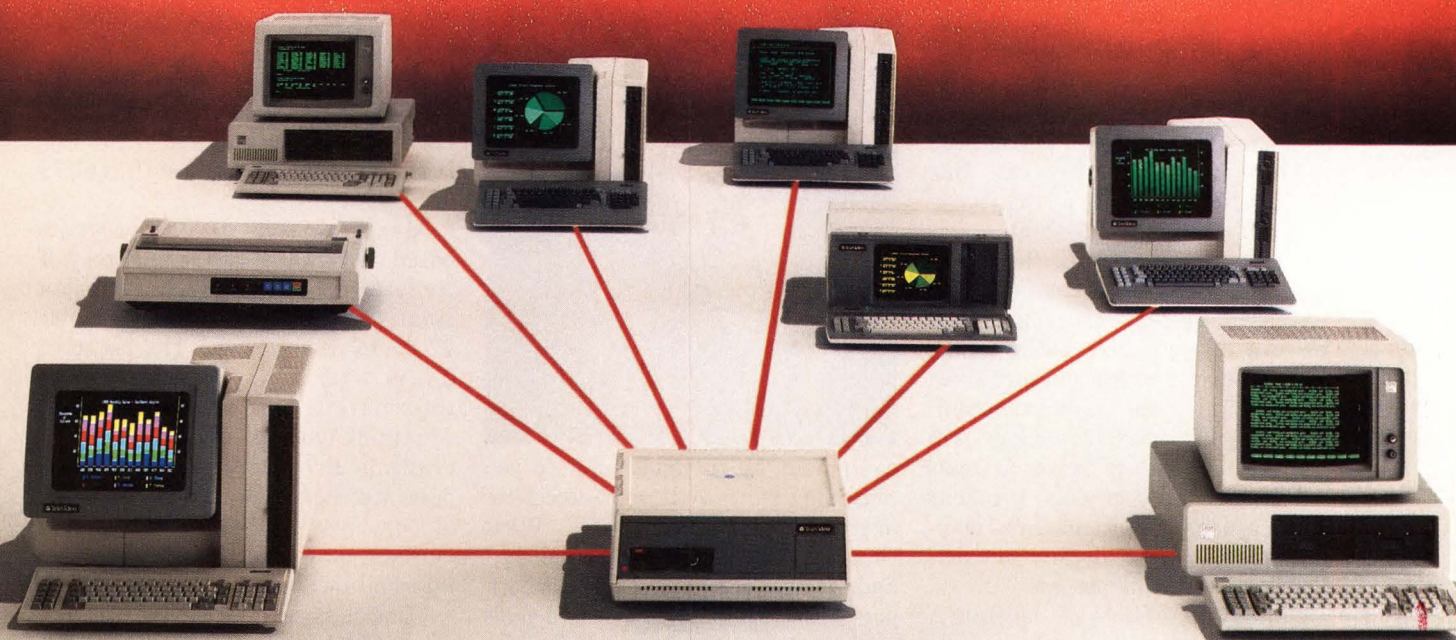


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NEWS & COMMENT

The new "ware" is mindware

There is a new breed of software that analysts predict may make personal computing more essential to the business world. It's referred to as "mindware"—software that helps workers think, instead of simply automating their tasks.

Several products (listed below) are now available to lead workers through the decision-making process. But these products are only a small sampling of mindware's capabilities, according to a report from the International Data Corp., a Framingham, MA-based market-research group. The use of artificial intelligence, denser and less expensive memories and disks, enhanced graphics capability, and optical-disk technology will all contribute toward better systems to aid the thought process. Products that measure stress, moods, and emotional reactions are already in existence and aid in this process.

A mindware system of the future, IDC suggests, might simulate negotiating sessions as an instruction tool. A negotiating partner could be represented by motion picture with high-fidelity stereo sound. There might also be biofeedback monitoring of the user's emotional and conscious states, supplementing personality-profile assessment data. (This scenario could be used with today's existing technology if someone wished to devote the time and resources to it, according to the IDC report.)

There are several products currently available that claim to aid professionals with management and decision-making tasks. Decision Aide, counseling software developed by Kepner-Tregoe (Princeton, NJ), is one such product. Say, for example, you are responsible for buying your organization's data-communications



equipment. With Decision Aide you must first state what your objectives or goals are. You ask yourself, "What should this equipment accomplish?" and "How much money is in the budget for this equipment?" Not all goals are equal, so the system helps you prioritize your objectives.

The next step is to consider your alternatives. A brainstorming feature helps if you get stuck. After all this different information is accumulated, Decision Aide multiplies the score you gave each alternative by the weight for that particular objective. Through this process, the system actually scores your various alternatives.

But Decision Aide isn't finished with you just yet. You must examine your three highest scores and consider what could go wrong with each of those choices. The system helps you prioritize the list in terms of how high the probability is that something will go wrong and how serious it would be if it did. At this juncture, the program tells you it's time to make your choice.

"It does not try to evaluate the situation, or give a computerized answer," explains David Dean, software products manager at Kepner-Tregoe, "It simply organizes the data you supply." Finally, the program produces a management-style report to document the decision or recommendation.

Decision Aide costs \$250 and runs on the IBM PC XT and compatibles, DEC Rainbow, and HP 150. For further information, call (609) 921-2806.

Maxthink is a similar program based on Edward DeBono's theory of context free thinking. (DeBono, an English author, has written over 22 books on thinking.) The program deals with the different ways information can be manipulated. Maxthink has over 70 commands, including Prioritize, to sort by importance; Fence, to mark boundaries of concepts; Categorize, to expand outlines; and Levelize, to reorganize information.

"The classical approach to problem solving, at least by means of computers, is spreadsheeting," explains Neil Larson, creator of Maxthink. "Any number process produces a number, but computers can do more than repetitious processing. For making managerial decisions, numbers do not apply."

Questions such as, "How do I increase office morale?" or "How do I allocate space for better production?" are relational processes that can't be answered through numbers. Relational questions should be answered by relational thinking—a process of collecting and then organizing information. Maxthink helps you manipulate information so you can look at things from different viewpoints—something you can't do easily on paper.

Maxthink runs on the IBM Person-

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You've heard the buzzwords: user friendly, integrated, smarter, faster, cheaper. But when you push the rhetoric aside you're still asking the same question, "Why can't I get a system that solves more problems than it creates?"

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DunsPlus gives the IBM PC XT a built-in business environment. This lets you mold DunsPlus to fit the way you do business.

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Flexibility is not an issue: Any part of the DunsPlus solution--hardware, software, or service--can be tailored to meet your precise business needs.

In fact, there are no issues. DunsPlus does what you want, the way you want it--now.

Designing systems that reflect the way you do business is business as usual for us. NOMAD2, the premier 4th-Generation-Language/DBMS from D&B Computing Services, has made us a leader in the field of information management services. And as your needs evolve, so do we. DunsPlus is just the latest step in translating technological advances into usable business tools--tools that reflect the way you do business.

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NEWS & COMMENT

al Computer and compatibles and is priced at \$249. For further information, call MaxThink, Piedmont, CA, at (415) 428-0104.

Human Edge Software (Palo Alto, CA) has introduced The Management Edge, a package that turns a personal computer into a manager's advisor. A problem is fed into the system and then a simple process using a question and answer format takes place. For example, if you want to know how to treat a productive yet shy subordinate, the program will first make you review yourself. An adjective describing your personality will appear on the screen. You must decide whether it is an apt description of yourself by answering yes or no. Then the system will walk you through a similar process reviewing your subordinate. The system compares the characteristics of both of you and suggests ways you might deal with the situation.

Armed with the necessary data and the program's library of psychological theory, The Management Edge can help tackle a number of managerial tasks, including increasing productivity and motivation, and improving communications.

The Management Edge retails for \$250 and runs on the IBM PC and compatibles, Apple II, IIe, and II Plus. For further information on the Management Edge, call (415) 493-1593.

PC AT: powerful, yes; multi-user?

Question: When is a multi-user personal computer not really a multi-user personal computer?

Answer: When it's three-user IBM PC AT with a PC-Xenix multi-user operating system that (a) will not be available for several months; (b) has very little business-applications software that can run on it, and (c) cannot easily allow multiple users to access information that the rest of the office has stored on their IBM PCs.

Analysts have praised the AT as an aggressively priced personal computer that will give experienced micro users the additional internal memory and storage capacity needed for increasingly byte-hungry business applications. For example, the Lotus Development Corp. (Cambridge, MA) claims its popular Lotus 1-2-3 integrated micro-software package will do calculations twice as fast and graphics three times as fast on the AT as opposed to the PC XT.

While some say that the lower-priced IBM PC will still be IBM's office mainstay, Douglas Cayne, an analyst with the Gartner Group, a market-research outfit in Stamford, CT, suggests the AT will eventually succeed the PC.

But analysts are skeptical about its usefulness as a multi-user micro. One analyst, Jack Hart of the International Data Corporation in Framingham, MA, says that the AT is not IBM's answer to multi-user personal computing in the office; that role has been slated for the System 36 mini-computer. Hart says to watch for future IBM announcements linking PCs to the System 36, which has its own immense business-applications software.

A main drawback with using the PC AT as a multi-user personal computer is that most personal-computer software is currently designed to run in the single-user arrangement of PC-DOS, the operating system of the IBM PC and PC XT. A PC AT user has a choice of working in the PC-DOS environment or in the single- or multi-user, multi-tasking arrangement of the PC-Xenix operating system, from Microsoft Corp. of Bellevue, WA. But there is little business software, such as spreadsheet and word-processing programs, available to run under PC-Xenix. More importantly, there is no intersection between the PC-DOS and PC-Xenix on the AT. Users working in PC-Xenix can't access information on PC-DOS applications software, where, in effect, the rest of the office's information lies. There is no software

bridge between the PC-DOS and PC-Xenix environments on the AT, unless a programmer intervenes.

At this time, several users on the AT can't be hooked up to IBM's new broadband PC network simultaneously. (The network was announced in August along with the PC AT.) This is because an AT needs to run PC-DOS 3.1 to be part of the network. Thus a user on a terminal connected to the AT can't be connected to the rest of the office-PC network. According to Hart, this shortcoming will be amended in the future.

The real loser in the AT announcement is IBM's PC XT, its hard-disk version which accounts for about 30 to 40 percent of all IBM PC sales. At roughly the same \$4,000 price, the AT offers double the hard-disk capacity, four times the floppy capacity and two to three times the processing speed.

One problem with the AT is its high-density floppy-disk drive (1.2 Mbytes compared with the standard 360-Kbyte drives on the PC). Any data written on the high-density drive won't be understood by a PC. According to Cayne, the answer is to get an optional 360-Kbyte floppy drive for the AT. Backup is the only obvious use for the 1.2-Mbyte drive, several analysts say, which might work better with tape, as the Compaq Computer Corporation did with its Deskpro personal computer.

Another factor is the new PC-DOS 3.0 operating system that will run on the AT. In the first quarter of 1985, IBM will offer PC-DOS 3.1, which is the same as PC-DOS 3.0 but also has the capability to hook onto the PC network. An upgrade from 3.0 to 3.1 will cost \$30. According to Cayne, the 3.0 version can only address up to 640 Kbytes of internal memory. The AT comes with either 256 Kbytes or 512 Kbytes, but expansion boards can be added to jack that up to 3 Mbytes. Cayne says to watch for a new version of PC-DOS that will be better able to take advantage of the larger internal memory on the AT.

(News continued on page 20)

LOCKED INTO FOCUS? NOMAD2'S LIBERATOR MAKES FOR AN EASY SWITCH



The best time to choose NOMAD[®]2 is before you develop FOCUS applications. But if you're currently using FOCUS, you're not locked in. And the reason is a new NOMAD2 facility called LIBERATOR.

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Is computer crime overrated?

Has the rise in computer crime been exaggerated? That's the conclusion of the statistic of a recent seminar on crime against businesses. The seminar was sponsored by Cardkey Systems, Inc. John J. Theiss, president of the Chatsworth, CA-based vendor of access-control systems, reported that about \$40 billion in white-collar crimes are committed against businesses annually. August Bequai, a Washington attorney and author specializing in computer crime, reported that these offenses cost American businesses at least \$100 million a year, or one-fourth of one percent of all white-collar crime.

The seminar was held in conjunction with the annual International Security Conference, which took place recently at the New York Coliseum. There was an imposing array of security systems and hardware on display. Most prominent were access-control systems, which come in a bewildering array and are based on a variety of methods, such as detection by body heat (infrared), ultrasound (sonar), audio, and proximity. Rusco Electronic Systems (Glendale, CA) featured a new low-cost system for smaller data centers. The base system, which can handle several doors, costs only \$6,000 and includes such sophisticated features as a timer that can block entrance at any given hour. Continental Instruments Corp. (Westbury, NY) offers a single-door system for \$1,500.

For a high-security system that doesn't require guards, Identix Inc. (Palo Alto, CA) has an access-control system based on fingerprint identification. Because this system takes at least five seconds to recognize an employee's fingerprint, it is not ideal for data centers with a great deal of traffic. If an unauthorized person attempts entry, the system stores his or her fingerprint for police inquiries.

Fingermatrix Inc. (White Plains, NY) offers a similar fingerprint security system called the Personal Touch Verification (PTV) unit which prevents any unauthorized person from accessing a restricted database via a CRT terminal.

Just as fingerprints can't be duplicated, Micro Card Technologies (Dallas, TX) claims their "smart card" can't be reproduced because—it thinks. The card contains confidential codes which include the cardholder's code (known only by the cardholder), and a secret code appointed by the issuer. If anyone besides the card owner tries to use the card, the microcomputer will "self-destruct," rendering the card useless. Using a smart card reading terminal supplied by Micro Card Technologies, a user types in his code to gain access. If an incorrect number is entered three times in a row, the card automatically self-locks, and can only be reactivated by the card issuer. The card has a built-in custom 8-bit microprocessor and 21,088 bits of memory. Prices for Micro Card Technologies' security system range depending upon the application. With six terminals tied to a host computer, the system would cost about \$4,000. For more information, call (214) 788-4055.

Office micros—are they "hot" or not?

Given its size and portability, the microcomputer is a prime target for theft. Many desktop computers are even smaller than a typewriter. And while there's no doubt that micro theft is on the rise, there is a controversy regarding the

extent of this problem. While the police remain skeptical, many security consultants agree that this crime is swelling in direct proportion to the increase in office micros.

To add to the confusion, there are relatively no records or statistics on the number of office-related micro thefts. Companies, too embarrassed to report their losses to the police,

account for this lack of information. (Those companies that wish to recover from their insurance carriers must inform the police.)

To further complicate matters, several major city police departments contacted by *Computer Decisions* don't keep specific records of computer theft. Instead, they usually lump stolen microcomputers into the category of stolen office machines or office equipment—which can include anything from calculators to typewriters or tape recorders.

There are signs, however, that an effort to get a handle on this unique form of theft is on the rise. The Special Thefts Squad of the Houston Police Department reports that in the first eight months of 1984 \$114,000 worth of computer-related equipment was recovered. (No similar stats were kept the year before.) According to a Houston policeman, most of the equipment is taken from office buildings, but some thefts occur in schools and private homes.

"It's really no problem at all," says Cpl. Joe Spralin of the Dallas Crime Prevention Bureau, referring to personal-computer theft in the Dallas business district. According to Spralin, a major portion of this type of theft occurs at retail outlets. And a New York City officer whose beat covers the Midtown Manhattan business district says, "Let's put it this way, office computer theft is not an epidemic. It's not as widespread as typewriter theft has become."

Harold Highland, editor of *Computers & Security* and author of *Protecting Your Microcomputer*, agrees. "The theft of personal computers from office buildings is a rarity," he says. "There are some instances where computers are stolen, but if you say this is one-tenth of one percent of total computer related theft, you're talking a high number." According to Highland, boards stolen from inside the computer are the biggest complaint made by major companies. Highland also says that retail outlets, department stores, and

(News continued on page 24)



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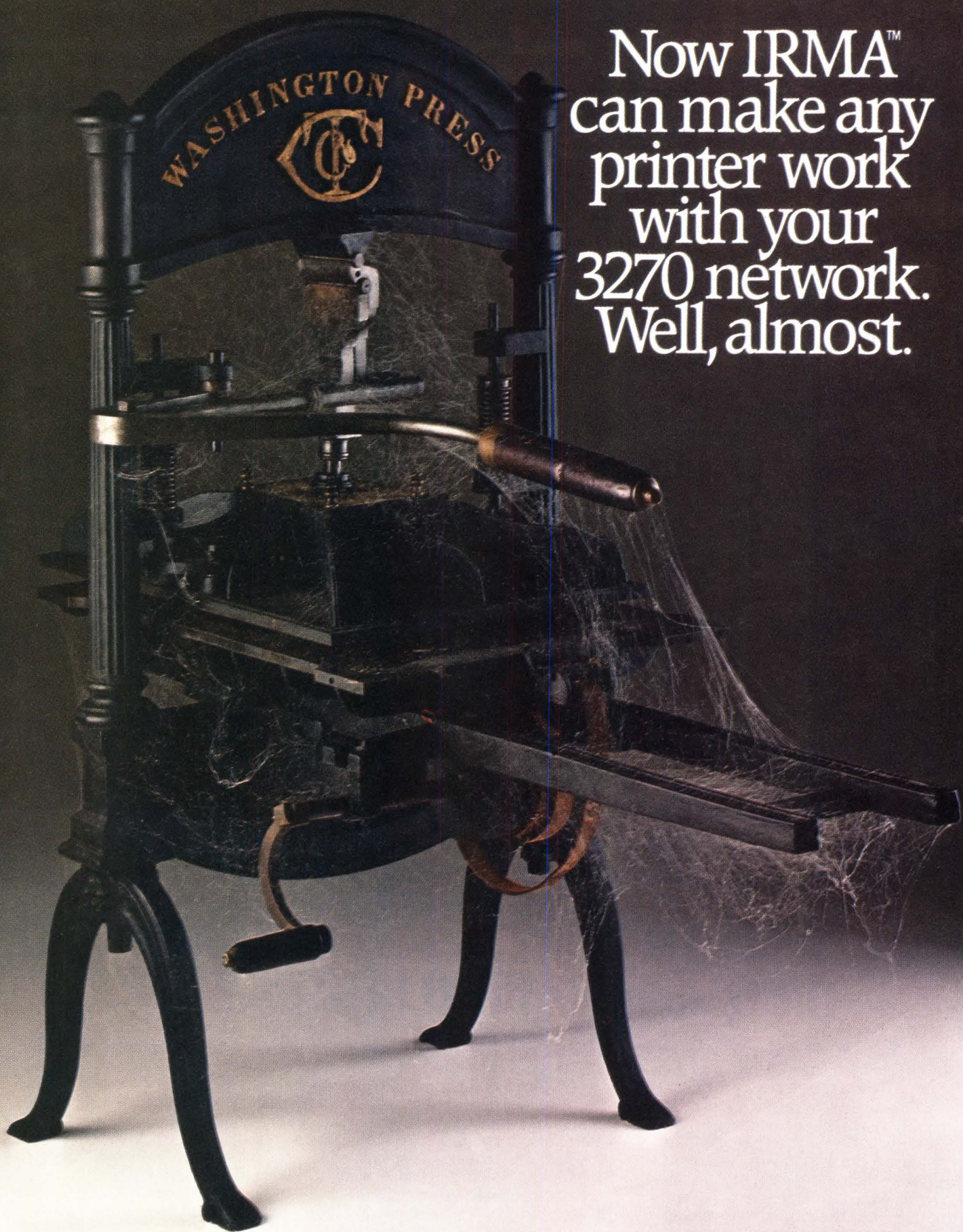
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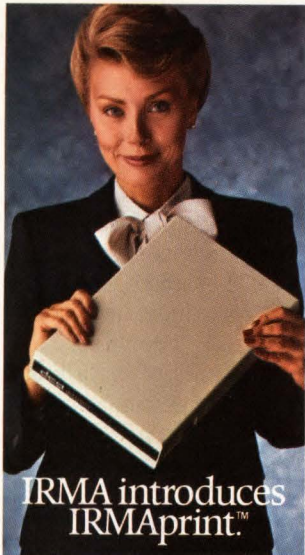
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NEWS & COMMENT

(Continued from page 20)

computer stores are the hardest hit by this crime.

David K. Johnston, chief executive officer for Safeware (Columbus, OH), a company that sells micro-computer insurance to businesses, disagrees with Highland. "Theft is the number one problem with computers. So far computers haven't been hit as hard as typewriters," says Johnston. "But to the police, a report of one or two microcomputers stolen from an office just doesn't leave the same

impression as 12 stolen typewriters, even if that one computer might be worth as much as all the typewriters combined."

Reed Philips, a security consultant at Advanced Information Management, security experts in Woodbridge, VA, says, "Microcomputer theft in offices continues to be a very large problem. One indication that there are heavy losses in microcomputers and equipment is the tremendous sales in alarm devices."

New ink-jet printer

Diconix, the Dayton, OH-based subsidiary of the Eastman Kodak Co., is offering the Dijit 1 ink-jet printer that uses a unique multiple-array technology that prints at speeds of 18 pages per minute and combines graphics and text at a resolution of 300 dots per inch. Dijit 1 will be available in the spring of '85 at OEM prices of from \$5,000 to \$7,500. The printer has 128 Kbytes of internal buffer memory, 500-sheet input-output bin capacity and can print on both sides of the paper. For more information, call Diconix at (513) 898-3644.



Diconix, the Dayton, OH-based subsidiary of the Eastman Kodak Co., is offering the Dijit 1 ink-jet printer that uses a unique multi-array technology that prints at speeds of 18 pages per minute and combines graphics and text at a resolution of 300 dots per inch. The Dijit 1 will be available in Spring 1985 at OEM prices of \$5,000 to \$7,500.

Anchor Pad (Marina del Rey, CA), a security-equipment manufacturer, is experiencing tremendous sales. The company reports that about 500,000 security-system units have been sold since the spring of '84. "People used to install one of our units after falling victim to theft," says an anchor spokesperson. "Now more and more buyers are installing security systems as a *preventive* measure."

Lt. Don Burdsall, head of the detective bureau for Cincinnati's downtown business district feels that the amount of time it takes for a company to even discover their computers are missing is a major problem. Often, the theft remains undiscovered until inventory is taken and by that time, the scent is cold. "We haven't had much luck catching them (the computer thieves)," says Burdsall.

So if a crime *is* being committed, who's the culprit? Philips says it's not burglars, but rather, insiders who are stealing the micros. He believes that employees steal them because of the commonality of home personal computers and business microcomputers. "Many companies complain that they are losing microcomputers and peripherals—all items that can be used at home."

Johnston disagrees. "Most thefts appear to be professional and targeted. That is, people are specifically going in to steal a computer, not just bits and pieces. They take the whole system, including disk and backup disks." —by Theresa Conlon

Fed software directory

Since your tax dollars fund the federal government's software development, the government is selling about 500 of its programs to the business sector. The programs are described in the 1984 Directory of Computer Software from the National Technical Information Service (NTIS). Listed in the 144-page booklet are mostly main-frame-software programs that pri-

marily concern scientific and engineering applications that have run on a variety of vendors' machines, such as those from IBM and Honeywell. The Ada compiler approved for Department of Defense applications is also available. The directory costs \$40. Call (703) 487-4600 for more information.

Trusting users for data integrity

According to a recent survey, "In users we trust" is the strategy of many dp and finance managers when it comes to accuracy, control, and security of data on personal computers.

The survey, done by the accounting firm of Price Waterhouse, headquartered in New York, shows that in corporations with more than 25 computers, data verification by users is by far (73 percent) the most common way of ensuring the accuracy and security of data and software during processing. Only about one-third of the respondents reported that they use more centralized input (batch) controls and read-but-not-write protection.

When asked how they ensure backup of information on micros, 83 percent said users are told to maintain backup copies of data files at regular intervals. Other, more centralized strategies, such as storing backup copies of disks in a protected area or forcing employees to submit them to supervisors at the end of the workday, were reported by only 20 and 8 percent, respectively, of the survey respondents.

The most popular way to limit access to micro hardware and software is to physically secure diskettes (58 percent) only allowing authorized personal to use certain machines (48 percent). Only 35 percent of the respondents having 25 or more micros said they have entry-level password protection, and only 15 percent said they have multi-level password protection.

Price Waterhouse did the survey

for the National Association of Accountants in New York. The results were based on responses from 138 individuals from 83 organizations. About 75 percent of these report over \$500 million in annual sales. Approximately one-third of the respondents' companies have more than 25 micros. About 85 percent of these managers reported that their micros are connected to other computers in their corporations.

Users were also asked how they ensure that their micro software packages are reliable. Sixty percent said they only buy popular packages that have widespread acceptance and use. About the same number said their dp department or micro users' group tests packages. About 40 percent relied on evaluations by other users and reports in computing magazines.

The results of the survey are available in an 83-page booklet entitled *Managing Microcomputers*, designed as a primer about the issues involved in implementing micros in the workplace. For a free copy of the booklet call (212) 754-9700.

PC-compatible comes with phone

Now you can buy an IBM-compatible personal computer with a built-in phone. At a suggested price of \$2,595, the ES.3 from Zaisan Inc. is targeted at executives and professionals who want to save desk space by combining micro and phone in a single unit.

The ES.3 combines the functions of the company's earlier ES.1 voice/data terminal with IBM Personal Computer-style local processing. The standard ES.3 integrates a full-featured telephone, a data terminal with a 9-inch screen, an internal 300-bits-per-second modem, a detachable keyboard, a 360-Kbyte, 5¼-inch diskette drive and business software.

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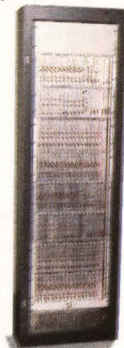
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NEWS & COMMENT

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Zaisan Inc., which draws its name from the Japanese word for fortune (although ownership and management are entirely American), can be reached at (713) 580-6191.

AI show comes of age

A I has gone commercial!" "This isn't an academic show any more!"

Such were the comments, either happy or unhappy (depending on the attendee's point of view), that greeted the fourth annual National Conference on Artificial Intelligence, labeled AAAI-84, last month in Austin, TX.

Managers, at least, will be pleased about the turnabout in this year's show, which was sponsored jointly by The American Association for Artificial Intelligence (Menlo Park, CA)

and the University of Texas at Austin. Commercial and practical applications of AI were seen everywhere on the exhibit floor, and tutorials and technical sessions stressed AI's role in business. Vendors at the conference were actually talking about making money from AI, a technology that has been a laboratory curiosity for 25 years.

It's only in the last 18 months that AI has become practical. Many of the attendees seemed to be less than 30 years old, reflecting AI's late development.

Big commercial names were on the exhibit floor, most for the first time. IBM (Armonk, NY) demonstrated research and advanced-development projects in expert systems, computer algebra, and educational systems. The products shown used both Lisp, the AI computer language in common use in the United States, and Prolog, the AI language being pushed hard by the Japanese. IBM has stayed out of AI for years, apparently because Big Blue's brass believed the future of AI was in software, not hardware. Evidently, times have changed.

Digital Equipment Corp. (Maynard, MA) was also much in evidence, presenting a new product, VAX Lisp, a "common" Lisp language for the full range of its VAX superminis. Among the other established hardware and software vendors were Apollo Computer (Chemsford, MA), Tektronix (Wilsonville, OR), Texas Instruments (Austin, TX), and Xerox (Stamford, CT), all of which offer both AI hardware and software.

But the big excitement was generated by the mainstream AI-hardware vendors, such as Symbolics (Cambridge, MA) and Lisp Machine Inc. (Los Angeles). Symbolics displayed its new 3670 and 3640 machines. One version of the 3640 was priced at \$69,000, thousands of dollars less than the traditional price of this type of machine.

Not to be outdone, Lisp Machine announced the Lambda 4X4, a full-function, high-speed, AI-software-

(News continued on page 32)

AI-expert shortage predicted

A lthough commercial applications of artificial intelligence—such as expert systems—are booming, there will be a serious shortage in the number of artificial-intelligence experts throughout this decade, according to Halbrecht Associates, a Stamford, CT, search firm.

More companies are recognizing that expert systems can be used to help inexperienced employees learn about specialized aspects of business. For example, a company may only have a few employees with many years' experience in making credit decisions in a bank. Expert systems can be used to help its junior executives make better choices in this narrow area of business.

For many years AI was only an academic concern. Now many corporations are looking into possible AI applications in their organizations, sometimes aided by outside consultants. Several MIS executives at large banking institutions are trying to understand how AI will fit into their organizations. "We're still trying to get comfortable with what the term 'AI' means," says Bill Cooke, a partner at Morgan Stanley, a Wall Street bank. "Is it a set of tools in a system designer's kit or unusual expertise requiring skills that only come with a great deal of training?"

Another question that must be addressed is who are the best candidates for AI positions? With a shortage of AI experts in industry and not many more in academia, many organizations may choose a technologically proficient employee from inside their staffs to learn AI applications, say several executives.

Hiring an outside AI expert can be costly. Some 20-year-old experts are making as much as \$80,000 annually, says Daryl Furno, a senior associate at Halbrecht. In addition to pay, they'll want access to their own computers and good working conditions.

Where do you find these experts? "You can't just go over to the city college and pick one," says Furno. A good way to acquire several experts is to hire a big name in the field who other, less luminary, AI stars will want to work with.

The ideal expert will have had hands-on experience creating or running expert systems, says Furno. The experience can be in another field because, like data processing, expert-systems experience is interchangeable among industries, she claims.

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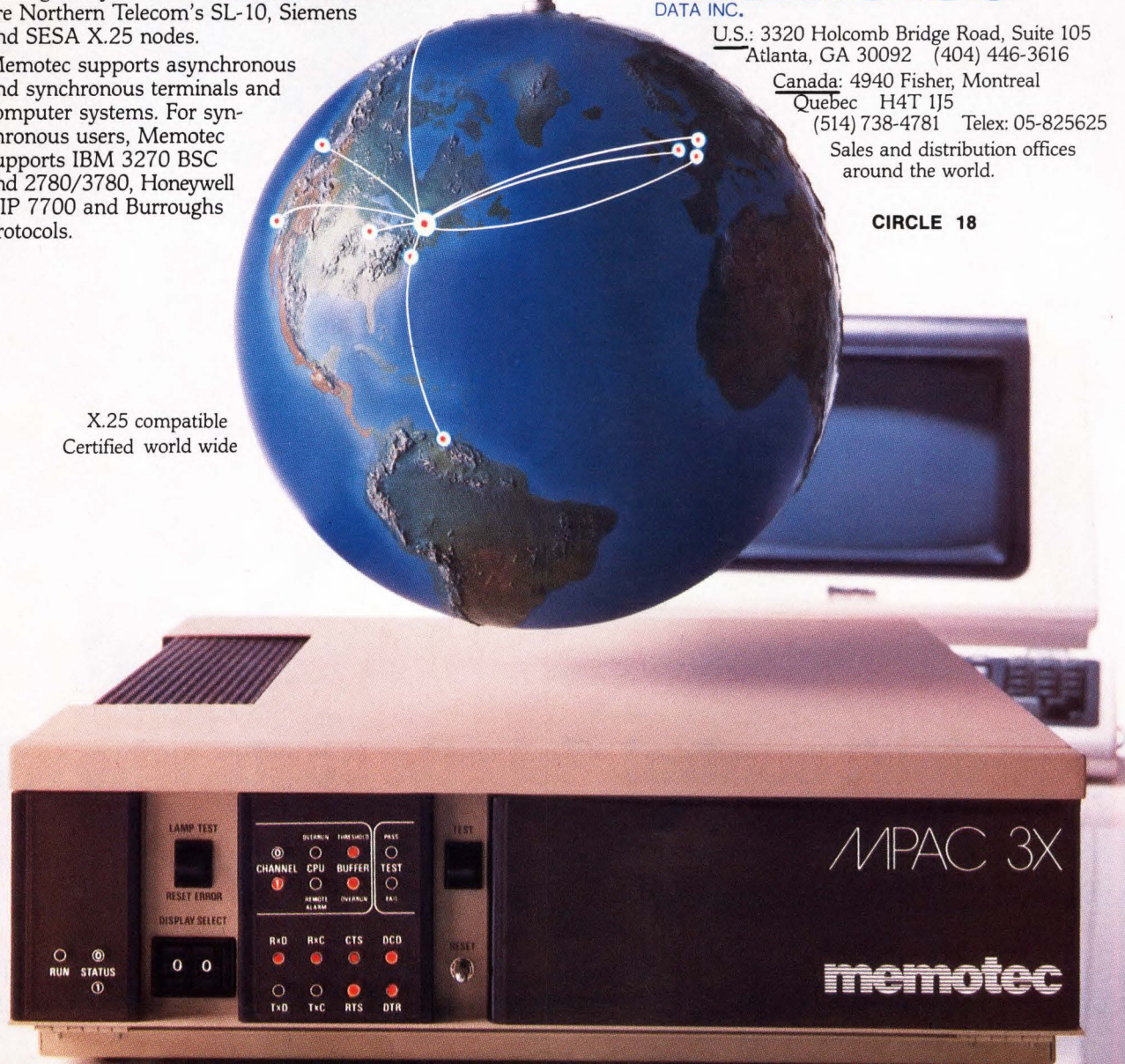
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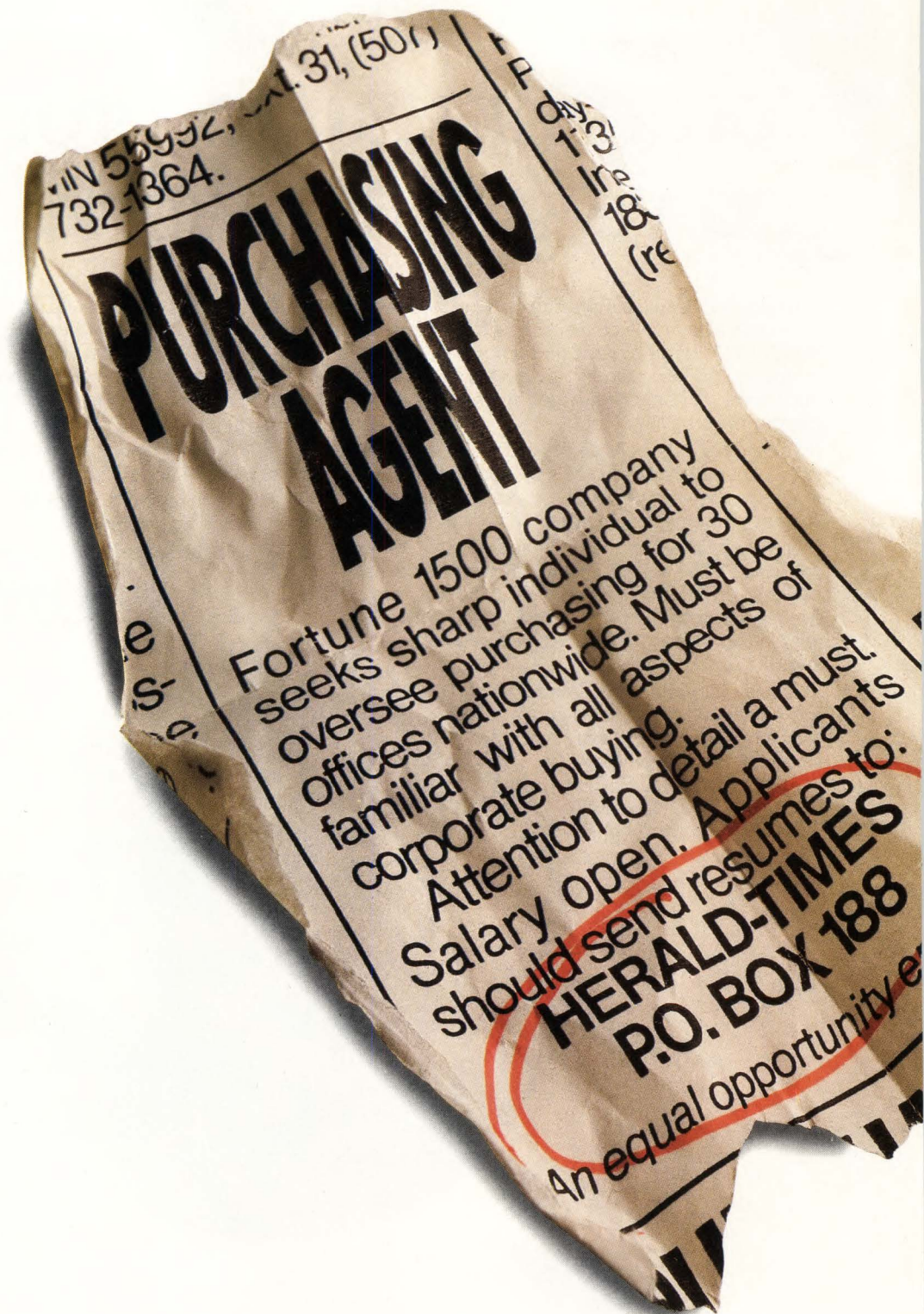
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NEWS & COMMENT

(Continued from page 28)

development station for four users priced at \$45,000 per user (less in quantity). All these developments show that the cost of AI is coming down to a level that's practical for corporations.

The AI software houses were much in evidence, too. Intellicorp (Menlo Park, CA) announced the latest release of its Knowledge Engineering Environment (KEE), which is touted as a significant step toward a natural-language AI interface. Gold Hill Computers (Cambridge, MA) presented Golden Common Lisp, the first common Lisp for personal computers. Also on the exhibit floor with new offerings were Inference Corp. (Los Angeles), Intellicorp (Menlo Park, CA), and Teknowledge (Palo Alto, CA).

Many of the name badges worn by attendees contained the names of large corporations, suggesting that many executives are becoming convinced that AI can save money, resolve previously unsolvable problems, or hone a competitive edge. The show generated a lot of excitement, and there was talk of splitting it next year into a commercial show and an academic show. Even a giant campus like the University of Texas at Austin can no longer contain all of AI.

—John Seaman

A "personal" secretary

Business micro users who do not have secretaries apparently are the target of a product that turns an IBM Personal Computer into an intelligent answering service and schedule keeper. Watson, from Natural Microsystems Corp. of Natick, MA, is a combined software-and-hardware package that for about \$1,000 keeps track of approximately 500 names and numbers. It not only answers the telephone and takes messages, but it also plays back previously recorded messages to specified callers, who can access Watson by inputting a special code into their Touch-

Tone phones. Users who are away from their computers can access Watson through any Touch-Tone telephone.

Watson consists of a floppy disk and a board with a 300-baud and/or a 1,200-baud modem that allows access to public-access databases and electronic-mail systems. Watson requires 192 Kbytes of memory and runs best on a PC with a hard disk. Users who want to use micro software and have access to Watson will have to acquire extra memory. Watson is scheduled to be available at computer stores later in the fall. Call (617) 655-0700 for more information.

Managing media

A free manual on how to store information material in the workplace has been published by Wright Line Inc., the office-furniture manufacturer from Worcester, MA. *Managing Information Media in the Automated Office* discusses problems encountered when diskettes, microfiche, and magnetic tape enter the workplace. The manual suggests that increased productivity can be attained by helping employees get the right information at the right time. Possible solutions include easy access to information through ergonomic workstations, proper filing and storage systems, and protective units. For details on obtaining a copy of the manual contact Wright Line Inc. at (617) 852-4300.

Translating word processor

Challenge Systems of Richardson, TX, has recently introduced the Translating Word Processor. Touted as the first desk-top computer designed for language translation, TWP translates from one language to another four times faster than manual translation. Spanish to English and English to

Spanish translations are available now, and other translations are being developed. To use the TWP, a typist keys in the text, and TWP produces a rough-draft translation with 90 percent accuracy, according to the vendor. A split-screen display lets the user see both languages while translation takes place. A split-print feature provides a side-by-side hardcopy printout of the original and translated text. TWP sells for \$25,000. For more information contact Challenge Systems at (214) 669-1101.

Laser-disk storage for PCs

Personal-computer users may be able to access up to 200 times the information available on a 10-Mbyte Winchester disk by means of a new laser optical-information system.

Reference Technology Inc., maker of the Clasix line of optical laser-disk products and services, believes that professionals who need immediate read-only access to a tremendous amount of information will opt for laser-disk storage. The Clasix product line is directly aimed at database vendors who must put information originally stored on magnetic tape or disks onto laser disks. The disks would then be sold to end users who have bought a drive that allows read-only access to the 12-inch optical laser disks that hold two gigabytes, or one million double-spaced typewriter pages of information. Clasix will market the drive to computer manufacturers and OEMs who would then sell it to end users.

Clasix has three components. It's a minicomputer-based service that converts information from magnetic tape to high-performance videotape. This information is sent to a third-party vendor such as 3M Corp., which converts it into a 12-inch laser disk that can hold data, video, and audio. The disk can then be placed in a drive that allows high-performance, read-only

(News continued on page 36)

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NEWS & COMMENT

(Continued from page 32)



access to the information through any minicomputer, personal computer or micro network that supports the ANSI SCSI interface.

The cost? A fully configured drive

that "plays" the laser disk will range from \$6,000 to \$9,000 in OEM quantities. Database vendors must pay about \$2,500 to transfer information from magnetic tape to one side of a

master laser disk. This master disk can then be duplicated at a lower cost. A set-up fee is also charged by the disk manufacturers.

For more information, call Reference Technology at (303) 449-4157.

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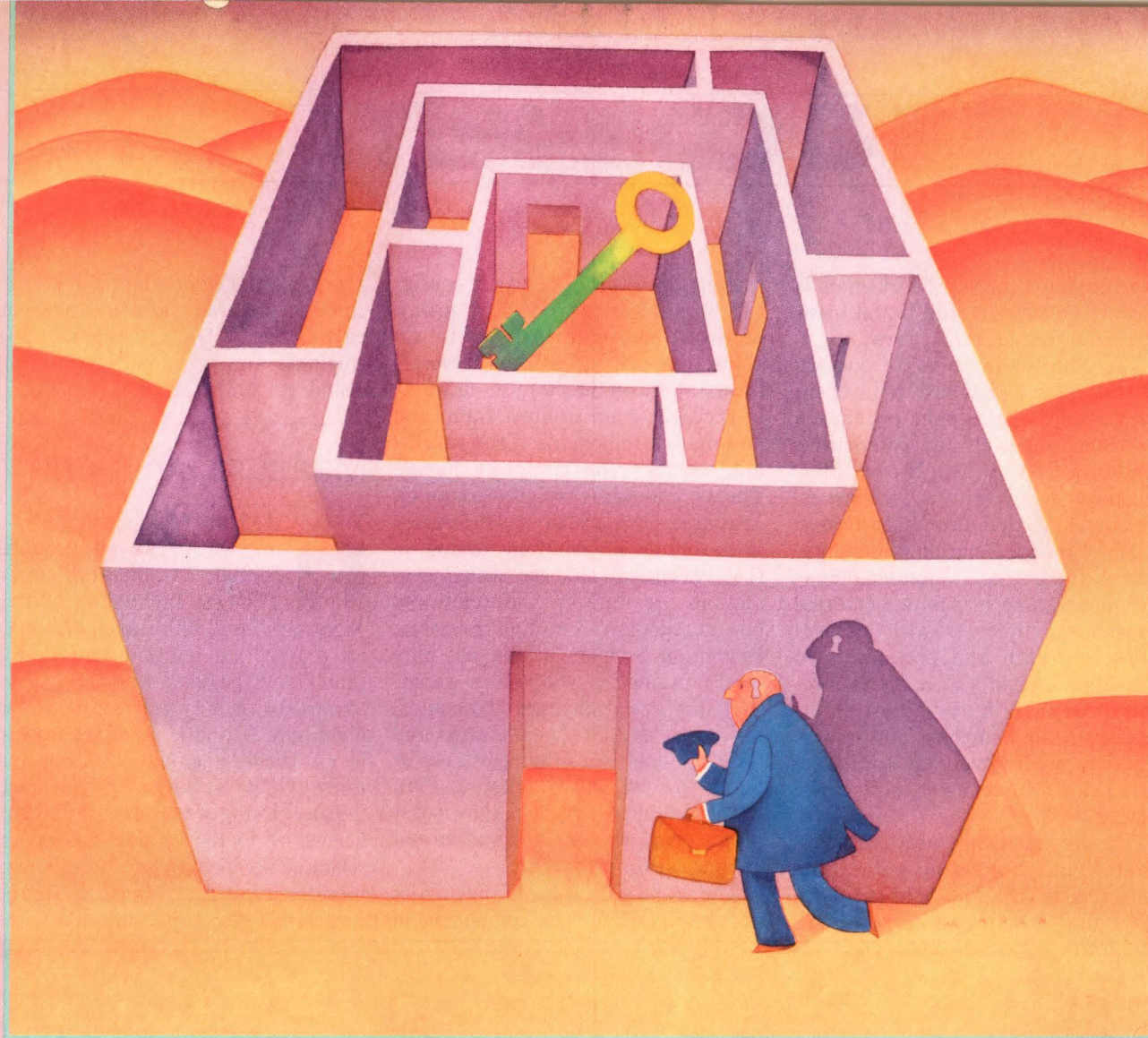
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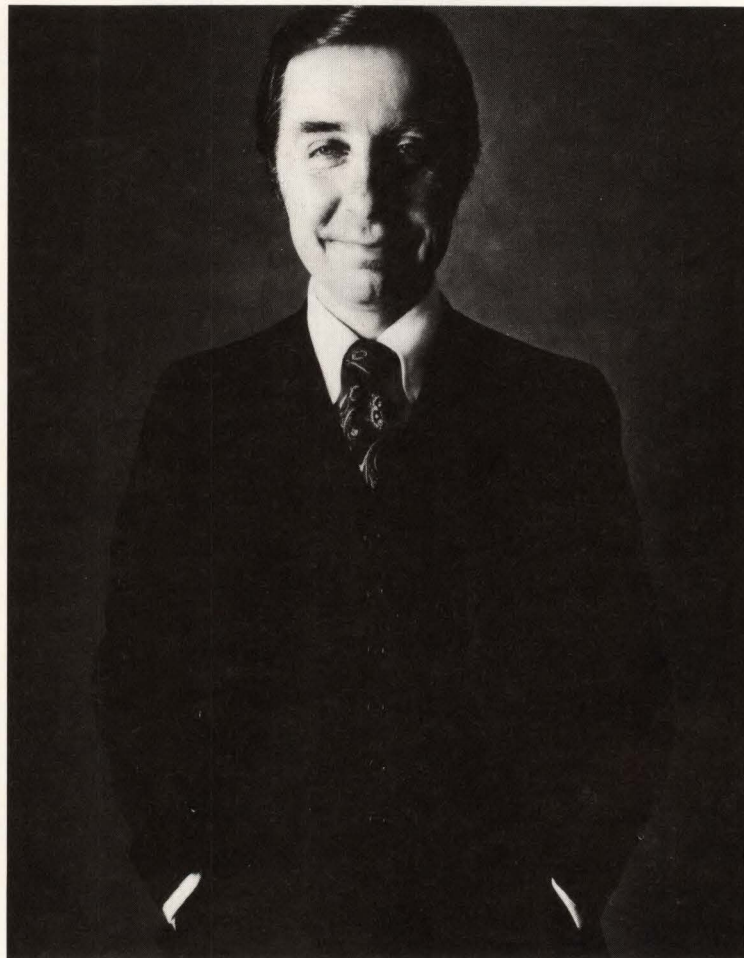
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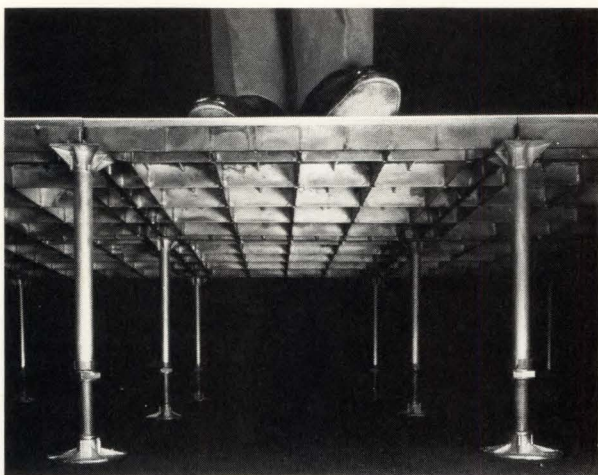
NEWS & COMMENT

computer via a cable and comes with a software program on a floppy disk. To monitor stress, a user places two fingers on the GSR monitor and uses the other hand to type on the keyboard. A number of changing visual

images are projected on the screen, the shapes and color intensity corresponding to the user's stress level.

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IBM to up mainframe software?

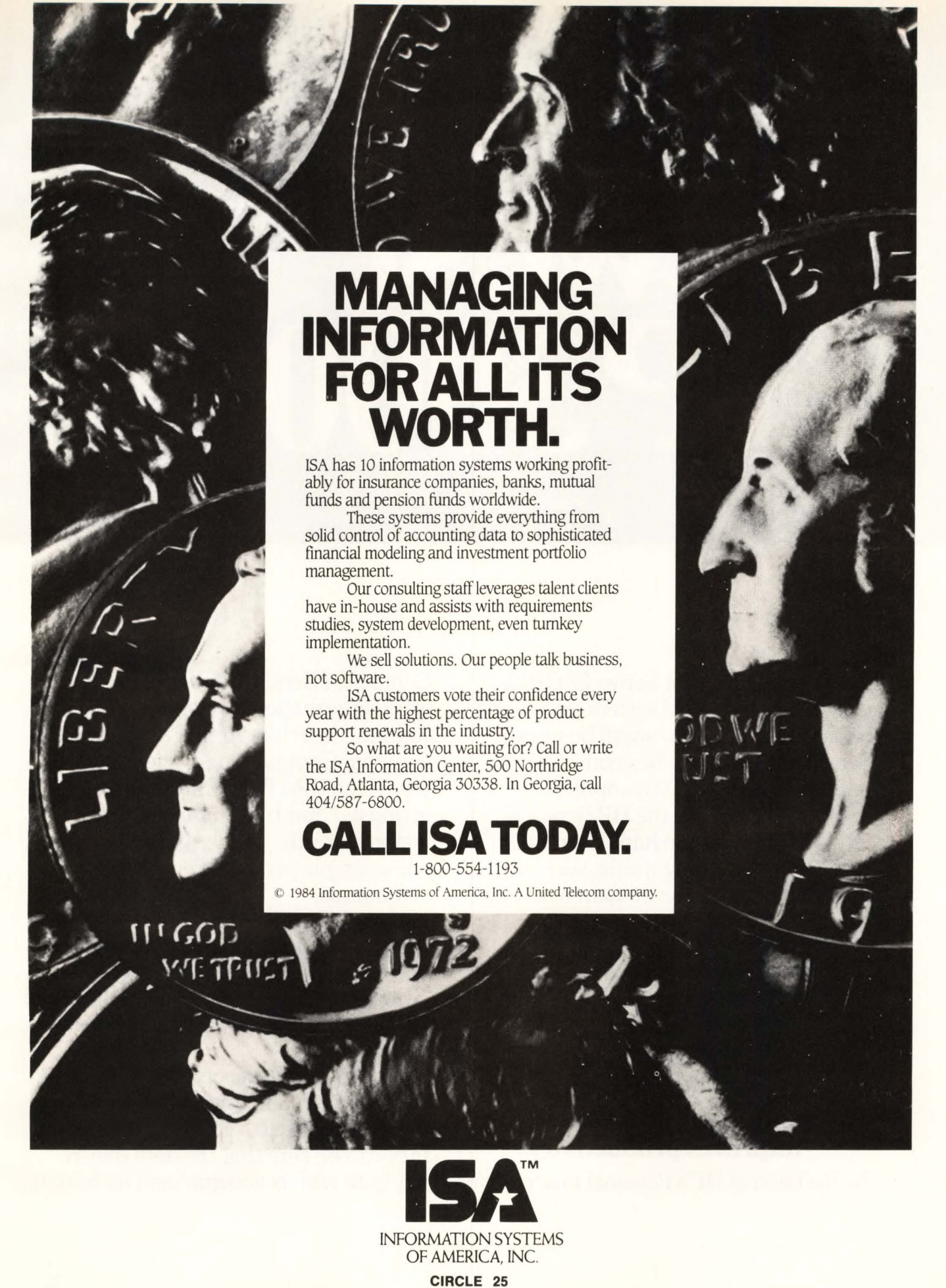
Potential IBM mainframe customers were greeted with good news last month as IBM slashed purchase prices on its 308X mainframe series from 12 to 16 percent. This was followed by cuts of from nine to 16 percent by Amdahl on its 580 series and a 12 to 16 percent cut by National Advanced Systems on its 8003, 9000, and 9100 mainframe lines.

The IBM mainframe price cuts renewed talk that the 308X series is reaching the end of its product cycle and that IBM is getting ready to introduce its successor, the so-called Sierra series. However, Charles Greco, director of financial services at International Data Corp., Framingham, MA-based market researchers, says IBM is looking to "squeeze more life" out of the 308X series and may delay Sierra until 1986.

Although the purchase price of large mainframes may be getting cheaper, many analysts speculate that IBM may soon want more revenue from its monthly mainframe-software rentals. One IBM watcher, Bob Djurdjevic, publisher of the Annex Computer Report, predicts a jump of 30 to 100 percent over the next two years. IBM spokespersons refused to comment on the possible price hike.

Many analysts note that IBM is expanding its software revenue by pushing customers to switch to its MVS-XA operating system, an increase of about threefold from the

(Continued on page 44)



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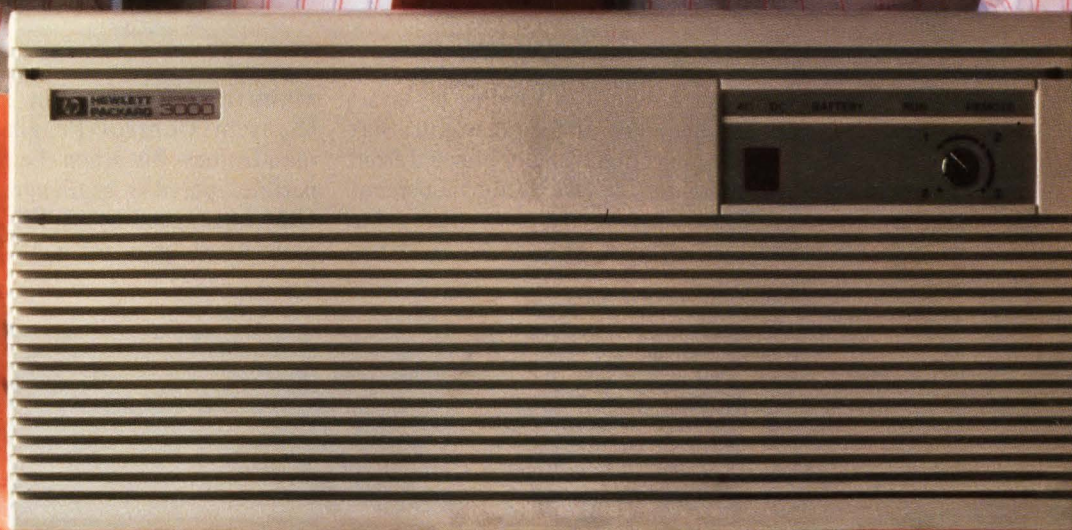
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NEWS & COMMENT

(Continued from page 40)

MVS, its predecessor. But Djurdjevic's thesis goes another step. He says that IBM's policy of selling rather than renting mainframes is resulting in a revenue gap that can best be filled by jacking up software rentals.

Djurdjevic projects that IBM hardware-rental revenues will continue to decline about \$2 billion a year—the same drop that occurred from 1982 to 1983 when rental revenues went from \$11.1 billion to \$9.2 billion. Now this revenue decline has been balanced by about a \$7 billion annual increase from hardware-sales revenues. But Djurdjevic predicts that annual hardware-sales increases will begin to drop significantly. IBM's statistics have been including customers who once rented mainframes but now purchase them. By 1986, IBM's statistics will have to accommodate this trend since its installed base will be completely converted from rental to purchase agreements, leaving an appreciable gap. This gap will lead to software increases, says Djurdjevic. He has projected how large the drop in hardware sales will be, but to get his forecast, you must pay for it. If you want more information, call (602) 956-8586.

Charles Greco notes that Djurdjevic's theory fails to take into account the existence of the IBM Credit Corp., which is taking up some of the slack in decreased hardware-rental income by, in effect, continuing the rental policy by buying mainframes and then leasing them to customers.

And where's Djurdjevic's proof that software prices will make up the slack? At the April 1983 annual shareholders meeting, when answering a question regarding the decreasing hardware-rental revenues, IBM Chairman John Opel noted that software and service revenues were "coming on pretty strong." But this 14 to 15 percent compounded average annual increase in mainframe-software costs since 1979 won't be able to cover the gap, says Djurdjevic. In addition, IBM recently instituted a 25 percent increase in large-system

software rentals in Europe, he says.

Djurdjevic also points out that IBM may not have fully profited from its software. In 1983, only 5.7 percent of the corporation's revenue came from software. Originally, IBM has

manufactured system software (System Control Programs) for mainframes. But when the plug compatibles posed a challenge in 1977, IBM introduced MVS/SE as an enhancement at a price of \$1,250 a

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month. "The users who went for this offer began a trip that will lead to a financial nightmare in the coming years," Djurdjevic says. This is because the introduction of the MVS-XA operating system tripled the

rental fee for a MVS/SP user from about \$2,000 a month to \$5,600 a month.

"IBM has obviously positioned itself well for the coming price hikes," Djurdjevic says. "Most of its software

is only available on a monthly rental basis. That's why IBM can really stick it to the user."

IBM's strategy to sell rather than rent hardware has been a gradual process that started in the 1970s, Djurdjevic says. In 1980, 50 percent were rented and 50 percent sold. In 1983, that changed to 72 percent purchased and 28 percent sold. According to Djurdjevic, IBM will eventually have to pay the piper when all customers convert to purchase agreements and it can no longer count on a steady rental income.

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CIRCLE 27

Computer pros pick winners

Ronald Reagan and Walter Mondale take note: Computer professionals surveyed in the last three presidential elections by the National Opinion Research Center (NORC) in Chicago have picked the presidential winner every time. The computer programmers and systems analysts surveyed as part of NORC's nationwide polls picked Reagan over Jimmy Carter in 1980 (56.1 percent to 29.3 percent), Carter over Gerald Ford in 1976 (55.9 percent to 44.1 percent) and Richard Nixon over George McGovern (55 percent to 45 percent). Of those surveyed, 33 percent of the computer professionals said they were Democrats, 20.3 percent were Republicans, and 43.9 percent were independents.

Although NORC doesn't distinguish between dp managers and MIS directors, those survey respondents identified as managers leaned more toward the Republican viewpoint. Like the computer professionals, they voted for Reagan over Carter in 1980 (53 percent to 38.7 percent), but they chose Ford over Carter (51.6 percent to 46.5 percent) and voted for Nixon over McGovern by a much greater margin (70.4 percent to 26.5 percent). The managers surveyed were equally divided among Democrats, Republicans, and independents.



by Susan Foster Bryant, Microsystems Editor

PERSONAL COMPUTING

It's been a taxing year

Managers, beware: You may spend the next couple of months writing more letters than you've written since you were a homesick kid at summer camp. . . .

"For an employee, non-reimbursed expenses incurred in the performance of services for his or her employer are deductible from the employee's gross income to the extent that the expenses are ordinary and *necessary* in carrying out his or her employment," states Thomas Boothe, an attorney with Haugh and Foote, Portland, OR. Before deducting personal computers from this year's personal income taxes, however, employees should know that the IRS has thrown a new punch: *Necessary* now means "required by your employer."

If you or your subordinates bought a micro after June 18 of this year for use at home, a new tax bill recently signed by President Reagan may cost you the deduction. The IRS, that long arm holding the government's purse strings, has a provision in the new bill that drastically shrinks the generous write-off available to employees who buy computers to do company work at home.

Until now, employees could deduct the full cost of a computer if the computer was used in the home for business reasons only. The amount of the write-off shrank if the machine was used to play "Donkey Kong" as well.

June 18 turned this tide of federal fairness. Now, just as you had to bring a note to your teacher to excuse an absence, you have to get a letter from your employer stating that the purchase of your computer for home use is required as a condition of employment.

Although this is bad news for you as an employee, consider the havoc it may wreak for you as a manager. During the next couple of months, you may be deluged with requests for these "permission slips." Until now, you've benefited from your subordinates' home-computer purchases because employees worked on company projects at home and became computer-literate as well. Now you'll have to spell out your work-at-home requirements in writing. It is expected that most companies will be reluctant to write these letters, which would help employees defend their deductions if challenged in an audit.

The problem is that the letter itself is not going to buy you or your subordinates an IRS seal of approval. If you are audited, you will still have to explain why you need the home computer. Why can't you just work late at the office?

You must keep clear records to support any deduction you claim. The following records, if accurately maintained, should strengthen your position: (1) the letter from your company; (2) all invoices for the original purchase of the equipment, software purchases, repair charges, consulting fees, or supplies; (3) a log with four columns: date of use, length of use in minutes, nature of use, and for whom the use was undertaken—each recorded at the time of use.

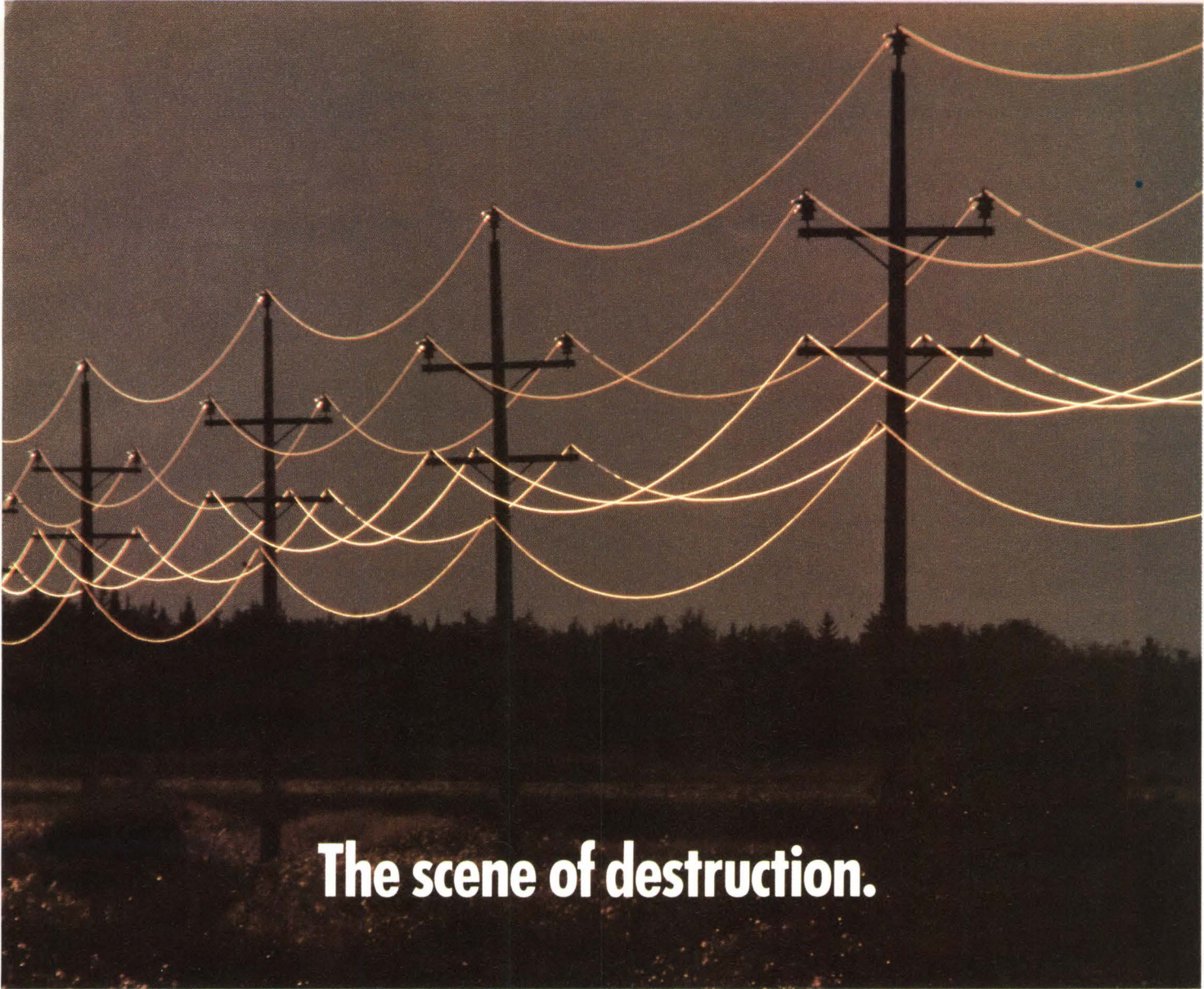
Maintaining these records will help you to demonstrate the amount of business use and to substantiate your deduction. With well-kept records, calculating your allowable deduction is fairly easy. First, divide all invoices into two categories: capital expenditures and expense items. Capital

expenditures include the purchase of the computer, peripherals, and software. Expense items include paper, repair, general maintenance, and the cost of items that will be consumed within the year or that are not expected to be useful for more than one year. Total the invoices in both categories.

Next, select a method of depreciation. Consult your attorney or accountant at this point. (The most commonly used depreciation method is the accelerated cost-recovery system.) Once you choose a depreciation method, determine the percentage of the lifetime of each capital expenditure—that is, the computer, peripherals, software, and so on—attributable to the present tax year. Calculate the appropriate depreciation for each item for the year. For example, the computer and its peripherals have different life expectancies.

An alternative is to calculate the lifetime of the entire system (computer, peripherals, and software) and determine the depreciable amount for the current year. Multiply the percentage of the lifetime of the capital expenditures attributable to the current year by the value of each capital expenditure. The result is the amount of depreciation available for 100 percent business use during the current year. For example, 20 percent depreciation $\times$ \$3,000 purchase price = \$600 depreciation for 100 percent business use.

Your next calculation is made from the log book. You will calculate the percentage of business use to home use. Write a fraction with the number of business hours as the numerator and the number of total hours as the denominator. Convert the fraction to a percentage. The result represents



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PERSONAL COMPUTING

the percentage of business use compared to the total use of the computer during the year.

For the final calculation, multiply the business-use percentage by the total amount of expense items for the year, and then multiply the business-use percentage by the allowable depreciation for the year. Add the resulting two figures together. That sum is the amount you may deduct from your gross income for the year.

In many cases, it is advisable for you to separate business expenses from home expenses on each invoice. Thus, in cases where paper and other expenses are solely attributable to business, these expenses may be carried in full to the bottom line of the expense column rather than first multiplied by the business-use percentage to determine what fraction of those expenses are deductible.

For example, let's assume you be-

lieve that a personal computer in your home would assist you in your work. Let's also assume that you've received a letter from your employer, retained all of your invoices, and kept an accurate and regular log. At the end of the year, you separate your invoices and calculate your business-use percentage. You find that you spent \$5,000 for your computer, the peripherals, and the software. You spent another \$1,500 on miscellaneous items, paper, and repairs. In total, you spent \$6,500 on your computer during the year. You also discover that 70 percent of your computer use was for business and that 70 percent of the supplies you bought were also attributable to business use. You make the following calculations:

Capital Expenditures:

\$5,000 divided by 5 years = \$1,000 (total depreciation available for year);
\$1,000 multiplied by 70 percent busi-

ness use (.70) = \$700 (depreciation attributable to business use)

Expenses:

\$1,500 multiplied by 70 percent business use (.70) = \$1,050 (expenses attributable to business use)

Total:

\$700 + \$1,050 = \$1,750 (total deduction for business use)

Assuming that you are in the 40 percent tax bracket, you will realize approximately \$700 in tax savings for the year. (\$1,750 multiplied by 40 percent = \$700.) Although this amount may seem very small, it is important to remember that it is a saving that is available to you.

Editor's Note: The information contained in this article does not constitute legal advice. Readers should contact their accountants to find out how these general principles can be applied to their own circumstances. □

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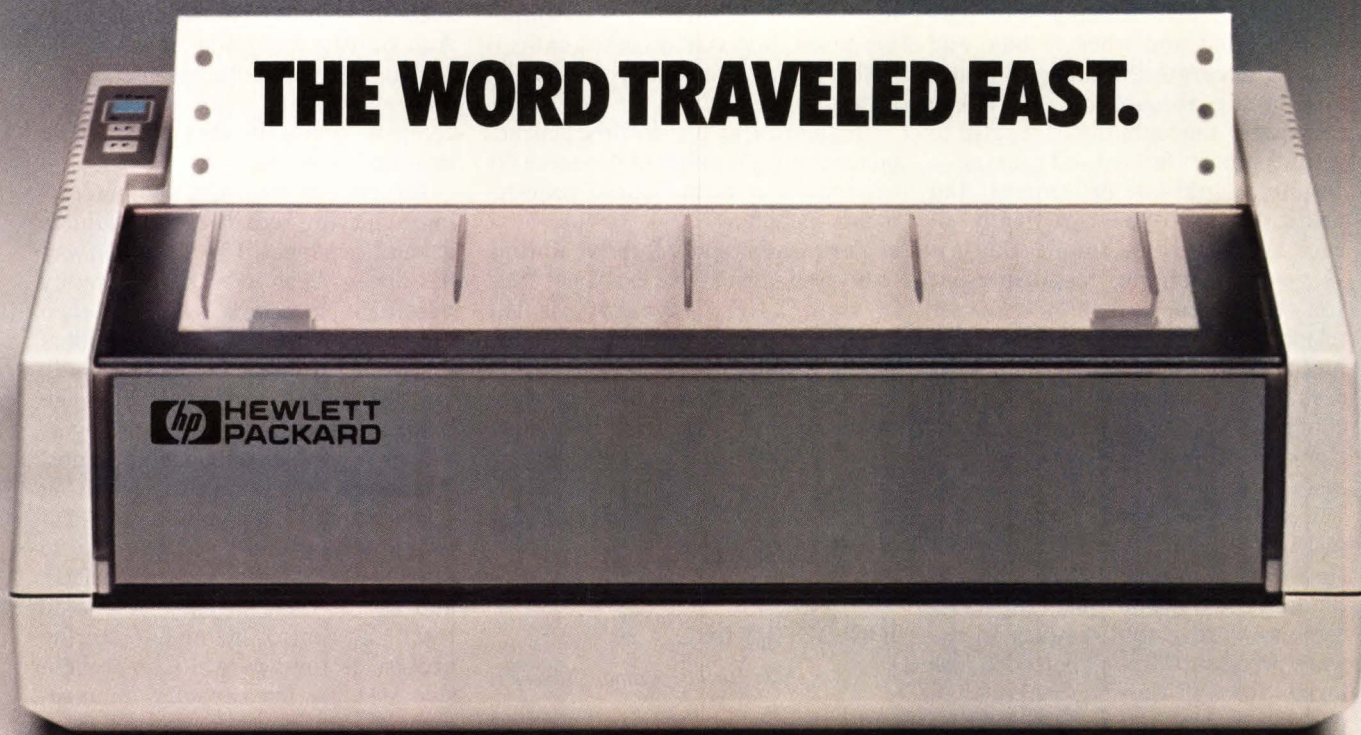
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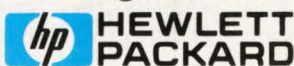
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STRICTLY SOFTWARE

Manufacturing systems: Can East meet West?

Your manufacturing-resource planning system (MRP) is finally pushing work orders through the plant, telling your purchasers what and when to buy, and passing accurate inventory information to the accountants. As a key member of the team that struggled to get this project funded and running—despite a multitude of technical and political snags—you can finally sit back and survey the results. But just as you're beginning to grasp what you've created, a factory manager telephones. "What do you think about just-in-time production?" he asks casually, raising questions that will challenge some of the basic assumptions upon which your planning system rests.

If you haven't been thinking about just-in-time, he'll probably tell you that the Japanese have achieved tremendous manufacturing efficiencies with it, that it relies on the work process itself to pull needed materials through the shop rather than pushing them through itself, and that it manages this via cards, called *kanban*, or some other tokens passed between those needing materials and those supplying them. "Why, the Japanese factories don't even need computers," he might say.

While his report is *almost* correct, there is, of course, much more to the story. An increasing number of American manufacturers are moving toward just-in-time practices and this development will have an effect on established MRP systems. But the two manufacturing approaches may not be as far apart as their push-pull descriptions imply. In some cases, MRP and just-in-time *can* work together. In fact, some observers contend, MRP provides the best path to just-in-time.

Under just-in-time, material ar-

rives at a workstation "just in time" to be worked on. The primary purpose of this scheduling is to minimize costly inventory. This approach also simplifies scheduling. Attention to quality is both a prerequisite and by-product of this technique.

Implementing just-in-time depends on reaching a number of not-so-easily attainable criteria. These requirements include:

- *Zero inventory.* Material waiting to be used must arrive early, not "just in time." Zero inventory is the primary goal that mandates all other requirements.
- *Small lot sizes.* Don't produce more than one item at a time since

"You can't make a plant work wonderfully just by changing the numbers in the computer."

Hall, Indiana University

keeping more than one set of components together simultaneously is contrary to zero-inventory goal.

- *Rapid work setups.* With small lot sizes and zero inventory, changes in operation must be made quickly in order to achieve any flexibility in production.

- *Zero defects.* A defective product can't be passed to the next stage on time and there will be no material on hand to make a replacement.

- *Short lead times.* The more time that elapses between request and delivery, the less likely the material will arrive on schedule. Lengthy lead times also give the manufacturing situation a chance to alter, sometimes changing the need for the material.

For some products, these criteria are not only difficult to meet, but im-

possible. Complex, customized products require a flexible manufacturing process that must rely on inventory to accommodate the continual changes. And *kanban* scheduling, in which the consumption of an item triggers work on a replacement, won't work unless a company wants the second item to be identical to the first.

But even in repetitive manufacturing, achieving zero inventory requires dramatic changes. The American way has always been to seek economy by purchasing materials in bulk and then shopping among competing vendors for the best prices. Job shops typically gobble these resources in large batches, which simplifies handling as well as saves time on machine setups. Together, these practices result in fairly large inventories and long lead times. MRP has evolved as a way to efficiently schedule the acquisition and use of these inventories and to track and control the manufacturing process as time passes. Comprehensive systems for capacity management, inventory reporting, and shop-floor control grew from initial efforts at materials-resource planning.

Should a company accomplish a transition to just-in-time, it would no longer need much of the help that MRP provides. If it used *kanban* scheduling, it would not need the computer to plan the work for each part, for example. Tracking small lot sizes through the factory for short periods of time would not require the sophisticated systems needed to follow batches on their long, meandering journeys. If a manufacturer achieved ideal just-in-time production, it might consider scrapping its materials-requirements planning, inventory control, and shop-floor control packages.

But don't move away from computers too quickly. According to many

(Continued on page 54)

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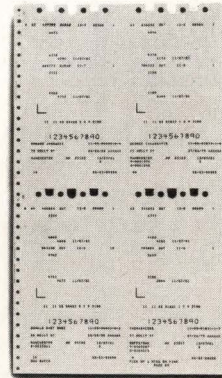
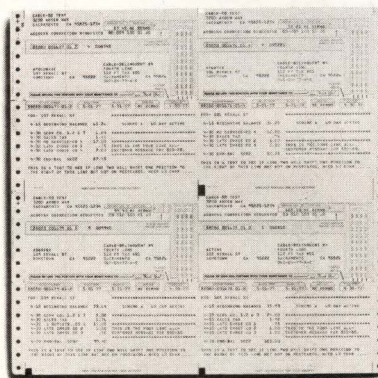
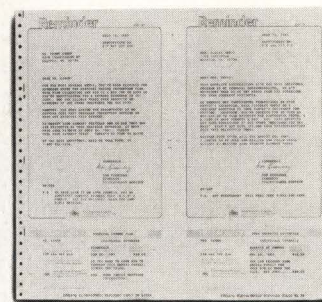
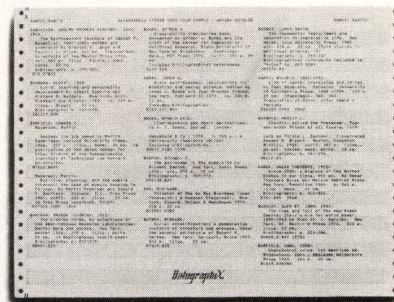
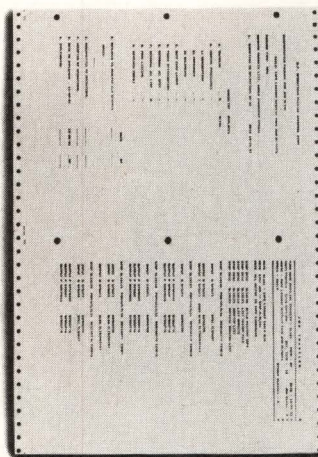
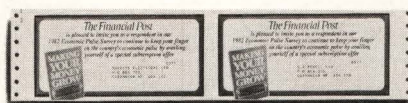
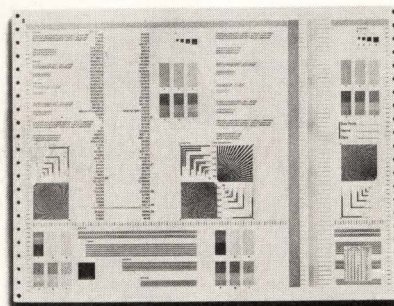
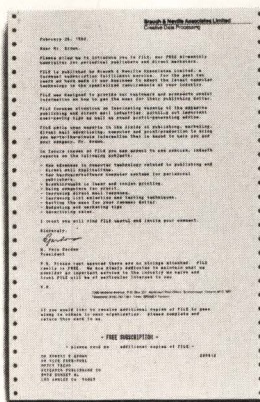
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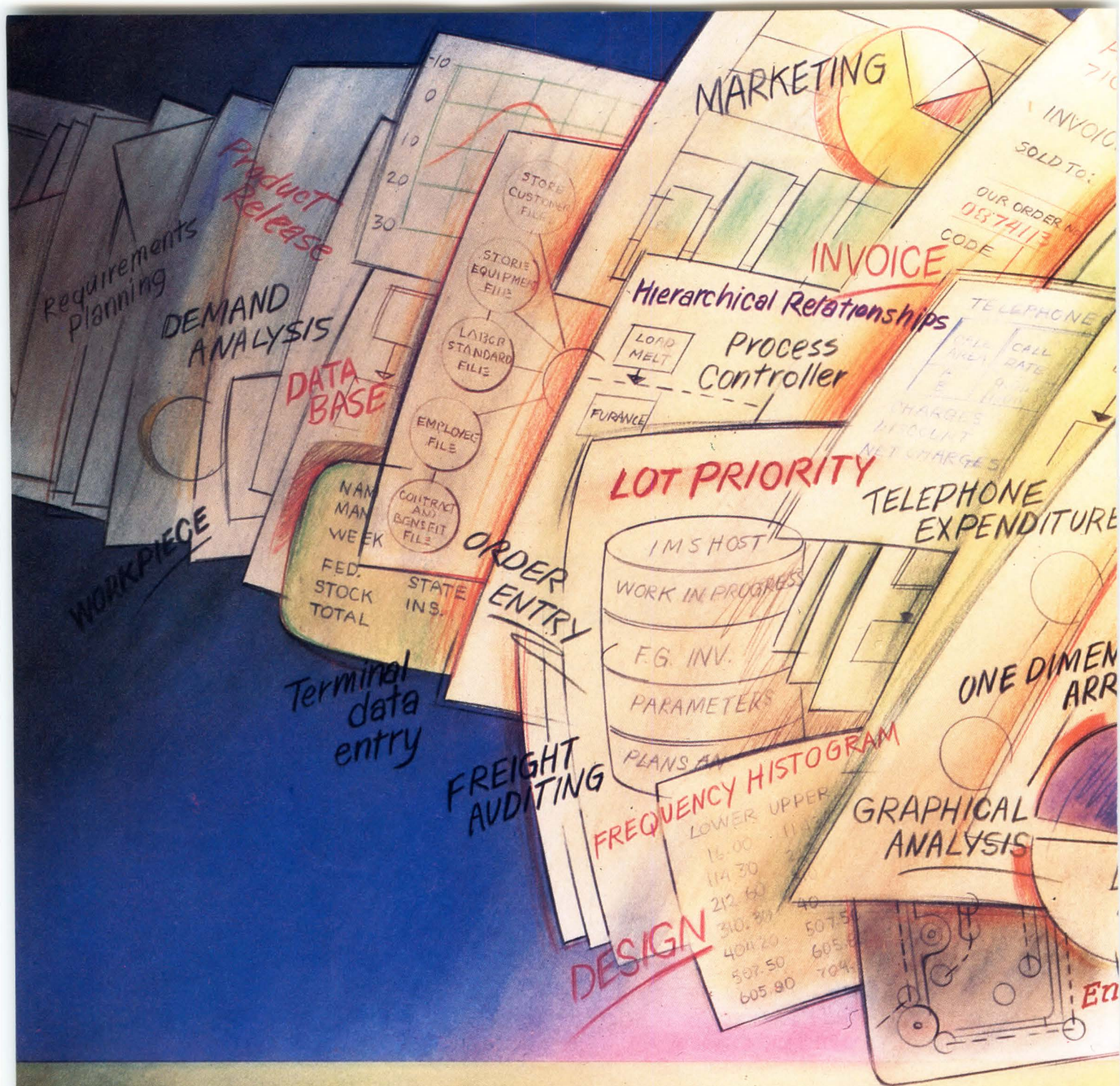
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STRICTLY SOFTWARE

(Continued from page 50)

observers, just-in-time is a goal—a final result. MRP can help companies work toward that goal and bridge any remaining gap between the ideal and the reality. And in a just-in-time situation, software can provide considerable help. These experts note that the Japanese companies that perfected kanban still use computers.

Whether a plant ties work schedules to customer orders, as in MRP, or to an aggregate level of demand, as with just-in-time, it must plan for sufficient materials and resources to create the products. According to Robert E. Hall of Indiana University, an expert in manufacturing operations, this planning is almost always a job for the computer. Under MRP,

Because *kanban* can only request replacements, it is only capable of reproducing the same item.

the materials-requirement-planning module explodes the bill of materials—the list of components needed to manufacture a product—into a work order that stipulates just what has to be done, and when, in order to complete a job.

The same package might be used to initiate a just-in-time schedule, he notes, but the plant probably won't require the detailed information it provides. It will only need to know the quantities of materials needed and estimated production rates. Rewriting the system to provide only necessary information can either be a simple or complicated process. "You may be able to rewrite only a subroutine here or there," says Hall, "But if that subroutine is connected to another, which is connected to yet another, and so on, you may end up working on it for six months."

Over the past few years, Stanadyne Diesel Systems, headquartered in Hartford, CT, has introduced just-in-time practices, including kanban

scheduling, into its production of fuel-injection systems and other engine parts. To initiate this system, it rewrote its materials-requirements planning package (originally PICS from IBM, later PIOS from Rath & Strong, Dallas). With the revised package, Stanadyne was able to suggest materials needs according to a master schedule based on a production-committee plan rather than on customer orders. The PIOS rewrite, which masks the system's order-number feature, required about 16 months' work by a six-person programming team, according to Jeffrey Anderson, manager of manufacturing systems.

It was far easier a change to give the system zero (or near-zero) lead times for the just-in-time materials. The materials-requirements planning system was designed to adjust schedules to account for lead times and was able to do its calculations at the lower levels just-in-time dictates. The manufacturer uses the system's bill of materials explosion to plan material quantities for its just-in-time operation, Anderson says. The system pumps the bill of materials data into a subsystem (written by the Stanadyne team during the 16-month project) that groups components into families of parts. This bill suggests daily production rates for these groups.

Although Stanadyne uses a single manufacturing system to cover operations in its four plants, it has not shifted to just-in-time across the board. It schedules the gut of its injection pumps using kanban, for example, and the housings and final assembly under MRP. For the pump's insides, tote-pans used for carrying components fulfill the role of kanban, circulating between supplying and using stations, pulling the parts and subassemblies through the shop floor. MRP provides the last pull to final assembly. "You can use materials-requirements planning where you must, and just-in-time where the opportunity exists," Anderson says.

The Stanadyne example shows

just-in-time being implemented at the lower levels of manufacturing. Other manufacturers that customize products during final assembly, such as automobile makers, will need to continue MRP to the higher levels to efficiently manage last-minute decisions. But many companies will first try just-in-time during the later stages of production, observers note, because reductions in setup times, a first step toward just-in-time, are achieved more easily then.

As the goal of zero inventory under just-in-time draws closer, it becomes easier to control inventory. Rather than following each item through a lengthy, complex shop-floor journey with thousands of transactions that

As the goal of zero inventory under just-in-time draws closer, it becomes easier to control inventory.

tax a computer's powers, one can assume that there is no inventory in the shop. This assumption allows what accountants call a post/deduct method of inventory reporting. This simply means multiplying the number of items made times each component listed in its bill of particulars and deducting the products from inventory. Part of the Stanadyne project produced a module that does precisely that.

More than one way

Not all observers are impressed by kanban's inventory-control features. Walter Goddard, president of Oliver Wight Education Associates in Newbury, NH, manufacturing-system consultants, points out that kanban resembles the two-bin, reorder-point approach that many American manufacturers scrapped as inefficient years ago. He contends that the push-pull differences between planned and kanban-controlled scheduling are

(Continued on page 58)



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STRICTLY SOFTWARE

(Continued from page 54)

unimportant. According to Goddard, when you make an item and send it to the next station, you're pushing it through. When you wait for the next station to come and get it, they're pulling it through. The results are the same. "The important point is not *when* you deliver the item," says Goddard, "but whether you're making the right item."

Because kanban can only request replacements, it is only capable of continually reproducing the same item. If it is necessary to make a change, kanban can't tell production what items to work on. For this reason, the Japanese manufacturers that perfected kanban use MRP when they launch new products. "Kanban scheduling is like steering a boat by watching the wake," says Goddard. "It works fine as long as you want to go straight ahead."

Goddard notes that planning will work whether you're reproducing the

same item over and over again or instituting changes. Therefore, he argues, the best route to just-in-time production is via MRP, not kanban. Under this approach, the plan's lead times are reduced and works-in-progress inventory is brought to as

The American way has been to seek economy by purchasing in bulk and then shopping for the best prices.

close to zero as possible. But the plan must reflect real changes in the manufacturing operation to allow for reductions. "You can't make a plant work perfectly just by changing the numbers in the computer," adds Robert Hall.

Changes that must be made to

achieve just-in-time include rearranging equipment to allow for repetitive operations, renovating machines—or buying new ones—that permit rapid setup, and training employees to move quickly from one operation to another to perform a variety of tasks.

It is essential to reduce the number of defects to near-zero during production. This requires close monitoring of operations and rapid adjustments to keep output within specifications. In many cases, workers can fulfill this function manually, taking measurements and performing simple statistical analyses by hand. Often, more sophisticated analyses of historical data will allow operators to identify trends and make adjustments or perform maintenance before trouble hits.

Personal computers—or terminals—on the shop floor can help with these analyses. They can accept data, either keyed in by the operator or fed

(Continued on page 62)

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Non-curved HOL-DEX label holders have also long been used for flat surface labeling in computer rooms everywhere. Ask your office supply dealer to order either type through United Stationers, or write for a free sample to the address below.



CEL-UD-EX Corporation
P.O. Box 4084 New Windsor, N.Y. 12550 914/562/4510



THE RAMIS II[®] INFORMATION CENTER GIVES YOU FREEDOM OF CHOICE.



RAMIS II MAKES YOUR INFORMATION CENTER WORK... FOR EVERYONE.

RAMIS II is the comprehensive software system developed with the Information Center user in mind. It meets the needs of both end-user and computer specialist,



allowing each to be significantly more productive.

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a powerful fourth-generation language for the experienced user.

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And, the choices RAMIS II offers do not stop with end-users. Your Information Center staff may select their own options in education and training, user assistance, and data security.

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Only RAMIS II integrates the choices that both end-users and computer specialists need to make the Information Center work... for everyone.

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Computer Operating System

CD 10

MARTIN MARIETTA

RAMIS II... THE LEADER BY DESIGN

The New Cincom: 10 the only software ve

Finally, there's one software vendor offering a sophisticated software information network capable of meeting all of your corporate, departmental and personal information software needs—The New Cincom Systems. Organizations around the world are discovering that working with Cincom's integrated family of products enables them to greatly improve both performance and productivity. Here are just 10 of the many reasons why you should be considering the New Cincom software information network for your company:

#1 Relational Data Management Technology

Powerful relational data management technology forms the "nucleus" of our software information network. Using a unique "Logical View" concept, all applications operate directly with "derived relational tables." As a result, we can provide complete data structure independence, as well as the high performance needed for today's production environments. This relational technology is the nucleus of both our TIS™ family of information products for IBM users and our ULTRA INTERACTIVE DATA BASE SYSTEM™ for DEC™ VAX™ users.

#2 Fourth Generation Application Development

The perfect complement to our relational data management technology is our industry acclaimed 4th Generation application development system, MANTIS™. In more than 1,500 complex production environments, MANTIS is dramatically reducing the application backlog through its powerful ability to "prototype," refine and commit the application to production in one interactive sitting.

#3 Manufacturing Control Software

CONTROL: MRPS is our sophisticated manufacturing control system that is fully integrated with our relational data base

You should know how our integrated family of software technologies meets all your information processing needs.

The New Cincom is an integrated family of information management software solutions that have been developed over more than 15 years of satisfying experience, more than 3,500 users. From this understanding of the needs of information-handling problems facing the business world today.

Our approach to information processing identifies three different business levels in today's typical organizations: corporate, departmental, and personal. And we've developed a comprehensive, integrated network of software technologies that satisfy those needs through three levels of implementation: Strategic, Tactical, and Local.

The New Cincom's family of software technologies provides the optimal, integrated solution for all three levels of your company. And when used individually, they completely satisfy your specific requirements and provide a flexible foundation that will adapt to your future information processing needs.

The New Cincom: Integrated Family of Software Technologies

The New Cincom's family of information management solutions comprises five integrated software mainframes for environments from the micro to the mainframe.

- Relational Data Management
- Application Development
- Decision Support Applications
- Business Control Applications
- Network Management

The foundation of our product line is the Nucleus relational data management system. It provides a logical view of data that insulates programs from the DBMS, data structures, accessing and navigation strategies, and physical environment.

CRICKET™ is our MANTIS 4th Generation technology applied to the IBM PCXT-370 environment. It provides the same powerful

performance and productivity of our TIS™ family of information products for IBM users and our ULTRA INTERACTIVE DATA BASE SYSTEM™ for DEC™ VAX™ users.

Application Development

The perfect complement to our relational data management technology is our industry acclaimed 4th Generation application development system, MANTIS™. A major breakthrough in software technology, MANTIS is a system available that provides complete, beginning-to-end, on-line application development—all in one sitting. By using highly effective methodologies such as prototyping, MANTIS helps you dramatically reduce backlog.

Business Control Applications

MRPS is our sophisticated manufacturing control system that is fully integrated with our relational data base

Decision Support

A high priority in our needs management solutions for the business level of needs is the personal, local mainframe and micro environments.

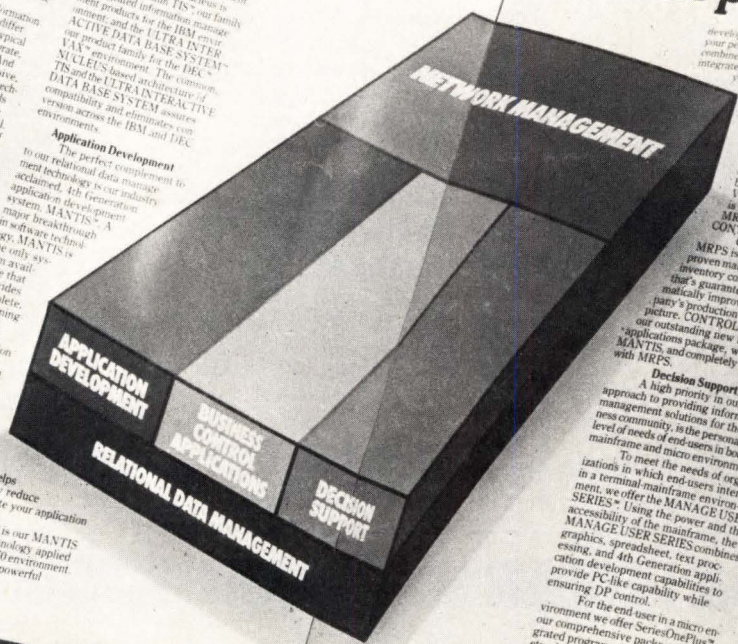
Network Management

NETMASTER™ is the foundation of our network management technology. It's a comprehensive approach to managing computer networks, distributed data, and distributed processing. NETMASTER is an advanced network management application program that lets you realize the full potential of its multiple-terminal, multiple-application, and multiple-CPU investment.

The New Cincom: Excellence In Software Technology

The balance of this brochure provides a more detailed overview of our five integrated software technologies. Look closely at what Cincom Systems has to offer. We believe that our new product line (every product either begun or completed in the 1980's) provides the highest degree of reliability, integration, and performance in the industry.

When you see for yourself what the New Cincom Systems is all about, you'll understand why the words "Excellence In Software Technology" fit so well under



developmental tools as MANTIS for your personal computer. And when combined with PC CONTACT™ our integrated micro-mainframe link, you can use CRICKET™ to interact directly with the mainframe.

Business Control Applications

MRPS is our sophisticated manufacturing control system that is fully integrated with our relational data base

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When you see for yourself what the New Cincom Systems is all about, you'll understand why the words "Excellence In Software Technology" fit so well under

reasons why we're endor you'll ever need.

technology. A complete closed-loop system, MRPS is improving the productivity and profitability of over 125 IBM and DEC VAX manufacturing environments around the world.

#4 Financial Control Software

CONTROL: Financial is our sophisticated financial accounting and control system which molds to the way you do business. Integrated directly with MRPS, **CONTROL:** Financial includes Accounts Receivable and Credit Management systems with Accounts Payable soon to follow.

#5 Advanced Network Management

NET/MASTER™ is one of the most recent additions to the New Cincom family of integrated products. Very simply, **NET/MASTER** is an advanced network management system that takes the complexity out of managing a sophisticated IBM computer network and lays the groundwork for distributed data base processing.

#6 The Interactive Mainframe—Micro Link

Further expanding the capabilities of our software information network is **PC CONTACT**, our mainframe-micro link which enables users to interactively upload/download data between the mainframe and IBM PC's. **PC CONTACT** gives the PC user the ability to access multiple file types stored in the corporate data base for Decision Support manipulation.

#7 Micro Decision Support Software

For comprehensive micro-level Decision Support we offer **SeriesOnePlus™***. **SeriesOnePlus** includes file management, spreadsheet, graphics, reporting and word processing components that are all integrated through a unique "BUS" architecture. Because the system is designed exclusively for business situations, **SeriesOnePlus** complements any mainframe-micro network strategy.

#8 Mainframe Decision Support Software

The recently introduced **MANAGE USER SERIES™** provides powerful Decision Support capabilities for the mainframe user. The **MANAGE USER SERIES** combines graphics, spreadsheet, text processing and application development tools to enhance the use and display of corporate data.

#9 Client Support

The one thing that isn't new about Cincom is our unrivaled commitment to service, support and user education. When you choose Cincom you can be assured of the highest caliber of support.

#10 Software Excellence

Why the New Cincom? Well, we like to think of ourselves as the New Cincom because every product in our software information network has been released since 1981. And, quite frankly, we

believe our new products provide the highest degree of reliability, integration, performance and value in the industry. As proof, just look at our sales. From 1982 to 1983, **TIS** sales rose 136%, **MANTIS** sales rose 50%, and **MRPS** sales rose by 45%. For even more proof we invite you to personally compare our products with what our competitors are offering. Then you'll understand why the words "Excellence In Software Technology" fit so well under our name.



To Learn Even More About Cincom Call Or Write For Our Brochure: "THE NEW CINCOM: WHAT EVERY INFORMED SOFTWARE BUYER SHOULD KNOW."

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2300 Montana Avenue
Cincinnati, Ohio 45211
Attention: Marketing Services Department

1-800-543-3010
In Ohio: 513-661-6000
In Canada: 416-279-4220

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Address _____
City _____ State _____
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Cincom Systems

Excellence in software technology.

STRICTLY SOFTWARE

(Continued from page 58)

in directly by an automated testing device, perform preprogrammed analyses, and immediately print out or display results. The shop-floor computer or terminal might also help assess quality measurements by

querying a database that stores standard tolerances. Such data may have been entered automatically by engineers using a computer-aided design and manufacturing system. If the findings indicate that maintenance is

necessary, the workers can communicate with a decision-support system that helps allocate maintenance resources efficiently. Software for all these functions exists.

Just-in-time also requires a fundamental change in the relationship between supplier and consumer companies. It works well in Japan because of the close cooperation that exists between material vendors and users. This allows kanban scheduling to extend to a factory's loading docks. If a truck arrives with material from a vendor, it does not unload unless kanban requesting the replenishment are at the dock. The vendor can tolerate this arrangement because it may well be operating under kanban itself and because it can be sure the user will hold to a smooth level of demand.

American manufacturers and their vendors, used to haggling over contracts, have far to go before reaching this level of cooperation. Given our free-market culture, they may never achieve it. Meanwhile, although many manufacturers may be working toward this level of cooperation, the unilateral move toward just-in-time by user companies strains relationships with suppliers. Supplier companies won't happily acquiesce to acting as warehouses so their customers can operate at zero inventory. Nor will they easily swallow goods pro-

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Dallas	Indianapolis			San Francisco	Washington, D.C.

Just-in-time requires a fundamental change in the relationship between supplier and consumer companies.

duced to fulfill an expected need that doesn't materialize because the customer changed plans in midstream.

To allow their suppliers to accommodate just-in-time schedules, user companies must provide accurate information on orders as early as possible. To do this, they'll need long-range planning and up-to-date data

(Continued on page 65)

MAXICALC II™

It's all you'll ever need in an electronic spreadsheet.

What's the best and most cost-effective way to meet the growing end-user demand for electronic spreadsheets? If you have a CICS system, the answer is MAXICALC II. Within hours, and with-
out extra investment in hardware, MAXICALC II lets you offer electronic spreadsheet capabilities using every CICS terminal in your system. Equally important, only MAXICALC II lets you link-up mainframe spreadsheet data and the information developed on your present and future PCs.

Electronic spreadsheets without PC investment

Most end-users who ask for PCs in their department really want and need only their spreadsheet capabilities. With MAXICALC II, you can give everyone the spreadsheet capabilities they need... plus the computing power, information storage facilities and security of your existing mainframe. And importantly, MAXICALC II keeps the need for end-user support from your DP professionals to a minimum.

Lets your stand-alone PCs access mainframe data.

MAXICALC II also gives you the means to link-up your existing personal computers with your mainframe. With the Oxford pcMainframe™ option, all IBM or plug-compatible PCs can upload data into MAXICALC workbooks and download mainframe data for use on the PC in a manageable, condensed form. This enables PC users to share selected spreadsheet data efficiently throughout the entire CICS system. With MAXICALC II and the pcMainframe option, your entire complement of 3270 terminals, printers and PCs become an efficient system to share and consolidate spreadsheet data.

As easy to use as the popular PC spreadsheets.

Even though MAXICALC II operates through your CICS/VS system, it provides all the simple-to-use operations that have made PC spreadsheets so popular.

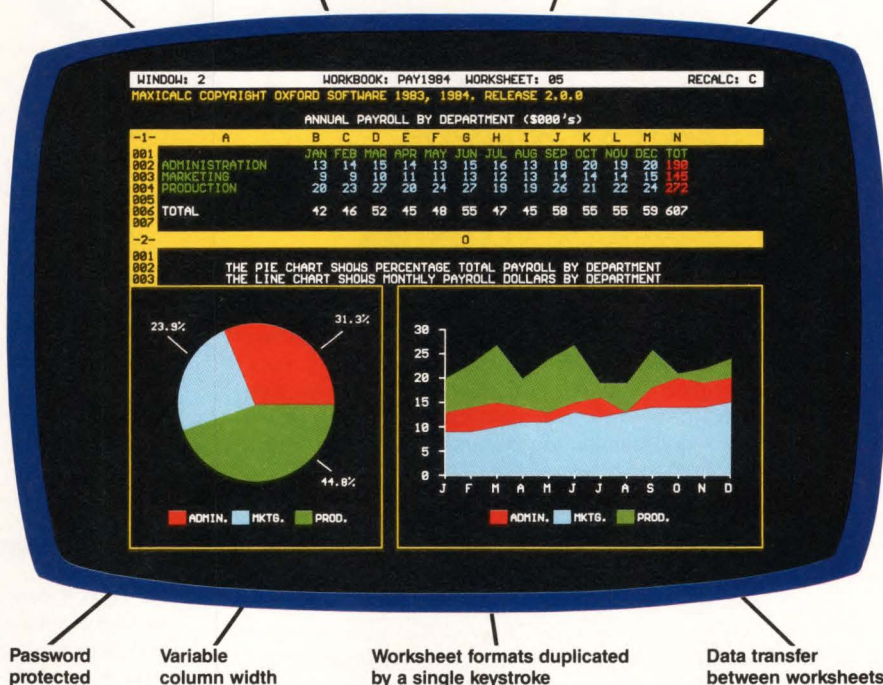
With MAXICALC II, users can master the simple English commands in a matter of minutes...and be on their way to better decision-making performance the first time they use it.

64 column by 999 row worksheets

99 worksheets per workbook

Up to 4 windows on one screen

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And unlike some other mainframe spreadsheets, you don't have to be a programmer to use MAXICALC II's advanced features. That's critically important!

And to assure that MAXICALC II is easy to use, there's a step-by-step tutorial, a handy quick reference guide, and even video training available in the educational package. No other spreadsheet package goes so far.

In addition, with MAXICALC II, DP management is assured of complete system control. You have the ability to limit the number of concurrent users, as well as the number who are recalculating or creating graphic displays. This guarantees that system performance is always under your professional control.

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- ☐ Send literature on MAXICALC II and Oxford's other products.

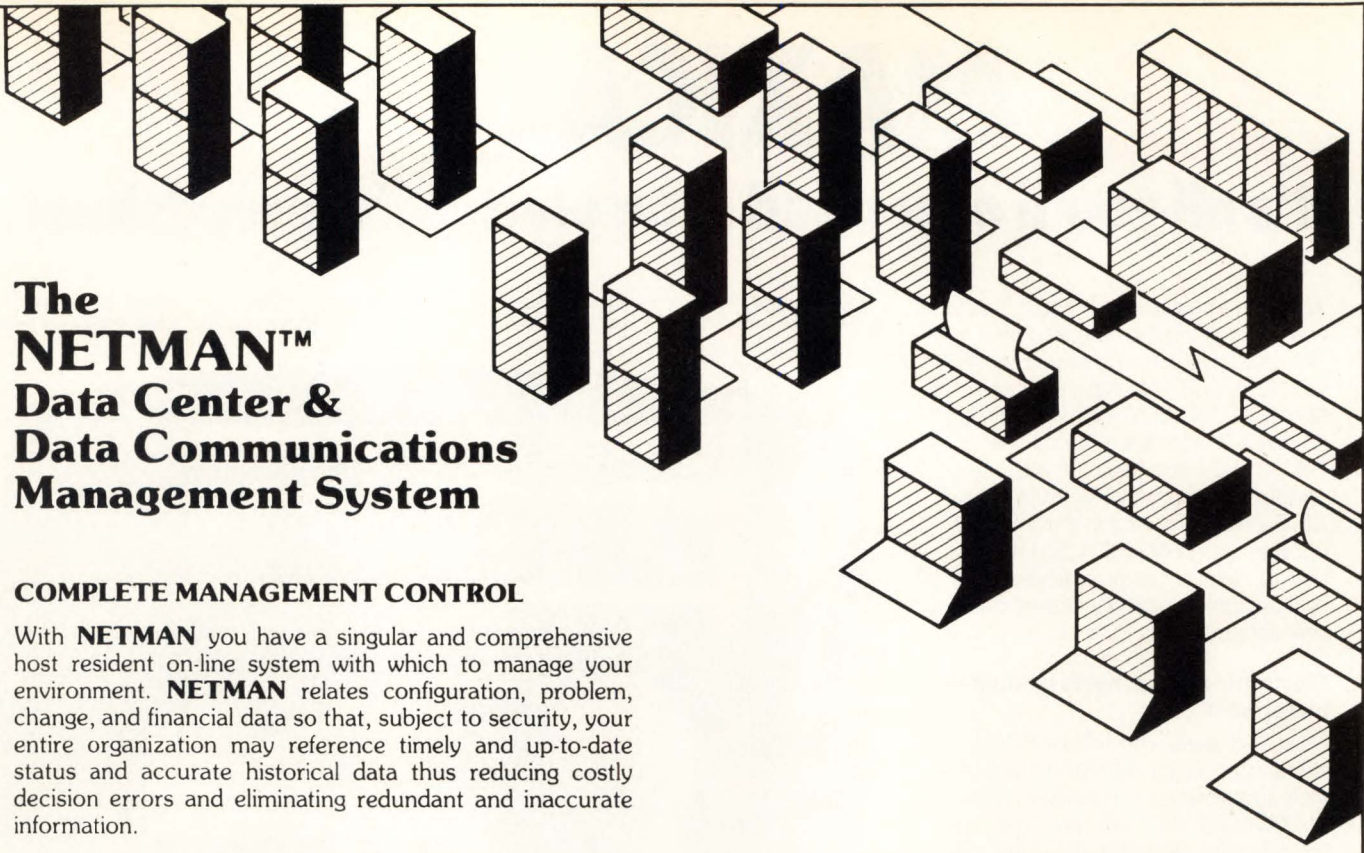
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The **NETMAN™** Data Center & Data Communications Management System

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With **NETMAN** you have a singular and comprehensive host resident on-line system with which to manage your environment. **NETMAN** relates configuration, problem, change, and financial data so that, subject to security, your entire organization may reference timely and up-to-date status and accurate historical data thus reducing costly decision errors and eliminating redundant and inaccurate information.

ACCURATE CONFIGURATION MANAGEMENT

NETMAN provides a detailed inventory of hardware, software, and network components with features including location, configuration connectivity, order tracking, and vendor data thereby minimizing the costs associated with unused or misplaced hardware and software and expediting acquisition processing.

FLEXIBLE PROBLEM TRACKING

NETMAN includes an easy to use problem description and problem status reporting format with complete historical archiving functions by relating problem data to your configuration information so that you may reduce hardware and software failures, expedite problem solutions, and improve vendor performance.

TRUE CHANGE MANAGEMENT

NETMAN permits change definition and status review and correlates changes to configuration data and problem reporting in order that you may improve project performance, plan and control configuration changes, and quickly solve problems due to changes.

COMPREHENSIVE FINANCIAL CONTROL

NETMAN furnishes basic and detailed financial information on a component basis for each contractual obligation. This financial analysis consists of on-line invoice verification, detailed budgeting prediction, cost accruals and allocations, depreciation and tax credit calculations, and many other time and cost saving processes.

NUMEROUS USEABILITY AIDES

NETMAN includes many of on-line controllable batch reports, functional security, audit trails, mass updates, **HELP** modules, user defined procedures, problem and message broadcasting and alarms, and is accompanied our highly rated application support program. **NETMAN** is available for most IBM and IBM PCM environments and comes with a complete sample data base tutorial to get you off to a fast productive start, in a user friendly atmosphere.



For further information call or write:

california software, incorporated

3232 nebraska avenue • santa monica, california 90404
(213) 829-0361 • telex: 703713 • answerback: NETMAN UD

SOFTWARE

(Continued from page 62)

from the factory floor describing the actual manufacturing situation. This implies continued reliance on computers for analyses of the past and present, projections of the future, and rapid communication of needs.

Software vendors with long experience in manufacturing systems are working toward products to support just-in-time practices. For the past six months, ROI Systems in Minneapolis has offered a just-in-time module for its Manage-2000 manufacturing system. The module runs on a variety of minicomputers under the Pick operating system and costs \$20,000.

Hewlett-Packard is introducing HP-JIT this month. According to

Kanban scheduling won't work unless a company wants the second item to be identical to the first.

a spokesperson, the package's materials-planning module will be similar to traditional materials-requirements planning programs "without all the bells and whistles." Other modules will define and analyze bills of materials for each product and track materials through the shop. The entire package will work comfortably with the vendor's materials-management software for batch manufacturing, MM 3000. Other vendors, including Comserv, Egan, MN, Arthur Andersen, Chicago, and Management Science America, Atlanta, have reported that they're close to introducing just-in-time packages.

Both MRP and just-in-time with kanban scheduling will contribute to American manufacturing, often working together within the same plant. Each system requires its own set of information-handling tools and information executives must be ready to supply them. The rise of just-in-time in the factories doesn't signal the obsolescence of MRP. But it is a call to action in a promising new direction. □

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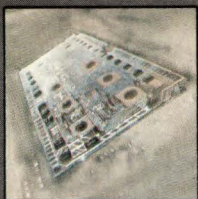


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1970

Four-Phase announces the industry's first all-LSI Central Processing Unit to give you increased performance in a smaller computer system.



1973

Four-Phase wins the largest-ever contract with the Federal Government for a data entry system.

Motorola/Four-Phase introduces The 6000 Series—a new milestone.

A milestone for new standards in office information systems from the company that started it all.

From the moment Four-Phase introduced the world's first all-LSI computer in 1970, we have consistently presented the industry with innovative hardware and software products to help make business more profitable and productive.

Today, as a member of the Motorola Information Systems Group, Four-Phase once again unveils another milestone in information processing—the new 6000 family of office information systems. Compact, powerful

processing units and flexible, capable software have been fused together into a family of systems that deliver maximum results today, with substantial expansion capabilities for tomorrow.

Technology for the real world.

Motorola/Four-Phase systems are tough enough and smart enough to deal with the real world—where speed, power, and reliability in a multi-user environment are prime considerations. The new 6000 systems feature the high-performance 32-bit Motorola 68010 CPU and an operating system derived from UNIX* System V under license from AT&T. We created





1978

Four-Phase announces The **MULTIFUNCTION EXECUTIVE*** (MFE), the first DDP operating system to allow multiple applications to run concurrently and independently.



1982

Four-Phase is acquired by Motorola Inc., combining our information processing expertise with one of the world's leading manufacturers of semiconductors and electronic equipment.

integrated system software that combines these two industry standards into a powerful, multi-user, multi-tasking environment that can stand up to practically any application.

There are two systems in the 6000 family. The 6300 supports 1-8 users, making it perfect for the smaller user or a remote office. The 6600 is a high-performance system designed to support up to 128 users. Both systems offer complete and integrated solutions—whether they're working in an operations-oriented environment where efficiency and precision are needed, or a results-oriented environment where flexibility and quality are key.

Service and support to match our technology.

At Motorola/Four-Phase, our commitment to you goes beyond providing quality, high-performance hardware and software. Support is just as important. Our award-winning Customer Support Operation is staffed with over 1,400 customer support specialists in over 175 cities across the nation. One phone call to our

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1984

Motorola/Four-Phase announces The 6000 Series—a milestone in productivity that delivers information processing performance today, and expansion capabilities for tomorrow.



by John Seaman, Data Communications Editor

DATA COMMUNICATIONS

High-speed analog options are here today

Despite the popularity of all-digital communications, there are applications which will remain analog for years to come. According to AT&T's own projections, by 1988 70 percent of long-haul data will still be transmitted over analog lines. So there will be a place for analog devices—especially high-speed analog modems that operate at speeds of more than 9,600 bps.



NL Industries Inc. (Houston), an oil-field service and chemical company, uses Codex 2660 high-speed analog modems to transmit data in support of production and development.

High-speed analog modems can provide over 50 percent more throughput, at approximately the same line costs of 9,600-bps transmission. And these high-speed analog modems, operating at 14.4, 16.8, and 19.2 Kbps, fill the gap (between 9,600 bps

and 56 Kbps) left by AT&T Communications' most common digital offering, Dataphone Digital Service (DDS).

These high-speed analogs comprise the fastest-growing type of modem. Although digital service is expanding, it isn't growing fast enough to meet the current demand for lines. For example, an end user who orders a digital circuit probably won't receive it for at least six months. Vendors report that some customers have canceled orders because they had critical applications that couldn't wait that long.

Thus far, performance assessments of digital circuits indicate that they operate well (and are perhaps more reliable and error-free than analog) when they are up, but when they are down, it's usually impossible to arrange dialup backup for a faulty digital link.

Within five years, digital circuits will probably become more reliable—and more available. But for the present, end users are buying many more high-speed analog modems than data service units (DSUs are necessary to access the digital AT&T Communications DDS offering). And proprietary new technologies are enhancing error control and transmission reliability in many modems.

We asked Dennis McKenna, director of communications-product marketing at Paradyne, why the demand

for high-speed analog modems was on the rise. "It's partly because the demand for all-digital exceeds the supply. DDS is the most important digital option (except perhaps for T-1 transmission at 1.544 Mbps), and only a limited number of lines are available," says McKenna. "As of yet, bypass, with long-distance satellite or microwave links and local cable or microwave hookups, has met the needs of few users."

What's the payback for the user who decides to put in some high-speed analog modems, running at approximately 14.4 Kbps? "For the same line cost, the user will get about 50 percent more throughput (14,400 bps compared with 9,600 bps). The additional cost of high-speed modems will quickly be regained with the less expensive transmission," says McKenna.

McKenna points out that the error rate goes up as you increase the (analog) transmission rate. But proprietary coding techniques, such as a yet-unnamed methodology at Paradyne or 8-State Trellis Coded Modulation from Codex, reduce the error rate until it equals a 9,600-bps analog modem.

The AT&T divestiture has also had a bearing on the increase in analogs. The local operating companies no longer have immediate funding to convert to more all-digital circuits.

(Continued on page 71)

High-speed analog modems

Codex
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Circle 688

General Datacomm
(203) 574-1118
Circle 689

Paradyne
(813) 530-2000
Circle 690

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*Systems
Approach*

A U T O M A T E D
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C O L L E C T I O N



Take advantage of the INTERMEC *Systems Approach*. It includes the industry's broadest integrated product line, sophisticated programming language, systems integrators and worldwide factory service. It's all backed by INTERMEC — the world's largest bar code equipment manufacturer.

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Due to this cutback, the changeover has been put on hold for the present, and even more analog circuits have been deployed. Says McKenna, "The Bell Operating Companies will be financially strapped for the next two or three years, reducing the scope of all-digital ventures."

McKenna points out that users can enjoy big line-cost savings with the new high-speed analog modems with integral-statistical multiplexers available from Paradyne. Using the MP14.4SM (14,400-bps data transmission with 8-port stat mux, \$12,500) or the MP19.2SM (19,200-bps data transmission with 16-port stat mux, \$18,000), a New York company with several multidropped 4,800-bps lines to its California offices could combine all its traffic on one link, resulting in considerable transmission-cost savings. A fully integrated network-management capability would also be available.

Gary Gummersall, senior manager of the electronic products division at Federal Express (Memphis, TN) chose Paradyne's high-speed modem because it seemed to offer the best price/performance tradeoff. "We were using over 1,000 Paradyne modems and many of them were the 14.4-Kbps versions. We were trying to go all-digital, but we couldn't get all the digital lines we wanted," says Gummersall. "Looking back at our experience, I predict there will always be a mix of digital and analog lines for most users."

Even if you manage to obtain an adequate number of digital lines, there are other tradeoffs between analog and digital transmission to be considered. Says Gummersall, "If you can't fully utilize a 56-Kbps digital DDS bandwidth, then you're better off with a lower-speed analog line and modems."

Gummersall is generally satisfied with the quality of Paradyne's high-speed modems, but he does offer one caveat: "The seating of all the components inside the modem device was not always as solid as it should have been. In shipping, some daughter boards came loose from the mother

boards. But we think Paradyne now has a handle on the problem."

NL Industries Inc. of Houston, an oil-field service and chemical company, found a way around the digital-line shortage while also saving on transmission costs. The company uses Codex' 2660 with 16.8 Kbps modems to transmit data in support of the production and development efforts of its chemicals division. The basic Model 2660 is priced at \$13,000; with an integral 6-channel multiplexer, the unit costs \$14,200.

According to Eva Hinojosa, data-communications manager, the 2660 modem provides significantly greater throughput and fewer bit errors when operating at speeds of greater than 9,600 bps through the implementation of the Trellis coded-modulation scheme. "The new technology of the 2660 allows us to communicate with complete reliability at very high speeds," says Hinojosa. "Because of our multiple-application requirements, we especially benefit from the

Although digital service is expanding, it isn't growing fast enough to meet the current demand for lines.

Codex 2660's ability to transmit with high-bit throughput over a single line."

NL Industries can also simultaneously transmit asynchronous and synchronous data for their critical production and development applications because of the asynchronous/synchronous converter which is a standard feature of the 2660's four-channel buffered multiplexer.

High-speed analog modems present a significant option when attempting to upgrade service while cutting line costs. Universal digital communications still looms on the horizon, but until it becomes a commonplace and readily available product, you'd do well to reconsider your analog possibilities. ☐

The new IBM DisplayWrite



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*Prices apply at IBM Product Centers and may vary at other stores.

** Available in July, 1984.

Series is here. Spread the word.

In 1980, IBM introduced the Displaywriter System. Today, it's become the best-selling stand-alone text processor in the world. One reason for this success is the Displaywriter's function-rich software.

If you're looking for software like that, but working on an IBM personal computer, you don't have to look any further. Because the IBM DisplayWrite Series is here.

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It runs in the family.

You'll find two word processing programs in this series: There's DisplayWrite 1, for IBM personal computers — including PCjr. And DisplayWrite 2, with added functions for your PC, PC/XT or *Portable* PC.

You'll also find DisplayWrite Legal, a dictionary of about 16,000 words that a lawyer might need to check.

And you'll find DisplayComm, which lets your IBM PC send and receive text to and from other IBM PCs. If you're writing at the office, this program could also let you send text to an IBM Displaywriter down the hall. (From there, it could be sent on to an IBM host computer for distribution.)

Some words on high function.

The DisplayWrite word processing programs give you the time-saving features you'd expect from IBM. Justified margins, centered lines and pagination, for example. You'll even have prompts and messages to help guide you along.

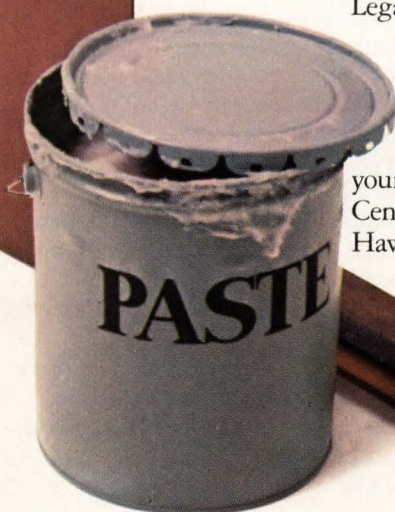
But there are also some features in DisplayWrite 2 you might not expect. Like easy column formatting, four-function math capability *plus* a spelling checker based on a dictionary of about 100,000 words.

Yet the biggest surprise of all may be the price.* DisplayWrite 1,** \$95. DisplayWrite 2, \$299. DisplayWrite Legal, \$165. DisplayComm, \$375.

Where you can find all four.

Get more information about the IBM DisplayWrite Series at your authorized IBM Personal Computer dealer or IBM Product Center. To find one near you, call 800-447-4700. In Alaska or Hawaii, 800-447-0890.

Stop there first and get the last word.



Personal Computer Software

OFFICE AUTOMATION

The micro's role in big business

At this point in time, it's hard to define the role of personal computers in large corporations. How much support are organizations giving to their micro users? Is this support sufficient, or are some users left adrift in a sea of

overwhelming technology?

Last May, Performance Resources Inc., an Alexandria, VA-based consultancy, surveyed 67 large organizations to examine the state of personal computing in corporations.

The responses reveal that spread-

sheet, word-processing, integrated-function, graphics, and database software are widely represented in all 67 corporations. While spreadsheeting is the most popular, word-processing applications are in surprising demand considering the proliferation of specialized word processors.

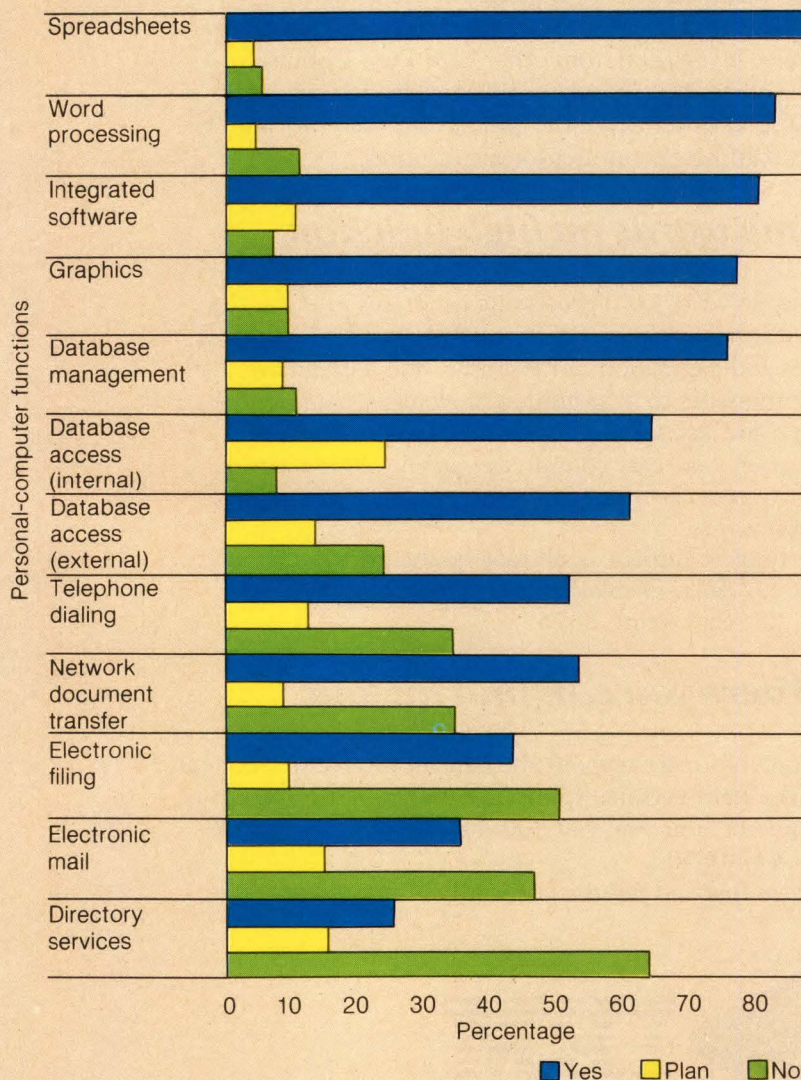
Performance Resources states that this marked difference in popularity is due to several factors. First, applications such as electronic mail require a "greater degree of technical sophistication" on the part of the user. Second, such applications are more "interdependent in nature" than the others. These applications wouldn't appeal to the "isolated" manager who is unwilling to surrender his or her independence in order to enjoy shared information and activity. Third, electronic mail and similar applications require a significant amount of technical aid from the MIS/dp department for full implementation.

When asked where they would like to add support staff, participants most frequently indicated they could use more technical support (both for hardware and software) and training and educational assistance.

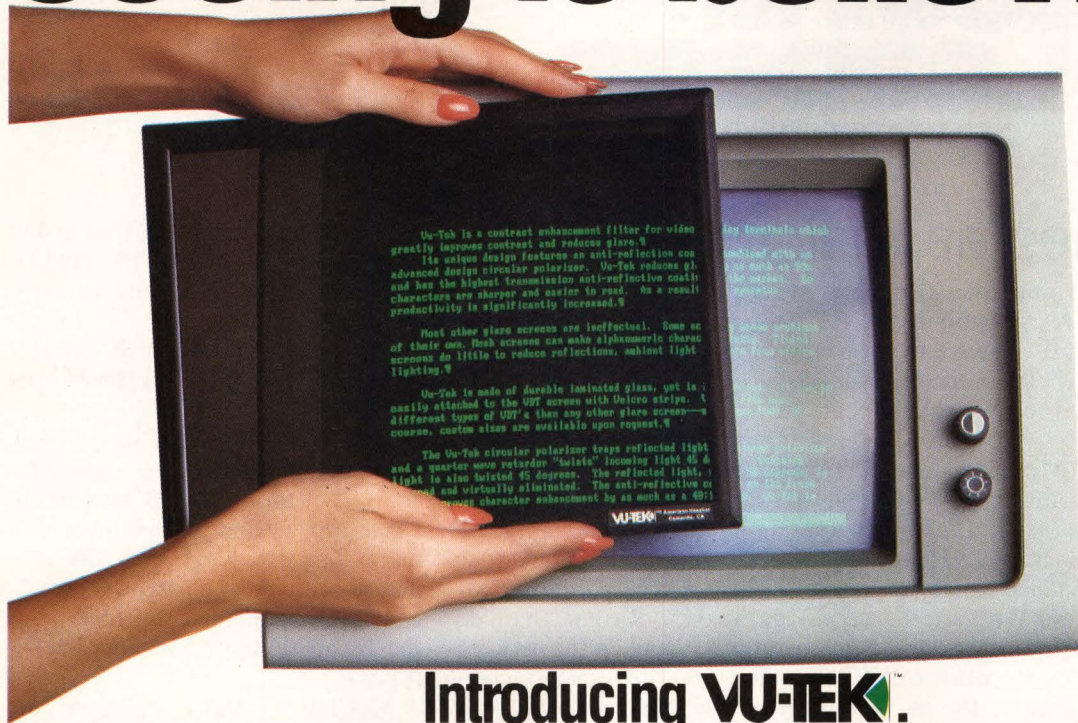
And what is the future role of the corporate micro? Based on the survey, Performance Resources recommends that the time has come for those supporting personal computing within the organization to take a strong stand in favor of planning. The survey states: "This new work tool [personal computer] will only be fully exploited and realize its maximum return on investment if the support team works to:

- Identify future user requirements in software and hardware.
- Study the increasing variety of automated business tools available.
- Assist users in identifying opportunities for applying these tools to specific work needs."

Personal-computer capabilities



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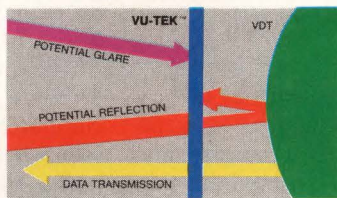
The cause of eyestrain? Glare. Reflection from office lights. And hard to read characters.

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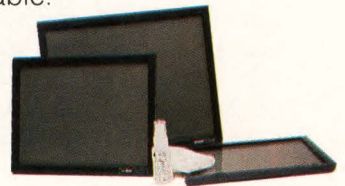
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FOLLOWING THE LEADERS

Mainframes as mainstays

Trend-spotting and industry predictions are the stuff to make even the cognoscenti think; and in the computer industry there's always more brewing than what's on the menu.

However, Stephen McClellan attempts to unmask its future in *The Coming Computer Industry Shake-out* (John Wiley & Sons, \$19.95).

As chief computer-industry analyst for Salomon Brothers, the Wall Street investment firm, McClellan uses his understanding of the marketplace to decipher the significance of the industry's volatility.

In his view, the market for mainframe computers has matured and is entering a phase of slow, cyclical growth. The first products to capitalize on the mainframe slowdown—general-purpose minicomputers—are now being dethroned by microcomputers and a host of specialized processors; and these each have spawned a plethora of smaller vendors.

Yet McClellan believes a marketplace populated by sundry micros and specialized processors will be short-lived without effective systems integration. And he foresees the demand for integration being met by large manufacturers that offer diversified product lines or provide system-integration services.

McClellan sees which way the river is flowing, but misses the boat. The mainframe is simply not the moribund product he assesses it to be. A 1984 survey of the top 100 U.S.-based data-processing vendors showed mainframe revenues growing at nearly 12 percent a year, a rate that has remained constant since 1979.

Furthermore, IBM, which commands more than 75 percent of the mainframe market, projects accelerated demand for mainframes in the coming years. Big Blue's argument

runs along the following lines: Until 1982, central-site processing demand (measured in millions of instructions per second) had expanded by 40 percent yearly. During the past two years, it has increased by 50 percent.

In addition, intelligent workstations are proliferating, meaning that increasing numbers of end users will require communication from micro to micro and access to corporate and external databases. Rather than do significant processing on the network itself—other than increasingly complex network-management tasks—it will be far more efficient to use a large mainframe.

Demand up for minis, too

The same scenario may be used to argue for an upswing in demand for minicomputers. It will often be neces-

McClellan sees which way the river is flowing, but misses the boat—the mainframe is not a moribund product.

sary to employ a second tier of processors between intelligent workstations and the central mainframe. These "workgroup" computers will both allow access to shared databases and act as controllers; they will serve costly peripherals, such as big printers and plotters, and provide gateways to networks linking departments to external databases.

The mini makers are well-positioned to provide these secondary processing centers. Responses to the Top 100 survey showed a dramatic improvement in the financial performance of vendors due to minicomputers for the first half of 1984.

McClellan's belief that micros and specialized processors are competition for mainframes and minis is misguided. Rather, they are complementary; the growth in demand for the former necessitating support from the latter.

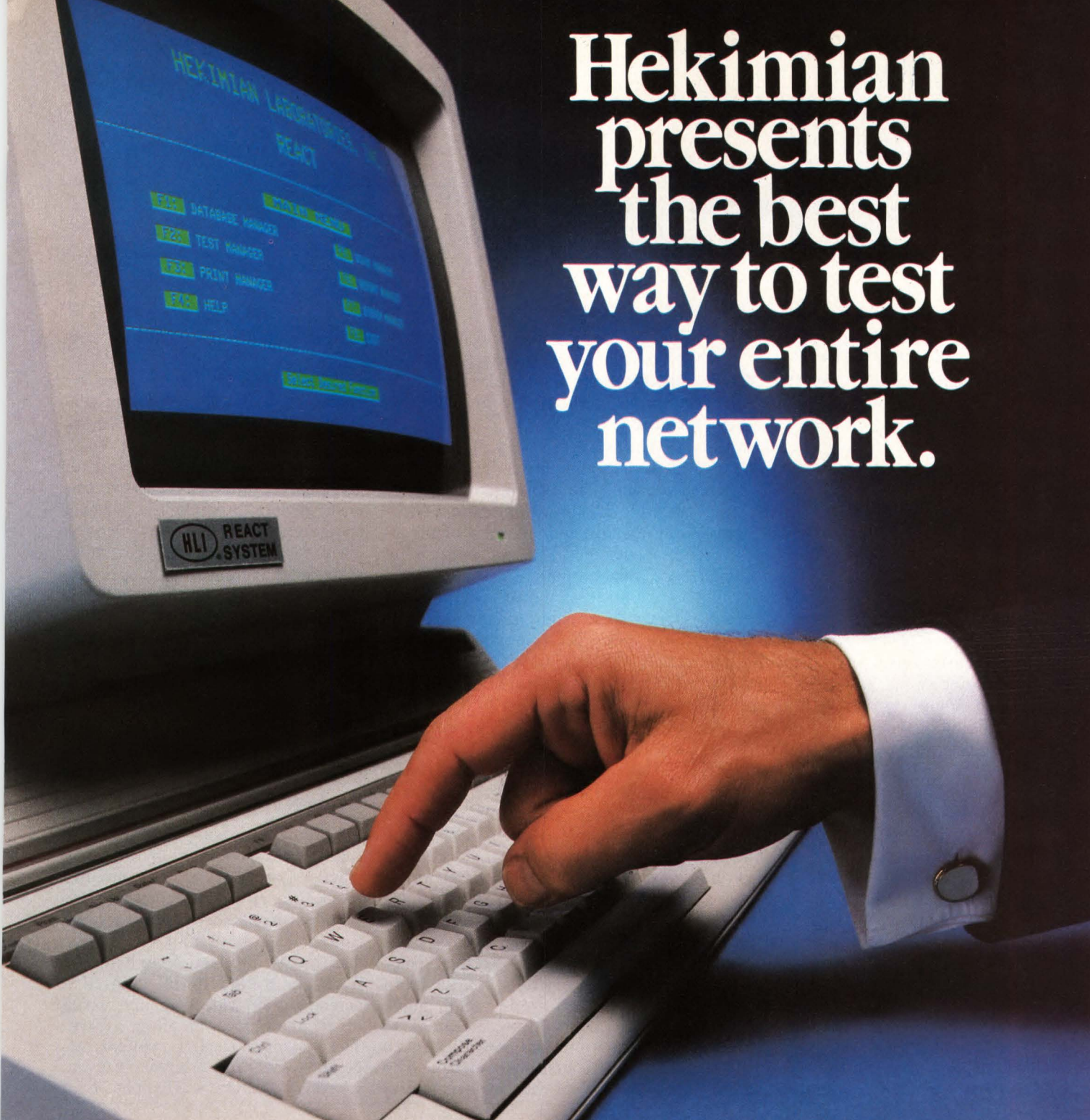
McClellan then moves on to sketch the major industry players, using his analysis of the first three chapters to chart their probable fortunes. My main disagreements with the corporate-profile section of the book concern McClellan's underestimation of the Japanese and overestimation of AT&T.

McClellan argues that Japanese computer vendors can only flourish in a stable industry, and that the computer industry is evolving too fast for them to establish a beachhead. He sees Japanese competition as an ever-present threat, but doesn't expect them to succeed in penetrating the U.S. market. I believe that it is not stability in the sense of a basically unchanging marketplace that the Japanese vendors require. It is instead the existence of industry-wide standards for product compatibility. De facto standards already exist, of course, given the overwhelming need to conform to IBM's product lines.

The jury is still out on AT&T's ultimate success as a major vendor of computer products, but it is yet to be seen whether or not AT&T can overcome the noncompetitive habits formed during years of operating in a regulated market.

Although his views seem to be subjective tyranny, they are presented well. So, even if you don't agree with McClellan, you may still enjoy his book. □

William Cappelli, an analyst with The Gartner Group, Stamford, CT, prepared the "Top 100 in data processing" report published in Computer Decisions' June 1984 issue.



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by David Roman, Staff Writer

TRAINING

Videodisks

Earlier this year, RCA Corp. abandoned the production of its videodisk player system, which was generating red ink at the rate of about \$100 million a year. Although the failure of RCA's system ended all talk of videodisks becoming popular home-entertainment items, they are living successful second lives as a medium for corporate training. "Many of the Fortune 500 industrials are looking at interactive videodisks as the new technology for their training programs," says Gary Slavin, director of marketing for Computer Technology Group, a developer of training courses.

Both as home-entertainment products and as training tools, videodisk systems have had to compete with videocassette recorders (VCRs), which, in contrast to videodisk systems, can record sound and moving pictures from a television receiver. VCRs have already established a foothold in training departments over the years, according to David Lubin, vice president of business development at Interactive Training Systems Inc. (ITS), a vendor of videodisk courses, but "the movement toward videodisks is heating up."

Promoters say that "interactivity between learner and teach-

ing tool, which distinguishes videodisks from tapes, videocassettes, and other training materials, significantly improves students' comprehension and retention.

While some videodisk players, such as the LD-V6000 from Pioneer Video Inc., have built-in microprocessors that provide limited interactive capabilities, most systems are not truly interactive unless they are connected to a personal computer. "The videodisk's capabilities, combined with those of a personal computer, create one of the most powerful individual training tools that exist," asserts Mark Tucker, vice president of Meritz Communications, which designs training courseware in a variety of media, including videodisk.

The source of this power is the videodisk system's ability to retrieve randomly stored data and images, a feature that VCRs lack. When the information stored on a videodisk is indexed, a personal computer controlling the disk's player can pinpoint a particular image on the disk and call it up in seconds with a few keystrokes. According to David Norton, senior educational specialist at Eastman Kodak Co., Rochester, NY, quick random access allows students to choose the information they want to study in a course without having to run through all the moving pictures

and accompanying sound that precede it.

Random access also lets users review and/or move to different segments of the instruction on a videodisk faster than they can using a VCR. Depending on either the commands an employee inputs or the answers he or she gives to "prompts," the personal computer will direct the videodisk player to recall or branch to particular material, providing the employee with immediate feedback. "If a trainee is quizzed and is found not to have a handle on a subject, the machine will repeat that information," says William Porento, service-training manager at American Motors Corp., Southfield, MI. Videodisk players can also combine permanent images and personal-computer graphics or data.

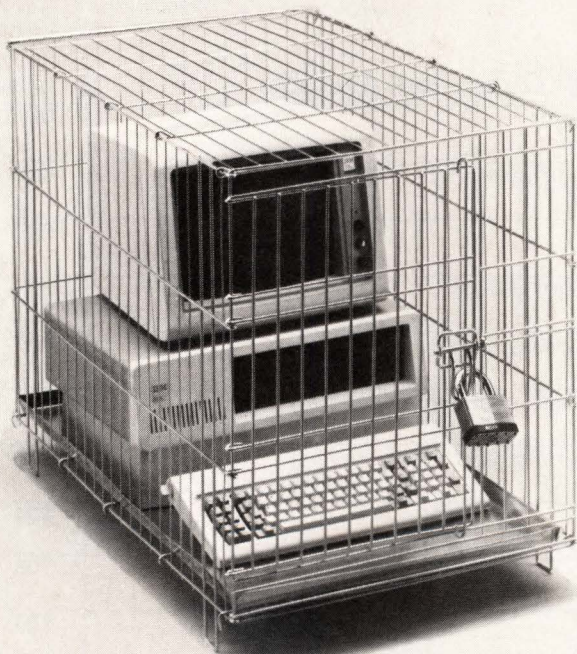
Hands-on training (almost)

Corporations can use videodisks to simulate the conditions of the workplace, whether it be the computer room, the automotive repair shop, or the operating table. Several years ago, SmithKline Beckman Corp., the health-care products conglomerate based in Philadelphia, created a demonstration videodisk that asked physicians to treat an ailing patient. The system showed the patient responding, favorably or unfavorably, to whatever treatment the physician

Laser videodisk player systems

Vendor	Name	Price	Circle
Hitachi (201) 935-5300	VIP-9500	\$1,640	693
Panasonic Industrial (201) 348-7183	TQ-2023	\$34,900	694
Pioneer Video (201) 573-1122	LD-V1000 LD-V4000 LD-V6000	\$1,200 \$900 \$1,490	695
Sony Communications Products (201) 930-1000	LDP-1000A	\$2,500	696

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TRAINING

suggested, and then either praised or chastised his or her performance.

"The videodisk lets you see what you are actually doing," says Herbert Strachan, a divisional director of technical training for Perkin-Elmer Corp. "It'll test you to make sure you know how to perform one task before it moves you on to something else." Strachan uses videodisk systems to train Perkin-Elmer employees to operate the computers the company makes. There are plans to make the training available to the systems' buyers.

"Because videodisk instruction is self-paced, allowing a student to replay or skip material, a person can take as much time as he or she wants

on a subject," says Strachan. In order to accommodate varying levels of expertise, some courses offer different levels of training on the same subject.

David Lubin of ITS notes that even though employees control the pace of instruction, they tend not to stretch out the time it takes to learn a particular subject. "The effectiveness of this type of training can be seen in what I call the 'compression factor,'" he says. "Well-designed courseware will let a student go through the same material that an instructor covers in a classroom, but in half the time."

Where can you get well-designed courseware? Mostly from independent vendors. According to John Hartigan, national marketing manag-

er for Sony Communications Product Co., the best Sony can do is refer the buyers to vendors that develop videodisk courseware. While some organizations develop their courseware themselves, "most of it is developed by companies like ours," says Anthony McGarr, vice president of marketing for Edu-Disc Corp., a manufacturer of videodisk courseware.

Difficult-to-write software

Unlike material stored on videotape or magnetic floppy disks, the data and images stored on videodisk are immutable. This factor makes the creation of videodisk training software difficult because each step in the training process, each topic, and every

Videodisk courseware

Vendor	Type of courseware available	Circle
Advanced Syst. (312) 981-1500	generic	697
Allen Communication (801) 537-7800	custom-designed	698
Computer Tech. Grp. (312) 987-4000	generic	699
Control Data (612) 853-5022	custom-designed	700
Creativision (904) 252-0911	custom-designed	701
Digital Controls (404) 441-3332	generic and custom-designed	702
Edu-Disc (615) 269-9508	custom-designed	703
Interactive Research (408) 986-1420	generic	704
Interactive Training Syst. (617) 497-6100	generic	705
JAM (716) 385-6740	generic	706
Meritz Communications (314) 225-6000	custom-designed	707
Nebraska Videodisk Design/Production Grp. (402) 472-3611	custom-designed	708
Sandy (313) 649-0800	custom-designed	709
Tom Thomas Organization (313) 681-8600	custom-designed	710
Wicat Syst. (801) 224-6400	custom-designed	711
Wilson Learning Interactive Tech. Grp. (505) 471-6500	generic and custom-designed	712

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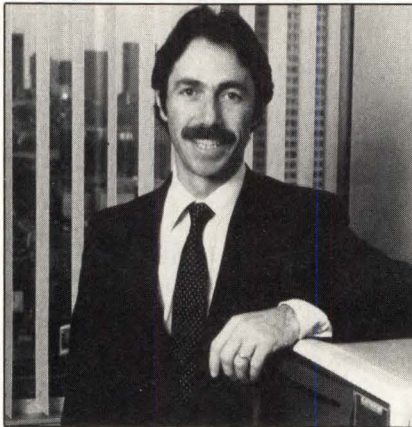
TRAINING

branch off of and back to the course's basic educational path must be perfect before it is placed on disk. After that point, nothing can be added or changed. Some videotape courses serve as the basis of videodisk courses, but they require additional work to be expanded from a linear format to one that is interactive.

Because the actual embedding of images onto videodisk is impossible for most organizations to perform, they must rely on third parties to create and "press" their instructional disks. Only Panasonic Industrial Co. offers a system that lets users design and press their own videodisks, although these disks do not store as many images as those that are pressed by other vendors. The Panasonic videodisk stores 24,000 still-frame images, or 13.3 minutes of full-motion video. Sony's LPD-1000 videodisk stores up to 54,000 singular images on a single disk, or about 30 minutes of

moving pictures on each side.

Ready-to-use videodisk software is available for purchase, but more is available for VCRs. The limited selection of software may simply reflect the fact that more training programs use VCRs than videodisk



"Well-designed courseware lets students cover the same material an instructor would cover, but in half the time."
Lubin, ITS

systems. But there may be another reason. Most videodisk software is written specifically for one organization's use and cannot be easily replaced by or compared to off-the-shelf software. "I've seen the generic training software," says Carl Chakmakian, manager of the sales-training department at AMC, "but I prefer our own."

Cheaper or more expensive?

The development of disk courseware can involve a lot of time, expertise, and money. "You have to justify the cost of a program before you put it together," Herb Strachan says, "because it can be expensive." He believes his department at Perkin-Elmer can offset development costs by reducing the traveling and living expenses of employees attending training sessions. "We usually fly the employees from our field locations around the world to our main office

TRAINING

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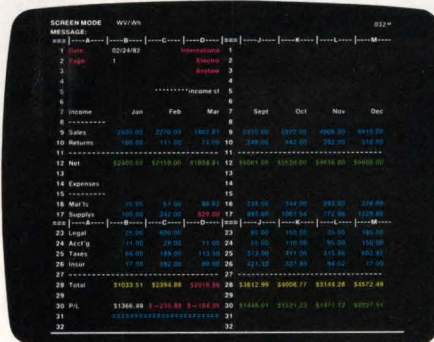
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TRAINING

for training," Strachan says. "When we get more videodisk units, we'll set up training on a regional basis, so that employees won't have to travel so far."

William Porento at AMC also finds videodisk players beneficial in training widely scattered employees. "It's difficult to give geographically dis-

persed workers the training they need," he says. Videodisk players may be the solution. The courseware he intends to use is still under development, but when completed, it will train close to 10,000 service technicians at 1,700 AMC dealerships

across the country. AMC also uses videodisk instructional systems to educate the sales representatives at its dealerships. A disk is created for each AMC model, including information about the car and selling tips. AMC's large number of users makes it easier to justify the expense of the systems and the costs of developing the disks. Because AMC has given the players a second use, the system has become more cost-effective. "The machines can't be used for training all day," says Carl Chakmakian, "so we've put a section for the consumer on most of our disks. The dealerships can use it in the showroom as a demonstration device."

Considering the advantages they offer, John Hartigan at Sony doesn't believe videodisk training systems are very expensive. "There's typically about a \$2,000 mastering [pressing] charge," he says, "and the individual disks cost about \$16 apiece. But if

you're going to produce about 1,000 disks, most vendors would waive the mastering charge, and you would just have to pay for the disks. At that volume, they'd cost about \$12 apiece."

Sometimes cost is a secondary issue. Kodak spent \$300,000 and the equivalent of three years developing an electronics course on videodisk, but Dave Norton says that efficiency led him to the videodisk. "When we started talking about training 2,000 employees," he says, "we had to look for an efficient way to do it. Lectures were out. We decided to use videodisks because we could set up a modular format and include something for everyone, and users could just look at the parts they wanted to. Now we have everybody from entry-level professionals to vice presidents and employees with a wide variety of interests at all levels of the organization using the same program for training." □

SmithKline Beckman's demo-videodisk system asked physicians to treat an ailing patient, then judged their performance.

persed workers the training they need," he says. Videodisk players may be the solution. The courseware he intends to use is still under development, but when completed, it will train close to 10,000 service technicians at 1,700 AMC dealerships

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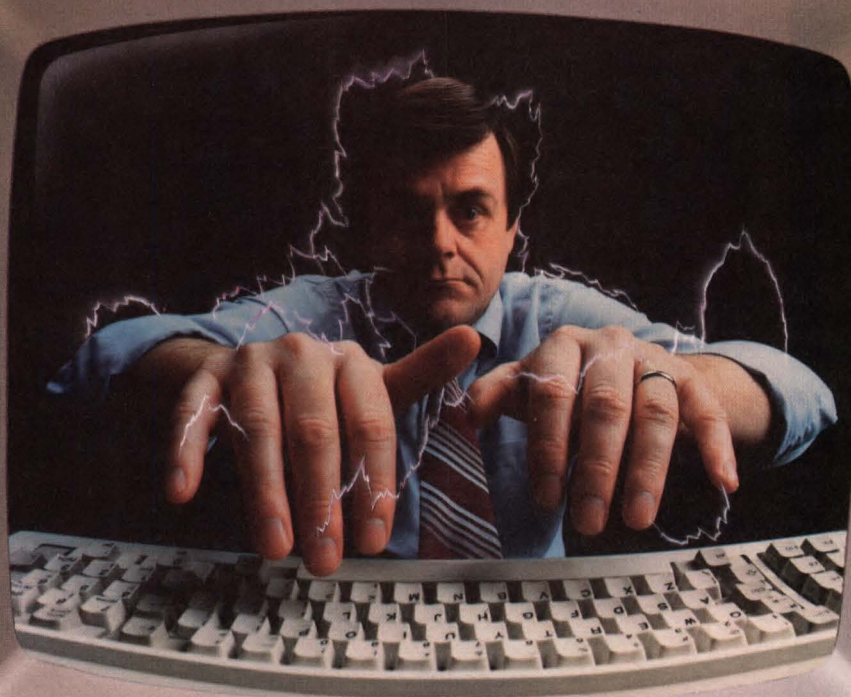
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Outstanding Data Center



DEC system 10 and VAX 780 computers and DEC rpo6 disk drives are the major equipment in the NNDC main computer room (above). The four magnetic-tape drives are from Storage Technology.

The National Nuclear Data Center (NNDC), part of the Brookhaven National Laboratory, manages several national and international physics databases, issues newsletters and publications, and provides nuclear information to scientists associated with universities, laboratories, and industry in the United States and Canada.

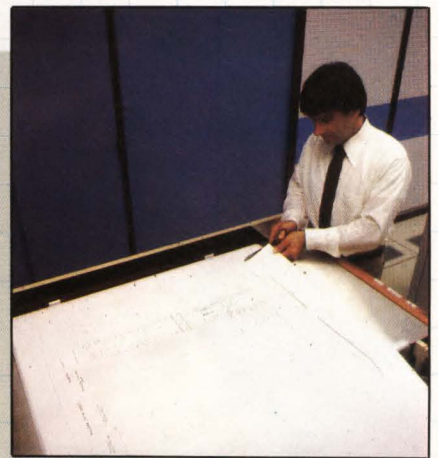
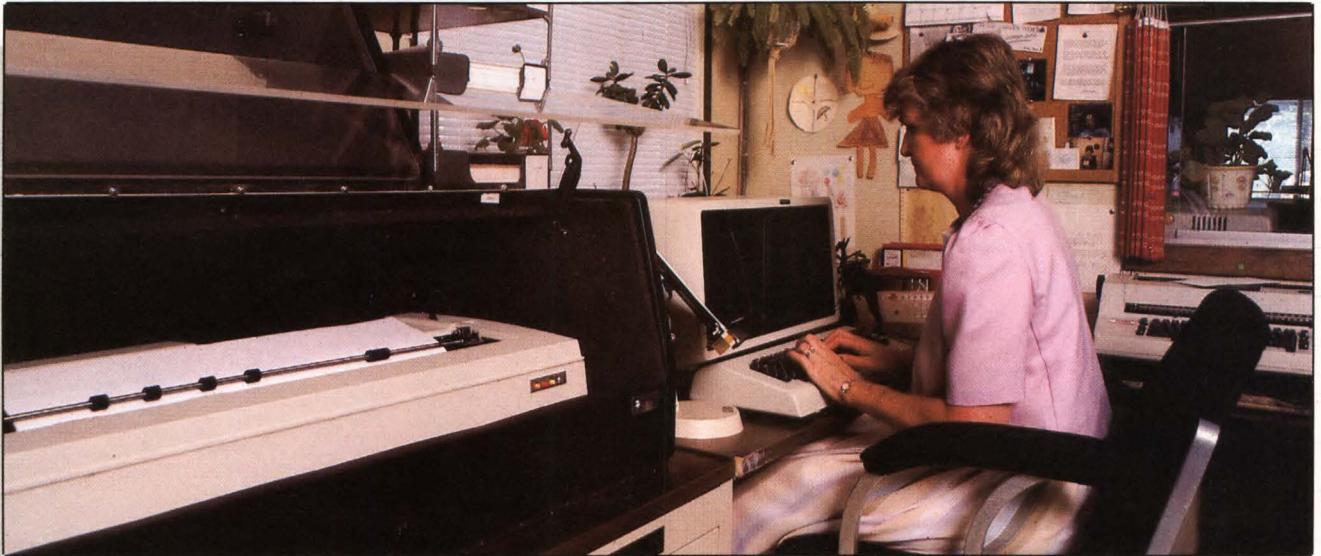
"Our staff creates large databases by culling nuclear data from journals and international exchange agreements, critically appraising it, and storing that information in our DEC system 10 and VAX 780 computers," says Sol Pearlstein, the NNDC's MIS/dp director. "If a scientist wants to compare his or her findings with



Using a light pen, Bruce Barton, computer-science analyst, draws and manipulates images on the display of Graphicus 80, an interactive graphic-display system manufactured by Vector Automation (right).

by Theresa Conlon, Staff Writer

Photos by Andy Levin



The NNDC uses NBI system 3000 dedicated word processors and a Qume twin-track S3/TT 75 daisywheel printer to prepare technical reports (above). Sol Pearlstein, director of MIS/dp (left), reviews the "Chart of Nuclides" with William Kropp, director of computer systems and operations. Anthony Fuoco, operations specialist, uses a 36-inch Versatec electrostatic plotter to review a rough copy of a chart before sending it to press (above right).

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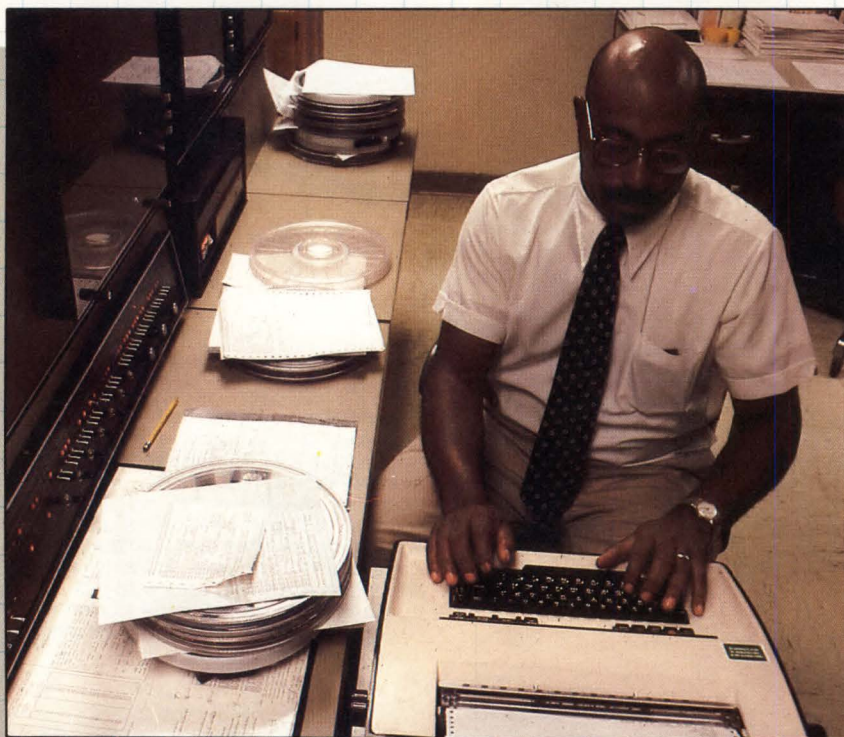
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those of other labs, here's where the NNDC can help. We collect all the data, plot and compare it, draw a solid curve through the information, and recommend the best value."

The NNDC is staffed by 17 scientific and professional employees and 11 support people. "We have little need for computer operators," explains William Kropp, director of computer systems and operations. "Most people prepare their own tapes and take their own output off the line printer."

The NNDC is located in the Brookhaven complex in Upton, NY.

Data-service assistants (above) access the two computers through DEC VT100, VT102, and VT240 terminals located throughout the center. Partitions were supplied by Modulux. Leon Lawrence (left), graphic-arts computer specialist, operates the Information International Comp80, a film recorder with a 35mm camera.

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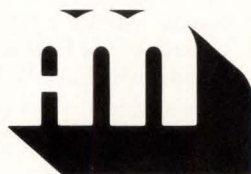
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ETHICS:

Seventh in the 1984 series of roundtables

Roundtable participants included (left to right): Roger Fenwick, Norma Rollins, Norman Statland, Bruce Spiro, John R. Rueckel,



The rights and responsibilities of individuals receive generous, almost agonized attention in American culture. While that concern is one of the glories of an open, democratic society, it creates practical dilemmas for those who deal with data and information. Recent laws protecting individual rights and codes of ethics formulated by professional groups further complicate already complex problems.

How should data-processing and information-management executives view their obligations to their employers, fellow employees, user departments, the nation and society at large? Should those in charge of dp and individuals who handle data conform to a code of ethics? In what ways does sophisticated and expeditious

information processing affect ethical concerns? Are employers taking steps to ensure that MIS/dp employees behave responsibly?

These are some of the questions put to a panel of knowledgeable persons recruited by Computer Decisions from the data-processing, information-management, and civil-rights communities.

Participants first verbalized their concepts of ethics:

Robert Ellis Smith: Ethics is knowing right from wrong and governing one's conduct accordingly. In business, it means seeing one's work in a larger context.

Harry B. DeMaio: It's a code of conduct. That code begins at the top of the organization and works its way down to various departments. I'm less interested in what an individual says

than in how he or she works and acts.

Roger Fenwick: It's a set of moral principles to live and work by in the business and professional worlds. It means practicing honesty and integrity in dealings with management, employees, and clients or customers. It harks back to the golden rule.

Norman Statland: At work a person is governed by a code of conduct, which is a personal interpretation of what the company sets as practices for conducting business. Persons in information processing have even broader responsibilities because they've been entrusted with information; ethics for them is largely a matter of knowing right from wrong and being honest.

Gerald Hoffman: But I get nervous when I hear business or professional ethics contrasted with personal ethics. It's not a distinction worth

MIS/DP'S NEW CHALLENGE

by David Whieldon, Senior Editor

In information management, development of ethical standards has lagged behind technology. But the times, they are a-changin'.

and Harry B. DeMaio.

Photo by Hal Stucker



making: If business ethics are different from personal ethics, there's a serious problem.

Bruce Spiro: Yes, one has ethical responsibilities to the company, but beyond that also to society, the profession, persons dealt with, and one's self. If a person believes the company isn't doing what's right, it's his or her moral obligation to do something about it.

Norma Rollins: There's a subjective ethical responsibility also, to those about whom information is collected—individuals who aren't clients. They're the ones information-gathering affects the most, and the effects on those persons must be considered.

Smith: One advantage of a code is that it allows timid employees to do the right thing. If they're pressured to compromise standards, they can say,

"I'd like to, but I can't. The company has a code that doesn't allow us to do that." Or they might cite a state law that gives protection.

Spiro: Everyone lives by some personal code. One purpose of a code of ethics is to inform the individual what a great number of persons consider to be professional and moral behavior.

Privacy of records is a frontrunner among issues of ethical behavior. Information departments are custodians of, and monitor access to, much personal data. Participants showed special interest in payroll and medical records and the keys that unlock the gates protecting them.

Statland: Privacy, as I see it, relates to information on individuals, say, their medical histories. Though it can be segregated in the information bank, once the information is captured—in

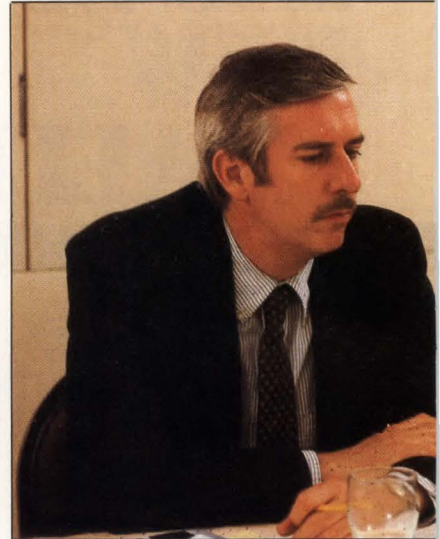
any form—it's going to be accessed. The purpose of access should be recorded, and the person who does the accessing should know that. If necessary, an annual report should go to the individual whose records are accessed.

Rollins: A question that often comes up in our [New York Civil Liberties Union] office has to do with diagnostic and treatment information sent to employers by health-care providers and then sent on to insurers. The issue revolves around how that information—for example, on psychological treatment or abortion—is used or whether it should be used at all. Someone in an employer's office must make decisions about how to set up systems so the information isn't available to all. If the information were to go from health-care providers directly

Ethics

(Continued from page 93)

Gerald Hoffman, Norma Rollins, Robert Ellis Smith, Bruce Spiro, and Harry B. DeMaio here discuss the rights of individuals to



to the insurers, it wouldn't be an issue.

DeMaio: At IBM we take significant steps to separate medical information from the rest of the information-management system, and further, accident records are kept apart from medical records. Only a small group of individuals has access to this information. Sometimes managers or executives want the psychological profiles of employees to determine if they might crack under stress—and that's a difficult dilemma. It's a situational decision. At the moment, the company favors privacy in these cases.

Hoffman: Standard Oil installed an employee medical-history system some years ago. Contrary to the dp wisdom of that day, we put a terminal in the medical department and, later, a minicomputer. We locked in the medical-records section to maintain privacy. When pressure is put on the medical people to give out information, they refuse. They even refused once when I asked. But not everyone is so fastidious.

Statland: That's the real danger. We have freewheeling access to data, and most companies don't record usage. The only way to restrain persons without so high a code of morality or ethics is to put deterrence into the

systems.

John R. Rueckel: Another difficult situation that arises is keeping payroll information confidential. No matter how an organization tries to control records, the information seems to leak out. It's been a problem in places I've worked.

Fenwick: I'm not sure it leaks out. In any major company, there are job levels and management categories, with average and top rates of pay that go with them. There may be a union contract that allows employees to know what others are earning.

Rueckel: Nonetheless, we're dealing with the ethics of employees who divulge what they know, saw or overheard.

DeMaio: Yes, and today there are individuals in organizations who gain computer power through personal computers and develop their own databases. They can access and correlate information, possibly violating individuals' privacy.

Thus more computing power may be located outside the dp shop than inside, and dp may not be under one management. This is something new. We should make sure that whatever code of ethics dp has been operating under is imparted to others coming

onstream with computing power.

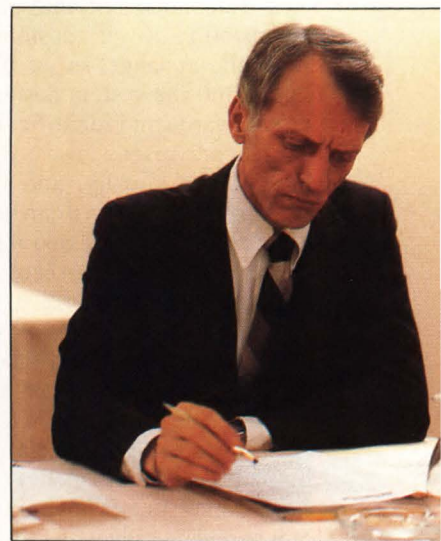
Statland: Yes, I'd say the same. The difference, though, is that most of the data you're talking about at the personal-computer level is in local files—data that used to be kept in the desk drawer. A lot of it is confidential, but I question how much of it is personal. Without planning ahead, it's difficult to pull it all together. I know that IBM provides nine local database-management systems. Once a user chooses one of them, he or she can't correlate data from one personal computer to another.

DeMaio: In our own organization and customers' organizations the greatest obstacles to privacy protection are the time, effort and energy required to classify and protect data.

Smith: But what about businesses intensely involved with personal information, like insurance carriers and credit bureaus? For example, assume an insurance agent carries individual records around in his or her own portable computer, which may be part of a commercial network.

Hoffman: Technologically, yes, it's possible to tap many databases and create universal personal files. However, the investment in the existing second- and third-generation systems

privacy and the obstacles to privacy protection.



amounts to billions, probably tens of billions of dollars. The resources needed to implement this incipient technology of sophisticated networking are just not presently available.

Spiro: The technology, though, in many cases, is moving very rapidly. In the future, computers will be totally networked. It won't be long before it will be possible to access records from a portable in an airplane from any database.

DeMaio: Protecting everything is an impossibility. There are problems that have to do not with how information is processed, but how the organization works. Designating who will or won't have access to information can be a powerful lever in the hands of management.

Spiro: Major organizations should recognize that information has value and that it should be protected for the good of the individual and the good of the company. Planning is needed to protect information. What's missing in many major organizations is recognition of the problem. And managements aren't willing to spend anything for protection.

Statland: There's an overhead cost to privacy and confidentiality. And business ethics notwithstanding, most cor-

porations aren't willing to incur the costs. Managements believe that employees are captives of the system. What can be done on behalf of ethics is largely governed by economics.

Smith: I dispute whether it's really that costly. Most of the studies that have been done have shown that the costs aren't overwhelming, especially if safeguards are built in in early stages.

DeMaio: One point here: It's very important that the security, audit, or surveillance group be subject to as much scrutiny as are the organization's operating groups. If one group is exempt, then the organization is out of balance.

In response, participants offered some practical experience with justifying the costs of protecting business or personal data. (Continued on page 96)

Roundtable participants

Moderator: David Whieldon, senior editor, *Computer Decisions*.

Harry B. DeMaio, director of data-security programs, IBM Corp., Valhalla, NY.

Roger Fenwick, district staff manager, New York Telephone Co., New York.

Gerald Hoffman, manager of special projects, Standard Oil Co. (Indiana), Chicago.

Norma Rollins, director of the Privacy Project, New York Civil Liberties Union, New York.

John R. Rueckel, manager of data collection services worldwide, ITT Corp., New York.

Robert Ellis Smith, lawyer, journalist, privacy consultant, and publisher of the "Privacy Journal," Washington, DC.

Bruce Spiro, chief of ADP systems management, Defense Communications Agency, Arlington, VA.

Norman Statland, national EDP director, Price Waterhouse & Co., New York.

Ethics

(Continued from page 95)

Fenwick: In a paperless telephone-company billing system, protection costs a lot of money. But we at New York Telephone felt that we had a responsibility to our customers and the public at large, so we built protection into the system design. There are passwords and identification procedures, on various levels, which are changed periodically, and there's a record kept. The record can be printed out to show who accessed databases.

Smith: I'd argue that there are economic byproducts, as well as costs. A company strives to make contacts with customers, to move them to call or write. Fair information practices are one avenue of doing that. Besides, it's an aspect of public relations: If a company can donate money to a symphony orchestra, it's not unreasonable for it to devote money to fair information practices, in the same rationale of making the community a better place to live in.

Hoffman: I have a lot of contact with IBM employees, such as account representatives and field personnel, in my job. I can testify that by and large they're very proud of the way the company handles its personnel records and makes its decisions regarding privacy.

Spiro: In the federal government, we're required by law to inform employees when anyone gets information

from their personnel files. That's gone a long way toward bolstering their morale; they really believe the organization cares about them.

DeMaio: In the international arena, a concern for security and privacy provides a darn good business return. If a company like ours can show it has a policy that's actually carried through, it gives us a substantial advantage when we go before a particular government to discuss operations and regulations. It's helped us in a number of circumstances where the multinational nature of IBM might have given a negative impression instead.

Rueckel: We've centered our discussion on the kind of information that we sense is deeply personal. But companies hold other banks of information about clients who have purchased products or services from them. These clients may feel that information should be private. Instead, they find that the information is exchanged with other parties, who send them mail or call them on the phone. For instance, they may get mailings from Mercedes-Benz dealers or Volkswagen dealers, depending on how much billing they've done on their American Express card.

Fenwick: Can't a person ask the organization to take his or her name off its mailing lists?

Smith: It's not statutory. The policies for removal came about because companies were sensitive to the issue. And the Direct Mail/Marketing Association has pounded away at its membership to provide the removal option. Its efforts have been effective enough

that many believed the option to have become law.

Spiro: Before effective laws can be enacted, ethical positions must be defined. That's one of the purposes of creating codes of ethics.

Hoffman: In the history of mankind, codes of ethics haven't proven very effective. The problem of privacy only is remediable through personal solutions, not system solutions.

Rollins: Ten years or so ago, IBM led the way by implementing a privacy package for their employees. Those concerned with the privacy issue hoped that other companies would follow suit. But the interest dwindled.

At this point, I believe that legislation tailored for smaller companies is the only way to go. Usually it's the small- to medium-size companies, with 25 to 150 employees, that do something terrible with the information they hold. I get phone calls from their employees.

Hoffman: Can you characterize those phone calls?

Rollins: A lot of them have to do with personal evaluations by supervisors. Employees who don't get along with supervisors find that the supervisors have put something negative in their files. The employees learn that the evaluations, which they haven't seen, are holding them back in their companies—or preventing them from moving on.

Fenwick: Isn't there a sunshine law that allows employees to inspect anything that goes into their personnel files?

Rollins: No. But a company may have union contracts that permit access.

Spiro: There's such a law for the fed-



"It's incumbent on a professional to make an individual moral commitment."

Statland, Price Waterhouse

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Ethics

(Continued from page 96)

eral government, but it hasn't been extended to the private sector...

Smith: ... except in about 12 states.

DeMaio: So there's no federal statute to duck under. A law could be passed, but because of technology, it would be largely unenforceable.

Inside IBM, we're trying to do peer assessment and self-assessment. That involves asking questions like, "Should this stuff continue to be held in this category?" We're trying to prepare employees for more formal audits. It's too early to know how well it's working. But making a central blitz on files is impractical. Spot checks and audits, which aren't part of our process, aren't sufficient either.

Rueckel: Auditing is a policing function. Outright encouragement from senior management is needed for that.

DeMaio: When I use the words "audit function," I mean quality control and auditing in the information processing system.

Statland: The time to determine the degree of privacy or confidentiality is when the files are brought online, not after the fact. Up front, the costs are relatively minor. The hindrance in most organizations is haste to get a project into operation.

Fenwick: In developing our large systems, representatives from our auditing group, who have background

in dp or information management, attend our meetings periodically. After a system goes online, they audit that system.

Statland: That's the way it should be. Large, well-run companies, with management-information groups, have management direction and are willing to spend the dollars.

How concerned with ethical, confidentiality and security issues must MIS/dp managers be in order to perform well? Should competence and professionalism be considered for codes of ethics applying to them?

Statland: MIS/dp managers have a responsibility to protect the information assets of their companies. However, they have long lists of problems, and I don't believe that privacy and security are high on those lists.

Hoffman: But a manager has no choice but to increase awareness of ethics within his or her company. A manager is a teacher, among other things. The only question is, what is taught?

Fenwick: We at New York Telephone have a set of codes we work by. They have nothing to do with whether an employee is in information processing: It's a business practice.

Hoffman: I don't see what expertise and competence have to do with ethics. Or, expressed a bit differently, why should they be unique to dp?

Spiro: Nothing about possessing competence is unique to dp or information science. But developing expertise through initial and continuing education within an organization is a managerial obligation.

Smith: Isn't there a potential problem with the sophisticated programmer,

with access to a lot of proprietary information, who can hold a company hostage? That is, he or she may steal from the company, take the know-how somewhere else, or screw up the systems before leaving.

Hoffman: It's an article of faith with me that the percentage of bad apples in the information-systems department is no greater than in any other. We deal with a different technology, not with different ethical issues.

DeMaio: More and more persons are using terminals, functioning as information processors. How can a professional information processor be distinguished from a nonprofessional?

Statland: Even in decentralized operations, processing centers, collection points and networks still operate. The individuals charged with management of these processing nodes are those who may be referred to as information-processing professionals.

The others aren't highly trained or well versed. They're users of information. The development of a code of ethics should be paralleled against a standard of knowledge.

Two societies—Data Processing Management Association (DPMA) and Association for Computing Machinery (ACM)—have taken steps to formalize standards, including standards of competence and professionalism. What effect does this have on MIS/dp managers?

Fenwick: They're the criteria for a standard of conduct in this profession.

Smith: Compliance with a code is probably more difficult in this profession than in many others.

Spiro: Enforcement procedures for

(Continued on page 102)



"At this point, we should present guidelines, not the Ten Commandments."

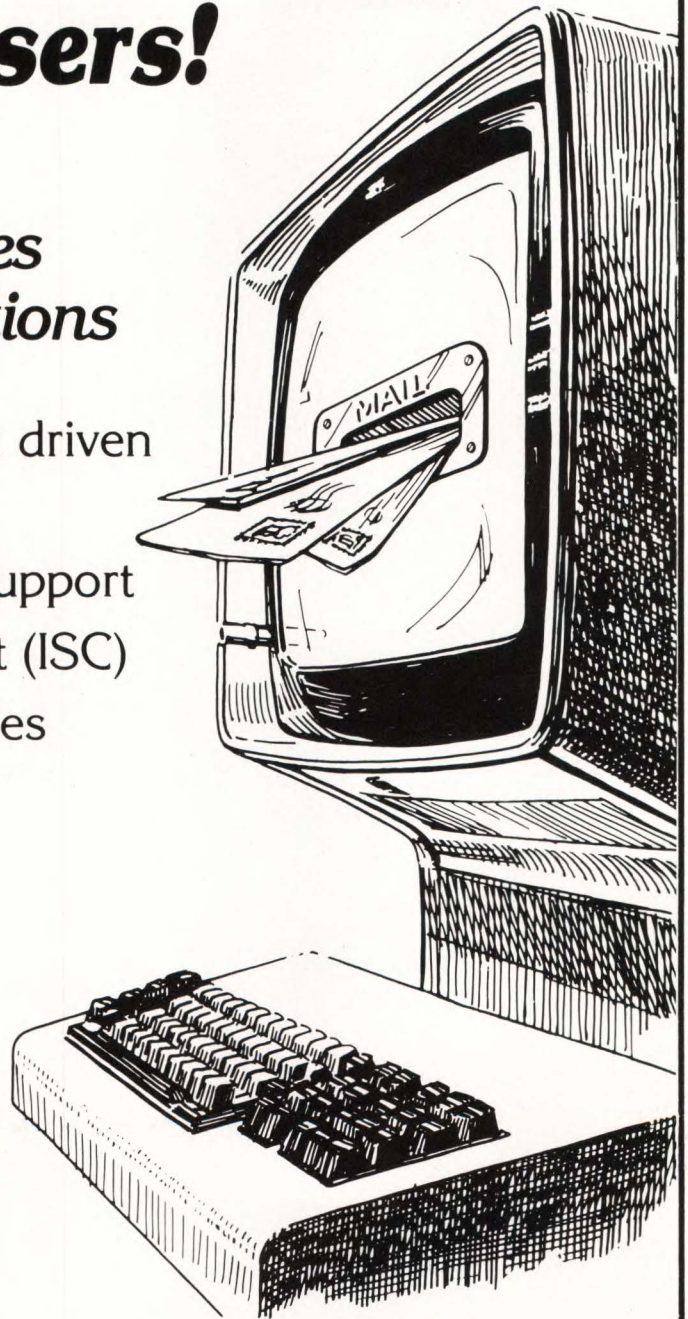
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Ethics

(Continued from page 98)

the DPMA code of ethics exist, and they're being called on in a current case, in the first major test. The enforcement procedure is quite involved so as not to make it too easy to bring charges. The person bringing charges must do so in writing, and the document must be notarized. Committees are appointed and appeal rights granted. The persons involved know the details, but when a case history is published at the end, the names are taken out. One of the purposes of the case history is education.

Hoffman: What sanctions are applied?

Spiro: Only suspension from membership. It's a privilege to belong.

Hoffman: What sanctions would you apply?

Spiro: I hope a standard of conduct might be developed for all in the profession. If that comes about, then it would be possible that the privilege of engaging in the profession could be taken away.

Hoffman: What you're talking about is the power of a self-appointed group, namely, the members of DPMA, SIM [Society for Information Management], and ACM to stop me, or him, or her from practicing the profession.

Spiro: No, that doesn't mean just the associations involved. There must be unanimity across the board—all the persons involved. There must be pub-

lic recognition that dp and information management is a profession. There must be formal educational requirements.

Hoffman: It's a grotesquely bad idea!

Spiro: I believe it's an excellent idea!

Hoffman: In this country, practice of a number of professions is legally prohibited to those not licensed. Typically, what begins as an effort to protect the public ends up as an effort to restrict entry. It's happened with law, and it's happening with medicine. It clearly doesn't work. And it's antithetical to my idea of human rights for private bodies to prevent persons from practicing their professions unless some clear public danger can be demonstrated.

Spiro: But there should be an attempt to ensure that the highest possible standards are adhered to.

Hoffman: That's a noble goal. I object to the compulsion associated with it.

Spiro: I don't understand how standards can be obtained without some compulsion.

Hoffman: When an employee and an employer enter into an employment arrangement, built-in safeguards are present. But public control is notoriously ineffective.

DeMaio: Do you wish to throw out the whole licensing process?

Hoffman: I do, except for medicine and the kinds of engineering that affect public safety, such as structural and electrical engineering. I see no reason to restrict the practice of law or

architecture—or information management.

Spiro: Don't you believe that information has value?

Hoffman: To be sure. But so do groceries, and the only standard for a grocer is cleanliness.

Spiro: Should a computer professional be licensed for security, then?

Statland: It's incumbent on anyone who's a bona-fide professional to make an individual moral commitment. I don't believe standards can effectively be mandated. It's not for DPMA and ACM to set up these codes.

What's more, if a person is "disbarred" from membership, and an employer says, "I won't hire you because of that," hasn't that person's privacy been violated?

Smith: Doesn't a code of ethics force a profession to set its priorities? Isn't that good?

Spiro: There is a long way to go toward defining what computer professionals are, let alone before one is thrown out. With the acceptance of a solid enough set of standards, it might be a good idea to throw out some individuals who can't or won't perform at those levels.

Hoffman: That's where we part company: I can't perceive of anyone wanting to do that.

Rueckel: I concur. Standards can't be made that restrictive. At this point, only broad guidelines can be presented. They should be guidelines, not the Ten Commandments.

DeMaio: A code of ethics is less a discriminatory vehicle that says, "Thou shalt not belong," than a definition of what is competence. Ex-



"What's missing in many organizations is the recognition of the privacy problem."

Spiro, Defense Comm. Agency

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Ethics

(Continued from page 102)

clusion in many professions is based more on the answer to the question, "Can this person demonstrate competence?"

Rollins: It's usually a question of fulfilling a contract: "You said you were going to take on this task, and you failed to do it." It's objective. It's like malpractice.

Spiro: Codes of ethics won't make good people out of bad. Their primary function is education of individuals in the computer community, of the public, of our 14- and 15-year-olds.

Computer-knowledgeable adolescents appear to have no consciences at all, according to widely circulated news stories of their exploits in penetrating systems. Panelist Rollins brings special knowledge of young people and ethics to the discussion.

Rollins: Once or twice a semester, I talk to business students in computer programs, generally at the graduate level. It's usually the first time anyone has spoken to them about ethics, privacy, and confidentiality. And it's very late in the process, because these students are ready to go out into the field. Many of them ask me afterward, "Why wasn't this designed into our programs? Why wasn't an elementary course given that might have made me think differently?"

Statland: It may be a full generation

before universities are tuned in to all aspects of data processing, including responsibility for security and privacy. The quality of computer education ranges from almost amateurish to relatively good. When an organization hires graduates, it takes on the responsibility of training them.

Spiro: I serve as president of the DPMA Education Foundation, which has developed a model curriculum for computer-information sciences. It has been adopted by more than 200 schools so far, and it includes security, confidentiality, privacy and ethics. We're exploring the notion of quality control, or accreditation, too, to ensure that schools not only follow the curriculum but also do it well.

DeMaio: The school influences students as well by the administrative rules it uses in its own department.

Spiro: The school is responsible for four years of education. But a company may be responsible for 40 years of an employee's education.

Rueckel: A manager certainly has a role in setting an example of ethical behavior. My company, ITT, has defined ethics through its policies, too, ranging from treating employees considerately to accepting gifts from vendors.

I'd like to add that ethics doesn't get much attention, certainly not the attention that computer literacy gets. Virtually nothing is written on ethics

in the computer trade magazines or in books.

Spiro: Developing a code of ethics is anything but simple. Seminars at national conferences and at the National Computer Conference weren't very well attended.

Statland: The problem of insufficient interest comes from the lack of understanding that ours is a technology-based society. Loose restrictions on computer use in the business community and the absence of enforceable laws open the door for young people to hack around and gain access to an organization's computer systems.

Rollins: Part of the problem lies in society's view of corporations as un-

"An obstacle to privacy protection is the time, effort and energy it requires."

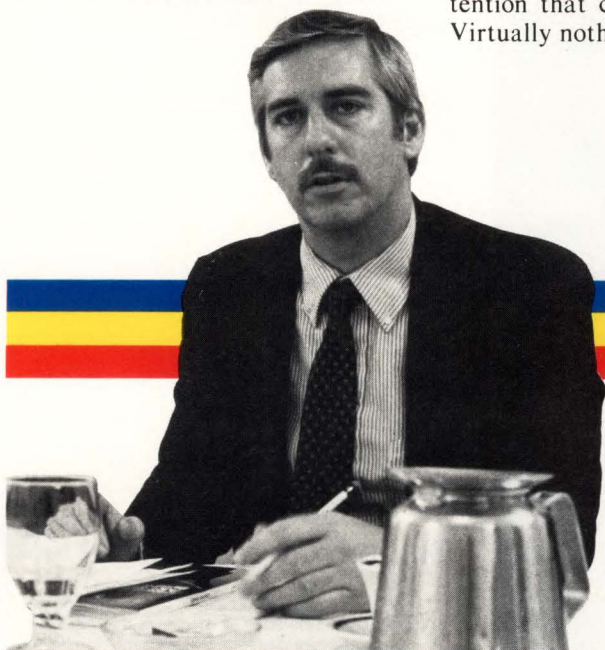
DeMaio, IBM

ethical—that they feel no responsibility toward the persons they serve. And like Robin Hood, the little guy—the hacker—gets the big guy.

DeMaio: Or is it that our ethical instincts are more sensitive when the situation is person to person, rather than person to institution?

Statland: The impression that business organizations deliberately set out to rip off the public is widespread. I deal with more business organizations than most people do, and I find that most of their employees are honest and upstanding. Of course, a few indi-

(Continued on page 108)



"One advantage of a code is that it allows timid employees to do the right thing."

Smith, consultant

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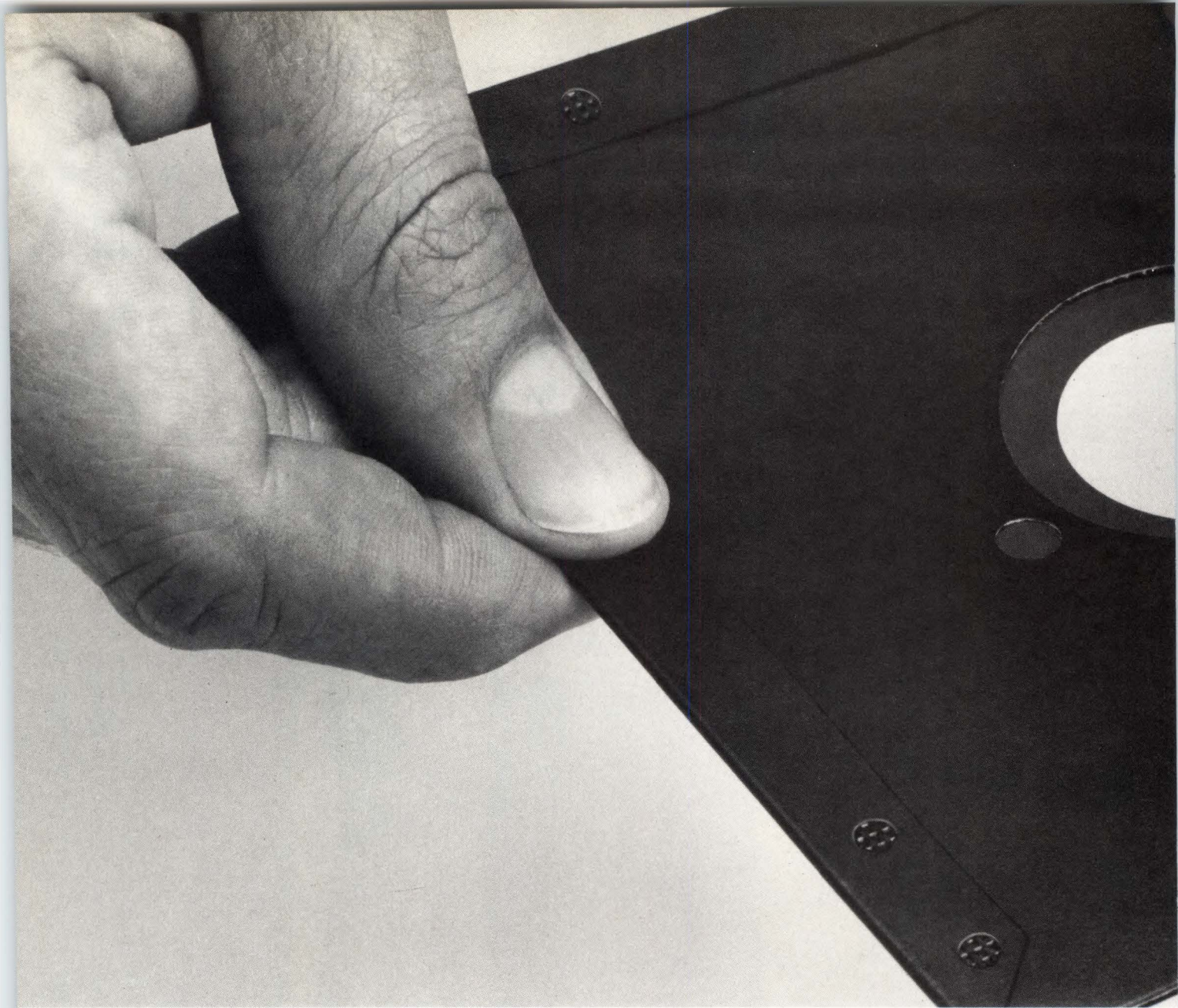
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Ethics

(Continued from page 104)

viduals take shortcuts. But substantial corporations don't set a goal of fleecing the public.

Hoffman: Here's another dimension of the problem: If someone steals information from a screen, the information still remains. "I haven't hurt anyone," says the purloiner. "They still have their information."

"The way to restrain unethical use of data is to put deterrence in the system."

Hoffman, Standard Oil

Rueckel: If there were only some way to assign a dollar-and-cents value to that information! If it could be said to be worth \$5,000 or \$150,000 then the incident would get the right kind of attention.

Smith: Companies, though, are reluctant to expose violations of ethical standards. Compare this behavior to that of professional journalism, which also is without a formal code of ethics. *The Wall Street Journal* disclosed a conflict-of-interest case within its own staff. A *Washington Post* writer won a Pulitzer Prize for a story that wasn't true—and that came to light.

DeMaio: Journalists operate in a fishbowl for all intents and purposes. If my corporation lets someone go for an ethical breach and chooses not to prosecute because it's not a legal breach, why should that be publicized?

Smith: Let's keep it simple and talk about violations of the law; for example, the crime of taking \$1,000 a month through a computer system. Do you imagine that a large corporation would cooperate with the press to make it known? I doubt it.

Spiro: It rarely happens, and perhaps I can exemplify the problem: Years ago an embezzler could, at best, steal up to \$1,000,000, and the crime would affect few people. Now, technology makes it possible to steal billions of dollars, perhaps affecting millions of persons. That's one way in which this profession is unique.

Smith: Exposure should be encouraged because it does so much to inhibit unethical and criminal behaviors.

Fenwick: Business isn't going to broadcast any wrongdoing of its employees. New York Telephone sometimes prosecutes and sometimes doesn't. If an employee owes the company money due to theft, restitution is expected. But the company isn't going to put a story in the newspaper.

The conversation turned to the ethics involved in another form of theft: copying software.

Hoffman: Another circumstance that's peculiar to our profession is the ease of copying a program if it's not copy-protected. From talking to a lot of people in the field, I can say that few of them see anything wrong with

"Ethics is just knowing right from wrong and governing one's conduct accordingly."

Smith, consultant

copying a diskette. My code of ethics tells me that if I buy Wordstar and read the license agreement, I've made a contract. I honor it, and I want anyone else to honor it. At Standard Oil we've made a lot of rather strong policy statements that say, "Don't do that!"

Smith: Do the cheaters rationalize it in some way?

Hoffman: I don't believe so. If the matter could even get to the point of rationalization, progress could be made. I suspect copying is not perceived as a problem.

Smith: That's the message I pick up from students who use software for recreation.

DeMaio: Many buyers don't realize they have a licensed product. If they've bought it, they believe they can do with it what they will . . .

Statland: . . . and don't consider it wrong to make copies.

Smith: In fairness to buyers, there are



"Concern for security and privacy provides a darn good business return."

DeMaio, IBM

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Ethics

(Continued from page 108)

some dilemmas. They're used to copying from print, music and videotape in the belief they violate no laws. So they don't think of software as different. In this fast-moving technology, ethical issues arise more rapidly than they can be dealt with.

Spiro: It's likely that a bill dealing with the copying of rented software will be considered by Congress.

Smith: Will technology make it impossible to pirate software?

Statland: By going to some lengths, microcomputer-based software that's reasonably safe from copying can be made. Decryption would still be possible, but the time and effort involved wouldn't be worthwhile.

Still another aspect of ethical behavior has to do with vendor relationships. Jack Rueckel of ITT had touched briefly on the issue of accepting gifts from vendors when discussing company policies with ethical elements. When further prompted, others contributed from their experience.

Rueckel: Our guidelines [for giving gifts] refer to the token value of a gift without specifying the amount. As for accepting gifts, I'd say that as a practical matter it would be acceptable to take a gift costing up to \$25. But I believe a gift worth \$25 should be mentioned to a superior to see if he or

Ethical codes already drawn up

As indicated in the accompanying roundtable discussion, the Data Processing Management Association and the Association for Com-

puting Machinery have developed codes of ethics for their members' guidance. Copies are available if you apply to:

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she would want me to accept or reject it. If the gift cost only \$10, I probably wouldn't bother reporting it.

Fenwick: At New York Telephone, accepting a pen or a notebook is all right, but not a case of liquor. Even such items as a lunch, dinner, or show is overdoing it; from our point of view, it's not an ethical practice. If we deal with vendors over time, as when we contract for software, we're expected to do our share, picking up the tab once in a while.

Hoffman: At Standard Oil the policy is worded something like this: "Any gift, of whatever size, which is given or accepted in the expectation of influencing a decision, is out of bounds."

Spiro: Interesting situations arise. For example, the Armed Forces Communications and Electronics Association holds a luncheon once a month. It used

to be that vendor companies would buy tables and invite persons from government. Then the government directed that we not accept lunches from vendors. Now the companies buy tables, give them to AFCEA, and the association invites federal employees to lunch.

Hoffman: That says something about the enforceability of ethics!

Smith: What if a vendor offered a free portable radio to anyone who inquired about an offer, or bought as a result of the offer?

Spiro: In the case of government, we can accept it, but it belongs to the government.

Hoffman: Here's a useful way to think about gifts: The Internal Revenue Service has rules about how much may be deducted for business gifts to one person. I believe that the limit is \$25. That might be a sensible guideline.

Rueckel: The key point, which is part of our policy, is this: Don't accept anything that will influence decision-making. That's especially important in other countries, where an obligation to the giver is implicit in the acceptance of high-value gifts. □



"In the history of mankind, ethical codes haven't proved very effective."

Hoffman, Standard Oil

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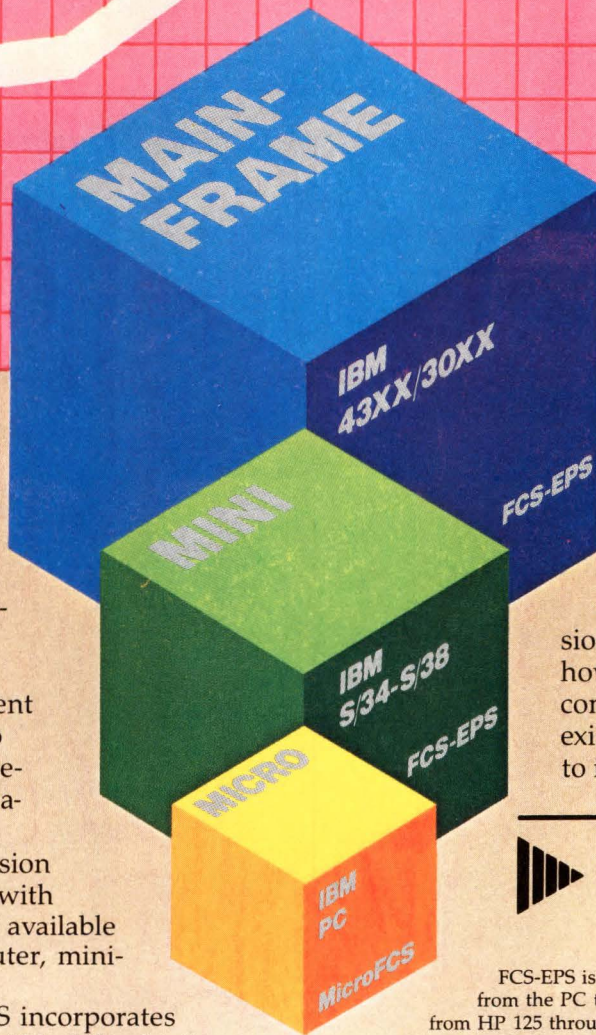
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FCS-EPS is available today on all IBM computers from the PC through 43xx and 30xx; Hewlett Packard from HP 125 through HP 3000, plus Wang, Honeywell, Univac, DEC, Prime, Data General, SEL, Burroughs, ONYX and CPM or UNIX-based microcomputers.

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An aerial photograph of a modern, multi-story office building with a flat roof and large windows. The building is surrounded by green lawns and trees. In the background, a body of water is visible. Overlaid on the image is a network diagram consisting of several colored dots (red, yellow, green, blue) connected by red lines, representing a computer network.

LANs vs. Multi-User Systems: Which Is Best For Team Computing?

Multi-user microsystems and networked personal computers are two ways to link employees. Which is best for your organization?

by Susan Foster Bryant, Microsystems Editor

Corporate America has just entered Phase Two of the personal-computing phenomenon. Phase One was the introduction of the personal computer into corporate confines, making computing power available on a one-person-to-one-machine basis to almost any employee. Phase Two involves setting up links between users—making personal computing *team computing*.

The great end-user question is no longer "When can I get my personal

computer?" but "When can we share our data?" And the question for managers is no longer "Which systems shall we let them bring in?" but "How can we cost-effectively integrate our resources so that employees can share files and peripherals?"

Managers have two options for team computing. For personal computers that are already installed, local-area networks (LANs) are available to tie them together. For

workplaces that don't yet have personal computers, multi-user systems are now available that offer perhaps the best of both worlds: personal-computing features *and* shared-use capability. Because employees generally work in teams rather than as solitary islands, multi-user systems cannot be ignored in mapping out an information-system strategy for today that will be effective tomorrow. *(Continued on p. 114)*



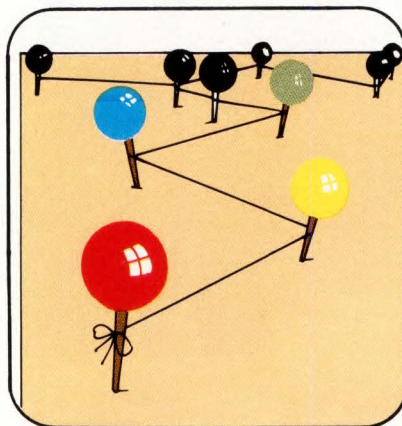
LANs vs. Multi-user Systems

(Continued from page 113)

A close look at both strategies for data- and equipment-sharing reveals deficits and benefits. LANs, for example, have several major drawbacks, according to industry pundits. One of the biggest problems with LANs is that they're costly. Many can't efficiently share peripherals and files. Moreover, there are no standards to ensure that one machine will be able to communicate with another machine through a network.

Strategic Inc., a San Rafael, CA, market-research firm, recently conducted a survey of 70 large corporations owning 2,000 or more IBM Personal Computers. Many of the users polled openly expressed confusion about existing LANs. Others said current LANs were just too expensive.

What does this spell for the manager concerned with departmental needs



for sharing resources and data? Computerland sells a six-worker personal-computer LAN made by Corvus Systems for about \$30,000. By comparison, a six-user multi-user system from Digital Computer Corp. costs only \$16,000. Yet both of these setups yield the same result: six worksta-

tions, each with a video-display terminal and a central 20-megabyte hard disk. The LAN includes a single 5¼-inch floppy-disk drive at each station, while the multi-user system offers a central 8-inch floppy-disk drive shared by all users.

In addition, managers must always evaluate what the cost is going to be to add more users. Adding an employee to an LAN may cost \$2,000 to \$3,000 more than adding an employee to a multi-user system.

Some observers claim personal computers simply were not meant to operate in a network, that they only function as single-user systems even if tied into an LAN. Network users are connected serially, which means each must wait in line to use peripherals. Also, communication software for LANs is still slow because data transfers between locations depend on user

Ushering in the era of self-service banking

For city dwellers, the word *bank* evokes images of long lunch-time lines and cranky tellers. Not so anymore for the customers of New York's Chemical Bank, where the metropolitan-research department recently started using local-area networks (LANs) to eliminate long waiting lines.

Three years ago, Chemical Bank began to automate its branches. Chemical Bank's goal was to reduce overhead by cutting labor and paper costs and to shore up the traditionally low profit margins of bank branches while improving operations.

To accomplish this goal, the bank did a needs analysis, sampled micros, and researched network options. It settled on the LAN offered by Nestar Systems. The system gives personal-computing power to the Chemical Bank customer and to each teller, branch manager, and sales-and-service representative. The system lets Chemical Bank process locally generated transactions after hours, and ships them back to the host computer without bur-

dening the daily flow of information.

Above all, the system was expected to reduce costs by lowering contention by users for mainframe power. Also, the bank expected to be able to lower maintenance costs by doing its own depot maintenance, ultimately saving 15 percent to 18 percent of its current budget by dropping service contracts.

How has this vision worked in reality? "We now have 20 Nestar local-area network systems in place," says Robert Linsky, project manager, Automatic Banking Center. "And although any system is never everything you want it to be, these systems are workable. They are mobile. Their costs have gone down as the prices of workstations have gone down. We have huge numbers of micros at each site—mostly Apple IIs—and we run about 10 to 12 per network."

Chemical Bank maintains its own networks. Linsky figures LANs have a five-year life span; by the time Chemical Bank's are that old, they'll have been depreciated and will have paid for themselves. By

that time, IBM may also have become a major force in networks, he adds. "We're waiting to see what IBM does in LAN technology. Although Big Blue has said it will be two to three years before it has a token-ring LAN, I don't think it will be that long," says Linsky.

Perhaps the most exciting use of network technology at Chemical Bank is found in New York's Times Square, of all places. There, at the bank's first Automatic Banking Center, amid the hustlers and the hustled, any customer can walk up to the banking center, touch a screen, and do a balance inquiry, cash withdrawal or cash advance, deposit or payment.

What has this got to do with local-area networking? The system runs on a three-node LAN from Nestar. When the customer keys in data, the personal computer puts it into a packet and sends it to the cluster controller, which in turn passes it to the host. The host sends the response back through the network to the customer. Banking truly is becoming a self-service business.

\$18,000



\$10,000



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In contrast, the CompuPro 10 is specifically designed to be a four-user microcomputer. One fully integrated system with advanced multi-user capability is less than **\$10,000.****

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LANs vs. Multi-user Systems

(Continued from page 114)

"polling." Before sending data, each device on the network must listen to, or poll, the line to make sure it is free of other messages. This method avoids data collisions that destroy data integrity. Constant polling eats up precious amounts of processing time. On the other hand, many multi-user systems carry data in parallel paths across an internal connection (a bus) rather than serially.

To combat the problem of lost processing time, many LAN manufacturers offer Carrier Sense Multiple Access with Collision Detection (CSMA/CD) LANs. CSMA/CD eliminates overhead and response-time degradation. Some multi-user system manufacturers also offer it.

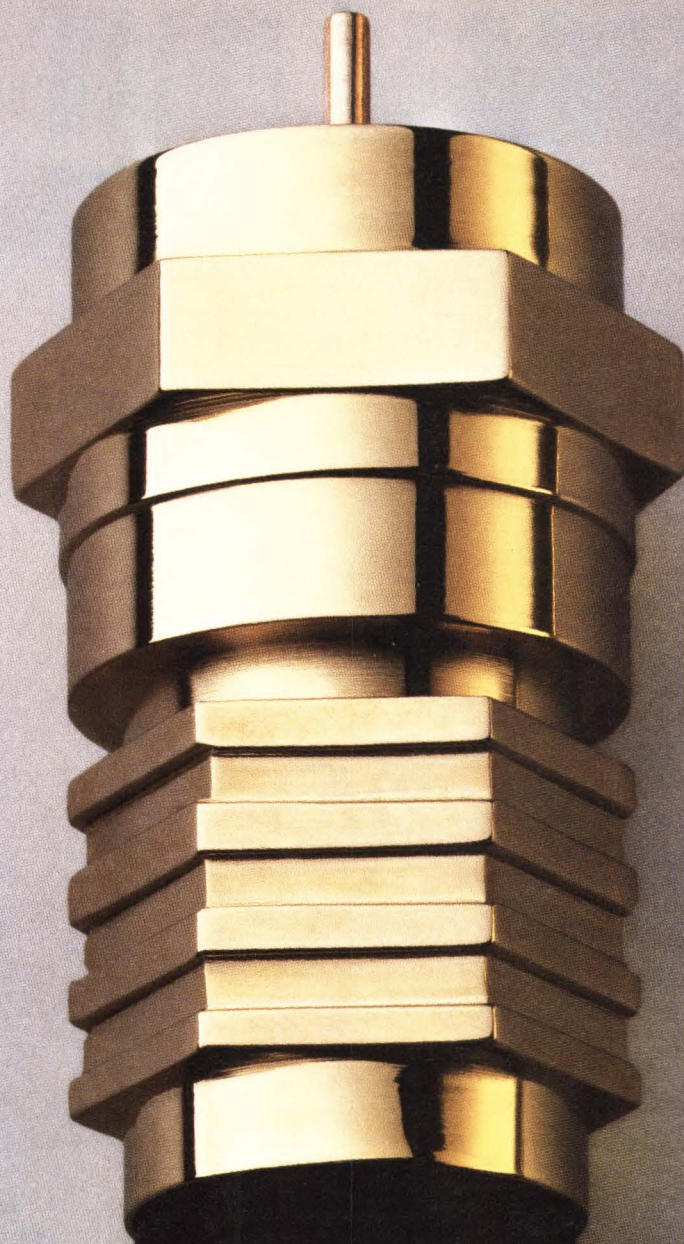
A thorough assessment of LANs and multi-user systems cannot overlook the significant aspects of net-

work-communication software, which, according to many, has been a disappointment. Sunit Khanna, group vice president of office automation and telecommunications for Creative Strategies International, a San Jose, CA, market-research house, has warned potential LAN users to distinguish among the levels of communication software available. "We

(Continued on page 120)

LANs for personal computers

Apple Computer (408) 996-1010 Circle 627	Destek Grp. (408) 737-7211 Circle 639	Kantek (206) 644-2970 Circle 651	Novell (801) 226-8202 Circle 663	Stearns Computer Syst. (612) 936-2000 Circle 676
AST Research (714) 863-1333 Circle 628	Digital Communica- tions Assoc. (404) 448-1400 Circle 640	Keybrook (415) 887-8999 Circle 652	Orchid Tech. (415) 490-8586 Circle 664	Systech (619) 695-3420 Circle 677
Autocontrol (314) 739-0055 Circle 629	Digital Microsyst. (415) 532-3686 Circle 641	Lantech Syst. (214) 340-4932 Circle 653	Pathway Design (617) 237-7722 Circle 665	Sytek (415) 966-7330 Circle 678
Avanti Communications (401) 849-4660 Circle 630	Fox Research (513) 433-2238 Circle 642	Logical Business Machines (408) 744-1290 Circle 654	Percom Data (214) 340-5800 Circle 666	Tecmar (216) 349-0600 Circle 679
Braegen (408) 945-1900 Circle 631	Gateway Communications (714) 261-0762 Circle 643	Magnolia Microsyst. (206) 285-7266 Circle 655	Pragmatronics (303) 444-2600 Circle 667	3Com (415) 961-9602 Circle 680
Bridge Communications (408) 446-2981 Circle 632	GE Intersil (408) 743-4300 Circle 644	Metapath (415) 345-7700 Circle 656	Proteon (617) 894-1980 Circle 668	Televideo Syst. (408) 745-7760 Circle 681
Corvus Syst. (408) 946-7700 Circle 633	General Telenet (212) 644-6972 Circle 645	Micom Syst. (213) 998-8844 Circle 657	Racal-Milgo (305) 592-8600 Circle 669	Trantor Syst. Ltd. (415) 490-3441 Circle 682
CR Computer Syst. (213) 822-5112 Circle 634	Hewlett-Packard (208) 376-6000 Circle 646	Mohawk Data Sciences (201) 540-9080 Circle 658	Santa Clara Syst. (408) 287-4640 Circle 670	Ungermann-Bass (408) 496-0111 Circle 683
Cromemco (415) 964-7400 Circle 635	IBM (914) 765-9600 Circle 647	Morrow Designs (415) 430-1970 Circle 659	SD Syst. (214) 340-0303 Circle 671	Wang Labs. (617) 459-5000 Circle 684
Datapoint (512) 699-7000 Circle 636	Ideas (301) 937-3600 Circle 648	Nestar Syst. (415) 493-2223 Circle 660	Softech Microsyst. (619) 451-1230 Circle 672	Western Digital Industries (707) 795-8574 Circle 685
Davong Syst. (408) 734-4900 Circle 637	Inconix (617) 655-1170 Circle 649	Network Syst. (612) 425-2202 Circle 661	Space Coast Syst. (305) 268-0872 Circle 673	XComp (619) 573-0077 Circle 686
Davox Communications (603) 424-4500 Circle 638	Interactive Systems/3M (313) 973-1500 Circle 650	North Star Computers (415) 357-8500 Circle 662	Standard Data (305) 776-7177 Circle 674	Xerox (716) 423-5078 Circle 687
			Starnet Data Syst. (303) 935-3566 Circle 675	



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Or just maybe it's the broad range of people who can relieve their network headaches with the contents of a single broadband cable.

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facsimile; FM radio;

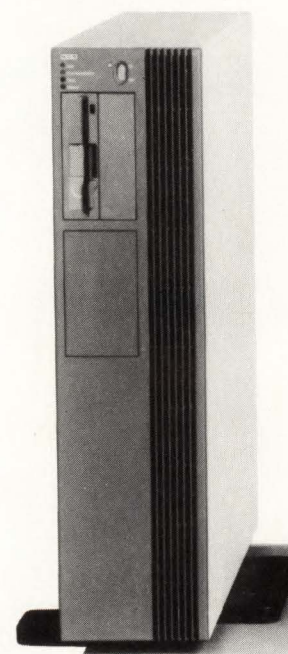
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nationwide distributed data processing network via SNA and other industry standard protocols.

Why does the Tower perform so well? Because it's built so well.

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Put it all together and you've got a system with a storage capacity that expands from 40 million characters to 214 million. One that can handle everything

from color graphics, electronic mail and word processing to data base management and electronic spreadsheets. And one for which programs can be written in COBOL, BASIC, Pascal, FORTRAN and "C."

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Along with this impressive piece of hardware comes an equally impressive piece of operating software: the NCR-enhanced version of UNIX.

It's a more powerful and, at the same time, altogether more "friendly" operating system. It lets neophytes write their own programs while allowing highly experienced people the freedom to tap such resources as a cryptic command set structure.

What makes this possible is a design which features five different user interface

POWERFUL CASE FOR UNIX: TOWER.

levels. Called "shells," they keep users within the boundaries of their own abilities. One "shell" is for professional programmers who develop operating software; another is for EDP people who write complex application programs; a third is for system administrators; the fourth is for office procedures analysts and the fifth is for casual users (it's so simple, even a vice-president can use it).

Put simply, UNIX is a lot more valuable to a lot more people on the Tower.

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A great computer deserves great application software. And that's what you get with NCR OFFICEWARE.*

One of its beauties is that it runs on

the Tower with IBM-compatible personal computers. So if you already have a slew of them, you can just hook up the Tower and supercharge them.

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OFFICEWARE even provides a link with the mainframe.

And OFFICEWARE is easy to use. Ridiculously easy to use. SOFT KEYS and PROMPTS guide the user through all operations. Effortlessly.

Quite simply, OFFICEWARE may be the most comprehensive office automation system available today. And it's only available on the Tower, a computer with enough power and versatility to handle your needs. Both come to you from NCR, a company committed to applying innovative computer technology to today's business problems. And one which offers its customers support and service from 1,200 offices in 120 countries.

For more information about the NCR Tower and OFFICEWARE, dial us toll-free at 1-800-CALL NCR.



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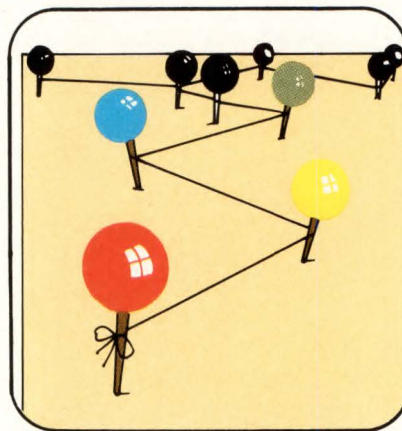
LANs vs. Multi-user Systems

(Continued from page 116)

can't expect the data communications within buildings and campuses to be as easy and trouble-free as voice communications," cautions Khanna.

Of course, proprietary networks—DECnet from Digital Equipment Corp. (DEC), Wangnet from Wang Laboratories, and Arcnet from Data-point Corp.—work well if your department can be restricted to the workstations and peripherals sold by a single manufacturer.

Some LANs allow dissimilar devices to communicate. Electronic-mail packages have been integrated into LANs such as Eaglenet from Eagle Computer, and Hinet from Digital Microsystems. It should also be noted that Nestar, 3Com, and Corvus, among the many LAN manufacturers, have made great strides in improving bus interconnections, file access, printer servers, and electronic-mail service. However, until networking software is more transparent, networks will not achieve their potential



usefulness to corporations.

One vendor that is attempting to reduce networking problems by setting up its protocol as an industry standard (by licensing it to other houses) is Microcom Inc., Norwood, MA. The Microcom Networking Protocol (MNP) is a file-transfer protocol that is independent of operating systems or individual micros. The software, which adheres to the Inter-

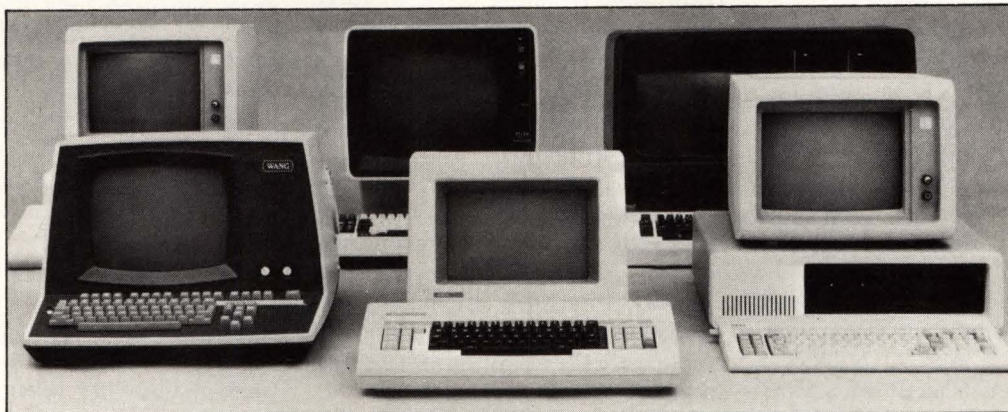
national Standards Organization's open-systems-interconnection model, will allow dissimilar equipment to communicate easily. Some of the companies that have begun to subscribe to MNP include Apple Computer Corp., MCI Communications (Washington), Lotus Development Corp. (Cambridge, MA), Dow Jones Information Services (New York), and Visicorp (San Jose, CA).

Another vendor that has made inroads into solving network-software problems is Communications Research Group (Baton Rouge, LA) with its Blast (Blocked Asynchronous Transmission) products. Blast allows dissimilar micros to perform file transfers via asynchronous ports. Other vendors that have also recently announced network-software solutions include Software Connections (Santa Clara, CA), Relational Technology (Mountain View, CA), Intelligent Technologies (Palo Alto, CA), Bridge Communications (Mountain

A sampler of multi-user systems

Vendor	System	Price	Circle
Action Computer Enterprise (818) 351-5451	Discovery/Personal Connection	Depends on configuration	714
Alpha Microsyst. (714) 957-8500	AM-100	\$5,850 to \$8,750	715
	AM-1000E	\$15,000 to \$16,166	
	AM-1042E	\$25,833 to \$29,500	
	AM-1072	\$30,500 to \$34,166	
	AM-1082	\$48,000 to \$60,600	
	AM-1092	\$56,000 to \$68,600	
	AM-1172	Depends on configuration	
Alspa Computers (408) 370-3000	Alspa-Net	\$10,000 and up depending on number of users	713
Altos Computer Syst. (408) 946-6700	580-2	\$2,750	716
	580-10	\$4,990	
	580-20	\$5,990	
	ACS8000-10	\$7,490	
	ACS8000-12	\$8,990	
	ACS8000-14	\$10,990	
	586-10	\$7,990	
	586-30	\$9,450	
	586-40	\$10,990	
	ACS8600-12	\$12,500	
	ACS8000-14	\$14,500	

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Soft-Switch communicates with IBM, Wang, Xerox, and NBI. It communicates with the MultiMate word processing program on the IBM PC, with DCF and with PROFS; with the IBM 6670 laser printer, and with standard hard copy printers.

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Let's say an analyst prepares a document on his PC with MultiMate. He executes Soft-Switch (which executes in the PC, as well as in the IBM host) and specifies distribution to his secretary's Wang word processor and to the 6670 laser

printer down the hall. Soft-Switch provides the micro/mainframe link, transports the document from the PC to the IBM host, translates the document from MultiMate format to DCA, translates the DCA format to Wang's WPS format and the IBM 6670 laser printer OCL format, and routes the documents to their final destinations.

Soft-Switch: a path to tomorrow

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LANs vs. Multi-user Systems

(Continued from page 120)

View, CA), Applied Intelligence (Mountain View, CA), and Softech Microsystems (San Diego).

One of the oft-cited reasons for corporate reluctance about LANs is the absence of an IBM offering. Speculation about an LAN announcement began early this year and reached a fever pitch by June, when IBM announced that it would offer a token-ring LAN—a very sophisticated network—within three years. In the meantime, IBM contracted with Sytek Inc., a small data-communications manufacturer, to produce a simpler product. Shortly afterward,

IBM also announced its first multi-user system, the IBM Personal Computer AT. It supports up to three users. Meanwhile, the new AT&T made its own announcements of a multi-user system and an LAN. The activities of both giants will dominate both options for multi-user access.

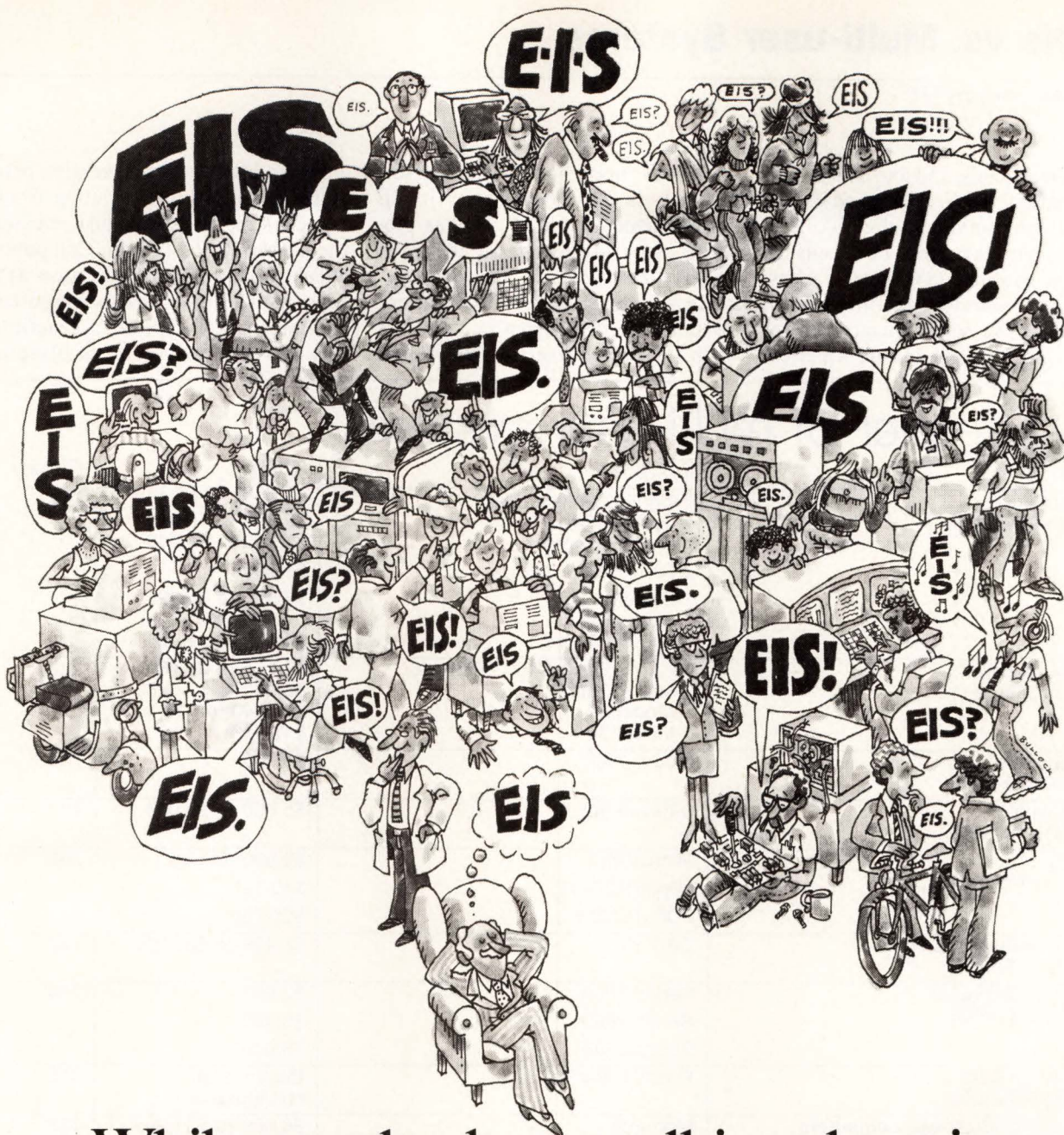
In the realm of LANs, AT&T's 3BNet provides Ethernet interfaces for AT&T's new 3B line of microcomputers. 3BNet provides central administration with automatic back-up, which lets managers monitor and reconfigure the network from a single terminal.

The entire network interconnects via a coaxial cable and operates at up to 10 million bits per second. (Other networks, such as Multilink from Davong Systems of Sunnyvale, CA, transfer data at 2.5 million bits per second.) Using commands from Bell Labs' Unix operating system, users can move data among machines, provide secure access to the network, and administer network operations.

3BNet was put to its first use at the recent Summer Olympics, where AT&T used it to link 14 3B20S computers on the data-communications system that provided athletes,

A sampler of multi-user systems

Vendor	System	Price	Circle
AT&T Information Syst. (201) 898-3278	AT&T Personal Computer	\$2,745 and up	717
Billings Computer (816) 373-0000	6000 System 12	\$6,740	718
Burroughs (313) 972-7000	B20, B21, and B22 Series	\$5,000 and up	719
Cado Syst. (213) 323-8170	Cado Cat III 20/24 20/28 Tiger ATS 30-32 Tiger ATS-64	\$5,490 and up \$11,650 and up \$15,000 and up \$24,000 and up \$31,000 and up	720
California Computer Syst. (408) 734-5811	Calstar II Calstar III Slimline 301 302 411 412 421 422 2300 Series	\$2,795 and up \$4,395 and up \$3,995 and up \$5,257 and up \$6,375 and up \$11,397 and up \$12,516 and up \$12,044 and up \$13,162 and up \$1,195 and up	721
Century Computer (214) 233-3238	Vanguard	\$3,295 and up	722
Codex/Motorola (617) 364-2000	CDX-268 Series Model 25 Model 45	\$4,897 and up \$5,995 \$8,995	723
Columbia Data Products (301) 992-3400	Multi-Personal Computer	\$3,395 to \$4,995	724
Compupro (415) 786-0909	System 816 Compupro 10	\$5,495 to \$13,995 \$4,995	725
Control Data (612) 853-8100	Control Data 110	\$2,895 to \$7,000	726
Corvus Syst. (408) 946-7700	Concept	\$3,995 to \$4,695	727



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CIRCLE 67

LANs vs. Multi-user Systems

(Continued from page 122)

coaches, officials, and journalists with information on scheduling and scores. The network served 60 sites taking in 1,700 terminals and hundreds of printers within 4,000 square miles. Managers should carefully watch AT&T as the communication giant moves, albeit slowly, to wire America.

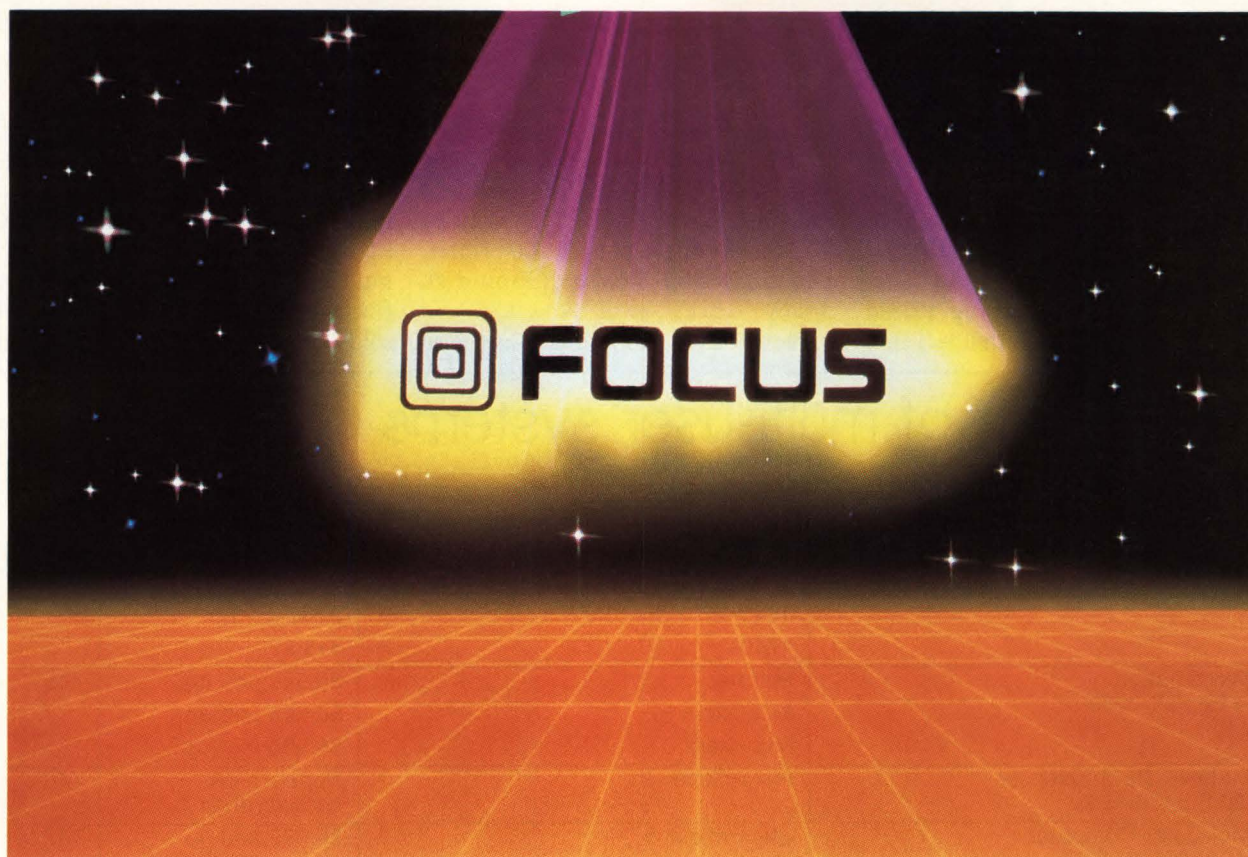
AT&T may have placed itself squarely in IBM's path with its 3B announcements, but it also has provided users with a bridge to the popular IBM PC. AT&T's "PC Interface" software allows the IBM PC to be one of up to 18 workstations in a network with the more powerful 3B systems.

Other big vendors have also been active on the team-computing front. For example, DEC has just released the Micro/PDP-11 Team Computer, which supports up to eight users at a time, with all users sharing resources and information. The chief benefit to this new system lies in its place in

A sampler of multi-user systems

Vendor	System	Price	Circle
Cromemco (415) 964-7400	D-Series System One	\$4,995 to \$9,495	728
	System Two	\$5,995 to 10,995	
	System Three	\$7,995 to 12,495	
	Z-80A System Zero	\$1,295	
	System One	\$3,995 to \$6,995	
Data General (617) 366-8911	System Two	\$4,695 to \$8,495	729
	System Three	\$6,995 to \$9,495	
	Desktop Generation Model 10	\$3,165 to \$5,430	
	Model 10/SP	\$9,660 to \$12,760	
Datapoint (512) 699-7000	Model 20	\$10,640 to \$16,160	730
	Model 30	\$17,030	
Datavue (404) 449-5961	Datavue 80	\$5,750	731
DEC (617) 897-5111	MicroVAX I	\$5,000 to \$9,000	732
	Micro/PDP-11	\$9,995 and up	
	PDP-11/23+	\$10,125	
Digilog Business Syst. (215) 628-4810	PDP-11/23+	\$20,750	733
Digital Computer (619) 566-8500	DBS 16	\$3,459 to \$25,000	
	Series 1000	\$3,995	
	Series 2000	\$6,450	734
Durango Syst. (408) 946-5000	Series 3000	\$8,950	
	Poppy II Series	Depends on configuration	735
Dynabyte Business Computers (408) 263-1221	Monarch	\$6,000 to \$21,995	736
Fortune Syst. (415) 595-8444	Fortune 32:16 Professional Syst.	\$8,000 to \$12,000	737
	XP (M)	\$13,000 to \$25,000	
Four-Phase Syst. (408) 255-0900	Series 2000 Model 220	Depends on configuration	738
	Model 240		
	Model 260		
Hewlett-Packard (415) 857-1501	HP 250	\$15,750	739
Honeywell Info. Syst. (617) 923-7500	Microsystem 6/10	\$3,995 to \$9,995	740
	Microsystem 6/20	\$17,000 and up	
IBM (Contact local sales office)	Personal Computer AT	\$3,995 to \$5,795	777
IMS Int'l. (702) 883-7611	5000IS	\$3,000 to \$6,400	741
	5000SX	\$2,700 to \$8,200	
	8000SX	\$4,500 to \$11,600	
	8000 S	\$5,600 to \$25,000	
MAI/Basic Four Business Products (714) 731-5100	S/10	\$3,995 and up	742
	S/80	\$14,635 and up	

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LANs vs. Multi-user Systems

(Continued from page 124)

DEC's upgrade path. Users who already have DECmate, Rainbow, and Professional personal computers in their departments can hook them to the Team Computer while continuing to use them alone for specific functions such as word processing. Priced at about \$20,000, the complete Team

Computer system features a Micro/PDP-11 system unit with a 10-Mbyte Winchester disk drive, 512 Kbytes of random-access memory (RAM), two VT200 terminals, one LA100 printer, and dual 400-Kbyte floppy-disk drives.

North Star Computers has also

been active, with the debut of Dimension, a multi-user system that can accommodate up to 12 users, each running a different IBM PC or PC XT application. The economics of a multi-user system in this case allow a five-user version of Dimension to be sold for \$12,500, or almost half the

A sampler of multi-user systems

Vendor	System	Price	Circle
Micro Craft (214) 630-2562	Dimension	\$4,000	743
Micro Five (714) 957-1517	Series 1000	Depends on configuration	744
	1640	\$16,495	
	1740	\$19,995	
Micromation (415) 398-0289	Mariner	\$6,500 and up	745
	M/System	\$6,500 and up	
	MiSystem	\$6,990 and up	
Mohawk Data Sciences (201) 540-9080	Hero/Super 21	Depends on configuration	746
Molecular Computer (408) 262-2122	Supermicro 8	\$5,995 and up	747
	Supermicro 32X	\$18,995 and up	
Monroe Syst. for Business (201) 993-2000	MS 2000 Series	\$3,695 and up	748
Morrow (415) 430-1970	D200	\$5,495	749
	Tricep	\$9,000	
NCR (513) 445-5000	Tower 1632	\$16,000 and up	750
NNC Electronics (714) 895-8000	System 520	\$7,932	751
	System 820	\$8,094	
North Star (415) 357-8500	Horizon	\$9,299 to \$14,399	752
	Dimension	Depends on configuration	
Ontel (516) 364-2121	Model 1505	\$1,800 to \$4,500	753
	Model 1507	\$2,400 to \$5,500	
Onyx Syst. (408) 946-6330	Sundance II	\$7,250 to \$9,759	754
	C500/MU	\$7,790 to \$8,750	
	C8002	\$20,500 to \$26,000	
	186 Series	\$4,495 and up	
OSM Computer (415) 961-8680	Zeus 3x	Depends on configuration	755
	Zeus 4	Depends on configuration	
Perkin-Elmer (201) 870-4500	Model 7350	\$8,400 and up	756
Pertec Computer (714) 660-0488	System 3200	Depends on configuration	757
Plexus Computers (408) 988-1755	P 25	\$14,950	758
	P 35	\$17,950	
	P 40	\$37,950	
	P 60	\$42,950	
	P 65	\$49,950	

New from Interactive Systems/3M:

The first high-speed broadband local-area network that guards against data crashes.

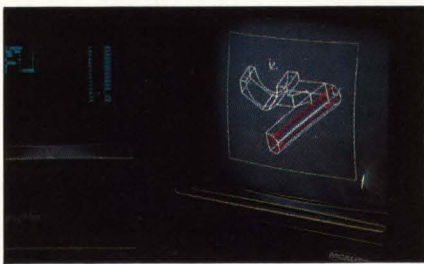
If you've been thinking of investing in a contention network, consider this: How do you guard against data crashes during times of heavy system use?

Answer: You don't, because contention schemes simply don't provide any kind of data insurance.

Fortunately, there is a new type of network that *does* protect against data loss. It's called 3M Videodata® LAN/1. And it's the first intelligent broadband local-area network that's designed to get data through on time, no matter how much traffic is on the cable.

Videodata® LAN/1: The efficiency of token-passing plus the proven flexibility and expandability of broadband.

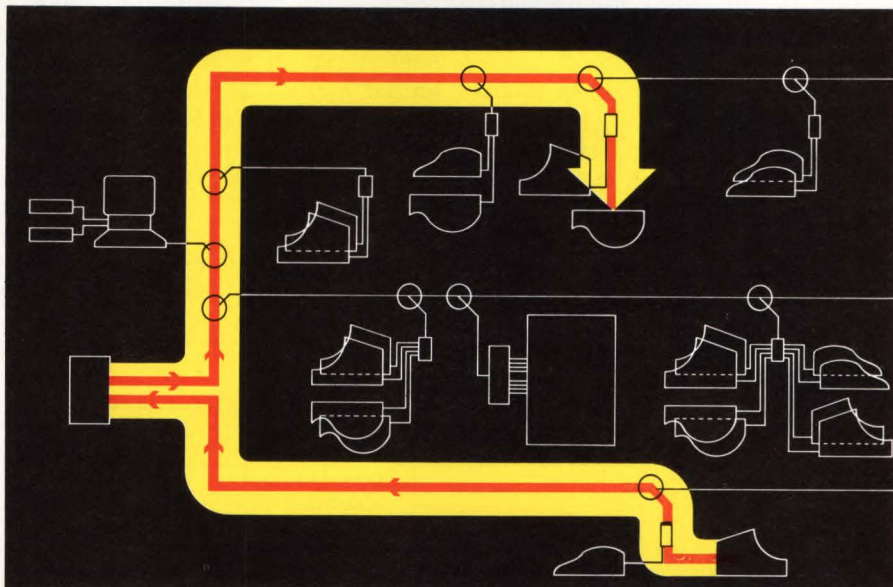
Token-passing networks eliminate contention troubles and data crashes by passing an electronic "token" from terminal to terminal. When a terminal has to transmit, it grabs the token and sends data packets to the receiving device. Receipt is acknowledged and the token is automatically released to continue its rounds. Because the system assigns a network entry address to each user, everyone has an opportunity to send data during each token cycle.



Because Videodata LAN/1 is a broadband system, dedicated channels can be used for full-motion video applications such as CAD/CAM and teleconferencing. These video signals are kept entirely separate from digital traffic on the network's token-passing channels.

So far, so good. But most token-passing networks are baseband systems, meaning that terminals must share a common channel as they would in a typical contention network. This can limit speed and capacity in some applications.

LAN/1 overcomes this possible limitation by combining token-passing with a proven *broadband*



In the Videodata LAN/1 network, messages can be sent from any terminal to any other without going through the host processor. Network Interface Units (NIUs) connect digital devices to mechanical taps (shown as small circles) on the main coaxial cable. A Network Monitoring Unit, or NMU, keeps a statistical record of network performance.

technology that allows many channels to be put on a single cable. The payoff: higher channel speeds, ranging up to 2.5 MB/s over a maximum seven-mile radius, with terminal data rates of up to 19.2 KB/s. Plus a capacity of up to 10,000 devices to allow plenty of room for future expansion.

Self-monitoring, with a printed record of network performance.

LAN/1 gives statistical proof of its own performance in printed form, thanks to a microcomputer-based Network Monitoring Unit (NMU). This unit, which also helps in routine maintenance and troubleshooting, may be used for remote monitoring as well.

Separate channels for voice, video, and graphics. Plus the ability to work in point-to-point applications.

Because LAN/1 is a broadband network, channels can be set aside for real-time voice, video, and high-speed graphics. This can be done without compromising digital traffic capacity.

LAN/1's broadband design also permits flexibility in network architecture, so that it can be used in high-speed point-to-point applica-

tions which can't be served efficiently with contention systems.

Other benefits include full transparency, an automatic shut-off feature to keep any one terminal from capturing the token, and compatibility with both dumb and intelligent terminals. The list of features goes on and on.

For the full story on the new Videodata LAN/1 network from Interactive Systems/3M, call 800-328-5727 x 176 toll-free. (In Minnesota, 800-742-5685 x 176.) Or mail the coupon.

**Mail to: Interactive Systems/3M
Response Center
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☐ Please have a representative call.

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Title _____
Company _____
Phone () _____
Address _____
City _____
State _____ ZIP _____

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LANs vs. Multi-user Systems

(Continued from page 126)

price of a comparable configuration of IBM PCs and PC XTs, according to North Star.

On the software side of the multi-user scene, Compupro (Hayward, CA) recently introduced its own version of Digital Research's Concurrent

DOS, a multi-user operating system. Called Concurrent DOS 8-16, Compupro's version is bundled with selected models of the company's System 816 Series of S-100-bus computers.

Concurrent DOS 8-16 is based on a

high-performance file system. It features "shared-code support," which lets users reduce memory requirements and program-loading time. An IBM PC-compatibility feature allows most application software written for the PC-DOS 1.1 operating system to

A sampler of multi-user systems

Vendor	System	Price	Circle
Polymorphic Syst. (805) 967-0468	System 8810	\$3,495 and up	759
	System 8813	\$3,995 and up	
Pro-Comp (212) 246-0074	Pro-Comp 8-8MU	\$6,000 and up	760
Product Assoc. (415) 364-3121	Zdisk Model 1	\$3,395	761
	Model 2	\$5,395	
	Model 3	\$6,395 (prices include software)	
QDP Computer Syst. (216) 526-0838	QDP 300	\$3,995 and up	762
	QDP 400	\$6,995 and up	
Quay (201) 542-7340	550M	\$5,595	763
	560M	\$5,995	
	570M	\$7,295	
	900M	\$6,845	
	900/33M	\$13,995	
	910	\$8,495	
Sage Computer (702) 322-6868	935	\$9,995	764
	Sage II	\$3,900 to \$4,700	
SDS (213) 390-8673	Sage IV	\$7,900 to \$10,800	765
	Series 4000	\$4,950 and up	
SKS Computers (614) 876-8668	SKS 2000 under MP/M	\$2,495 and up	766
Smoke Signal (213) 889-9340	Chieftain Series	\$4,325 to \$11,725	767
	VAR/68 Series	\$4,325 to \$11,485	
Star Tech. (714) 557-8640	Nano Star 10	\$7,200	768
Stearns Computer Syst. (612) 936-2000	Custom only	\$2,945 and up	769
Tandy (817) 390-3011	Radio Shack TRS-80 Model 16	\$8,397 and up	770
Tarbell Electronics (213) 538-4251	Rebel	\$6,295 to \$6,695	771
	Empire	\$7,595 to \$7,995	
Vector Graphic (805) 499-5831	Vector 5E Series	\$6,250 to \$11,995	772
	Vector MX	Depends on configuration	
Victory Computer Syst. (408) 259-7370	Microfactor	\$9,990 and up	773
	Factor	\$12,990 and up	
Visual Tech. (617) 851-5000	Visual 2000	\$8,990 and up	774
Wang Labs. (617) 459-5000	Professional Computer	\$2,595 and up	775
Zenith Data Syst. (312) 391-7000	Z-100	\$2,899 and up	776

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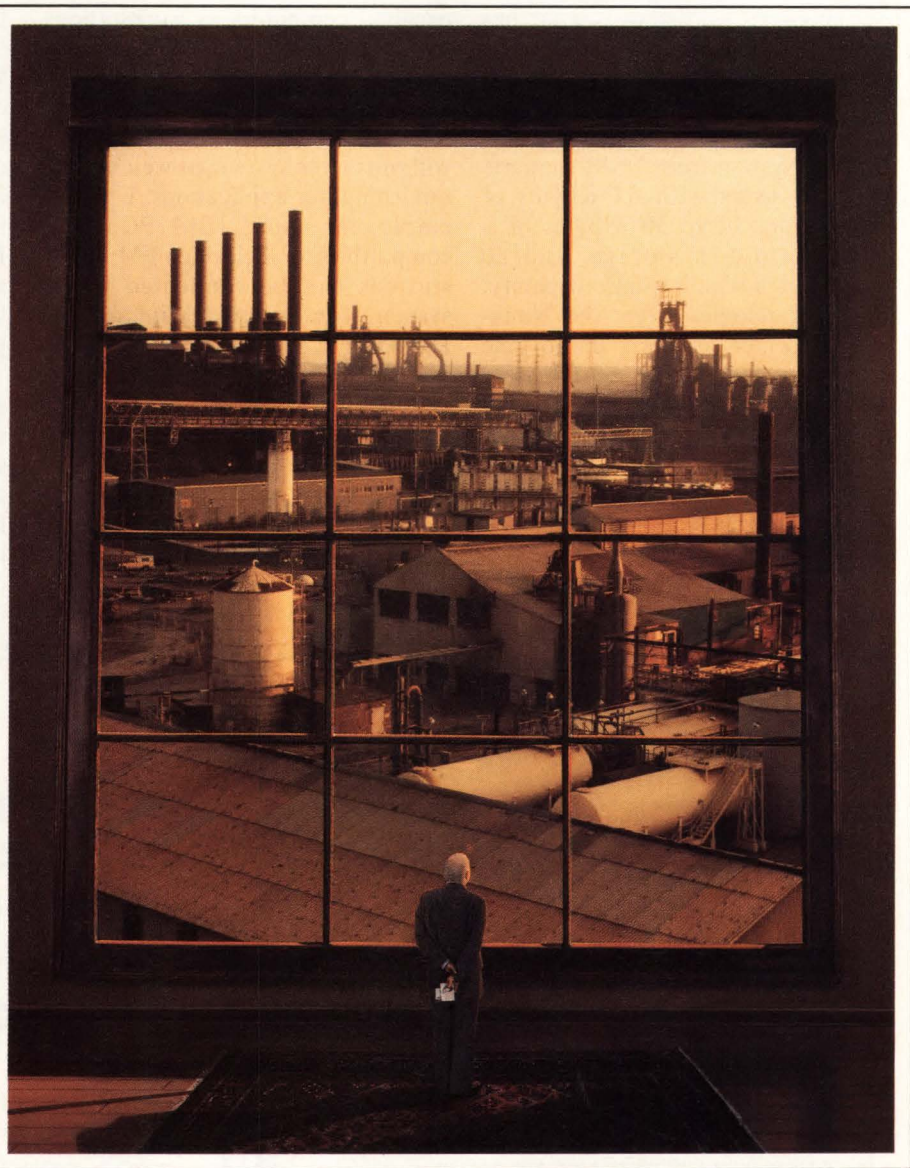
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Your First Logistics Decision



LANs vs. Multi-user Systems

(Continued from page 128)

run on the System 816, increasing the number of application packages available for use with the multi-user system.

Despite all of the activity in multi-user software, hardware is what has been making the most news lately. For example, Micro Five Corp.'s 1640 and 1740 models provide up to 512 Kbytes of RAM to up to 10 users. The new Zeus 3X system from OSM supports up to 32 users with 64 Kbytes of RAM, from 12 to 50 Mbytes of 5 1/4-inch hard-disk storage, and 20 Mbytes of streaming-tape capacity. Star Technologies offers the Nano-star 10, which supports up to nine users with 128 Kbytes of RAM, a 10-Mbyte 5 1/4-inch Winchester disk drive, and a 1 Mbyte 5 1/4-inch floppy. Onyx Systems' 186 Series is of note because it can run the PC-DOS, Concurrent CP/M-86, and Oasis-16 operating systems, opening up a wealth of application-software availability.

Also noteworthy in this wealth of new multi-user systems is Televideo's Personal Mini, which has special architecture and a minicomputer operating system. The Personal Mini uses personal computers as workstations. According to the vendor, new users can be added to the system for as little as \$99 per connection. Applications software for the IBM PC and PC XT will run on the system, as well as some minicomputer applications. Up to 16 employees using IBM PCs, PC-compatibles, or Televideo PM Workstations can be connected to the system. The Personal Mini sells for \$8,995.

The Pertec System 3200 multi-user system supports up to 32 users with a choice of operating systems—O/S 3200, Unix, Pick, or M/BOS. Programs can be concurrently executed in different languages, such as Business Basic and Cobol. CP/M is supported at the workstations. Morrow Inc.'s Tricep System supports four to

eight users running the Unix System V operating system. It sells for \$9,000. Stations for additional users can be had for \$2,500 each.

Alpha Microsystems also has a new family of Unix-based multi-user systems. The AM-1172 has 70 Mbytes of Winchester-disk storage with a choice of backup options. Up to 16 employees can use it at one time. Visual Technology Inc.'s Visual 2000 will support up to 16 terminals. A base-level configuration includes 512 Kbytes of RAM, a 19-Mbyte Winchester drive, a 5 1/4-inch floppy drive, six RS-232C terminal ports, and a parallel printer port. Its price is about \$8,990.

There are several options for managers trying to build shared-resource systems using LANs or multi-user systems. Although differences between the two methods of sharing information and peripherals exist and neither is perfect, both can make your department's personal computing truly team computing. □



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THE END OF FIRING AT WILL

Once an absolute right, now an absolute nightmare, firing at will has left both corporations and managers open to costly and time-consuming legal battles.

by Martin Lasden, Western Editor

There was a time when being the boss meant that you could shoot first, ask questions later, and not have to worry about getting in trouble with the law. You could always count on the sanctity of the "at-will" doctrine to see you through. As one court explained it back in 1877, a boss has the absolute right to fire his or her subordinates at will, whether "for good cause, for no cause, or even for cause morally wrong." With the rise of unionism, the passage of the federal Civil Rights Act, and the birth of the Equal Employment Opportunity Commission, life became more difficult for the trigger-happy executive. Sure, you could still catch your targets off guard, but you had to be a lot more careful about who your targets were.

Now, however, even that limited prerogative is in jeopardy—threatened by a rapidly growing number of court decisions that are holding employers accountable to standards of propriety that they've never had to heed before. If you shoot first now, the courts are saying, you may very well have to pay for it later.

Already, the list of companies that have been burned reads like a *Who's Who* of corporate giants. American Airlines, AT&T, Atlantic Richfield, Firestone, IBM, NCR, McGraw-Hill, Avco, and many others have shelled out sizeable sums to fight and/or settle the wrongful-discharge



Photo by Rick Barr



claims leveled against them. "The at-will doctrine is dead in the big picture," declares Cliff Palefsky, a labor attorney, who, in a jury trial in 1981, won for his client a \$300,000 judgment against IBM for firing her on the grounds that she was dating an executive employed by a competitor.

That sort of talk, needless to say, is making some executives very nervous, prompting nightmarish scenarios of managers unable to manage and businesses unable to compete. "What these cases often do is open up legitimate management decisions to examination by juries that are ill-equipped to sit in judgment," declares Victor Schachter, a San Francisco-based attorney who represents the interests of corporations. And, he says, that "hampers the flexibility of businessmen."

Whether it is to protect the rights of ordinary citizens or to right the wrongs of mean-spirited managers, the problem with using the law to effect social change is that the law is open to interpretation. Observers note that the same law that works against the unfair dismissal of a corporation's best people can just as easily work against the dismissal of its incompetents. And the same law that gives workers the right to refuse to participate in improper and/or illegal activities may very well work against all levels of cooperation.

Just how burdensome these new decisions will be to working managers remains to be seen. But, as scores of corporations are now realizing, these standards just can't be overlooked. For, in a single suit, where individual managers as well as entire corporations can be held liable, hundreds of thousands of dollars may be at stake. That cost doesn't include all the time, energy, and legal fees spent on defense.

That sort of threat naturally compels corporations to institute new policies and procedures, and to revise outdated employee-relation handbooks. Some, however, are going even further by taking the unprecedented step of giving nonunion employees the opportunity to appeal their grievances to "impartial" committees empowered to review and reverse management decisions. These companies aren't naive. They know full well that when you establish a mechanism by which management's authority can be directly challenged, some managers are bound to be offended. But corporations are doing it because they feel that they have to, because it's important to them to resolve personnel problems before they end up in court.

The state of California has been a pioneer in "wrongful-discharge" litigation. As attorneys like Victor Schachter attest, that has spurred a boom in litigation. His office,



Firing at Will

(Continued from page 133)

Schachter, Kristoff, Ross, Sprague & Curiale, alone handles some 50 wrongful-discharge cases at any one time. But, of course, that's not the kind of business most other businesses like to hear about, especially when, as Frederick Brown, another San Francisco attorney, estimates, employers are losing some 70 percent of the cases that make it to jury trial. "It's the American way to sympathize with the little guy," Brown explains. "That's why employers are losing so much. It's like David against Goliath."

While most wrongful-discharge cases are either thrown out of court or settled before they go to trial, Brown's 70 percent estimate in favor of the plaintiff suggests that being perceived as the underdog does have advantages. And, with claims nowadays averaging between \$250,000 and \$300,000, there is obviously much to be gained by underdogs.

Where did it all begin? In California it began with three landmark decisions handed down by the courts in rapid succession between 1980 and 1981—*Tameny v. Atlantic Richfield*, *Cleary v. American Airlines*, and *Pugh v. See's Candies*.

In *Tameny v. Atlantic Richfield*, the state Supreme Court ruled that ARCO did not have the right to terminate an employee because he had refused to participate in an illegal price-fixing scheme.

It was a California appellate court that next ruled on the complaint of Lawrence M. Cleary, who was fired by American Airlines after working there for some 18 years. Citing both the length of Cleary's tenure and the fact that he did not receive a hearing prior to termination, as stipulated by the airline's own personnel policies, the court concluded that such an employee could not be terminated without good cause.

And finally, in *Pugh v. See's Candies*, an appellate court cast a sympathetic ear to the plight of Wayne Pugh, a 32-year employee with See's who had worked his way up from dishwasher to vice president before he was fired. Again, citing long tenure, commendations, promotions, and the

verbal assurances made to him that if he did a good job "his future would be secure," the court ruled that the confectioner had, in fact, made an implied promise to Mr. Pugh not to discharge him without just cause.

This prototypical trilogy provides terminated employees with two possible legal legs to stand on. On the one hand, if an employee is given certain assurances and good performance reviews during the course of employment, an "implied covenant of good faith and fair dealing" exists that cannot be broken without just cause. Attorney Cliff Palefsky explains it to employers this way: "... if the promises you make and the puffery you use to induce someone to join your company reasonably lead an employee to believe that he or she has a job unless he or she doesn't perform, then that is a term of the contract."

The second possibility rests on tort theory. Here, the plaintiff claims that termination constitutes a violation of public policy and/or an infringement of his or her personal rights. If it involves an allegedly illegal price-fixing scheme, as it did in a California case, an alleged violation of consumer-credit law, as it did in a West Virginia case, or an alleged violation of the state's Food, Drug and Cosmetics Act, as it did in a Connecticut

case, the issue is the same: Can an employee of conscience following the dictates of law over the commands of his or her supervisor be fired for insubordination? In each case, a state court of final recourse ruled for the employee of conscience.

Besides contract and tort theories, there are other legal avenues that terminated employees may pursue. If a boss is so careless as to spread false or derogatory statements about a fired individual, he or she can easily be sued for defamation. If it can be proven that a boss consciously lied about an imminent termination or promised security when he or she knew that there would be none, then he or she can be sued for fraud. And if a boss knows that somebody is about to be fired, but doesn't say so ahead of time, then a case can even be made for negligence.

Two years ago, a negligence claim was upheld in Michigan against Bissell Inc. In that case, the plaintiff, an executive who had been with the manufacturer for 23 years, had been given some vague feedback about slipping performance. But in a performance review three months before his termination, the supervisor failed to warn him of his impending dismissal. This failure, combined with the employee's long tenure, which would naturally engender a sense of security, prompted the court to rule against Bissell. There is, however, one curious footnote to this case. Initially, the presiding federal judge awarded \$306,906 in lost wages, pension benefits, and mental-distress damages to the plaintiff. But then he decided to reduce the award to \$61,354.02 because the man's poor performance made him "largely responsible for his discharge" despite Bissell's negligence.

The negligence theory could soon be extended in a California class action suit against Atari Inc. Atari abruptly laid off some 600 workers on February 22, 1983, the first of several massive staff reductions. The workers allege they were laid off without warning.

Taken in whole, these develop-

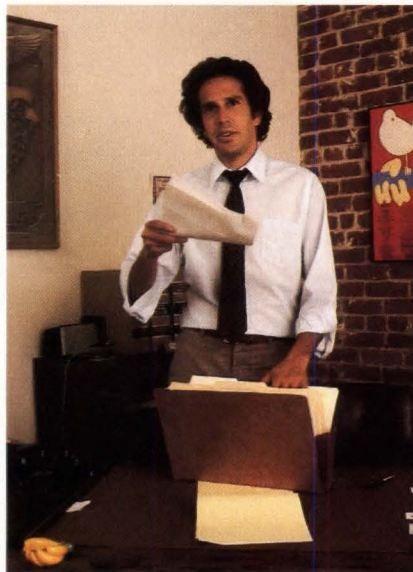


Photo by Charles Moore

"The at-will doctrine is dead," declares San Francisco attorney Cliff Palefsky.



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Firing at Will

(Continued from page 134)

ments suggest that the balance of power that exists between employers and employed has shifted markedly, and that job security has become at least as valid a claim as business efficiency in firing decisions. Indeed, there are those who suggest that some semblance of a property right is taking shape in the relationship between employees and their jobs. Writing in the *Wall Street Journal* back on March 4, 1980, management expert Peter Drucker made that point. "The evolution of the job into a species of property can be seen as a genuine opportunity," he said. "It might be the right, if not the only, answer to the problem of 'alienation,' which Marx identified a century and a quarter ago as resulting from the divorce of the worker from the means of production. . . .

"At the very least," Drucker adds, "employers will have to recognize that jobs have some of the same characteristics of property rights and cannot be taken away without due process."

Laws that work against the unfair dismissal of a corporation's best people can work against the removal of incompetents.

But what is due process? And who's to say what is and isn't fair? These are the questions companies are forced to consider as they go about the task of setting rules that, in effect, put added constraints on their managers' discretion in firing decisions. In one sense though, this latest demand for due process is not a break with the past, but merely a continuation of it. Throughout the '60s and '70s, many corporations, pressured to reduce the risk of discrimination lawsuits, instituted progressive-discipline policies, by which employees are guaranteed a series of written warnings and reprimands that cite specific complaints before they are fired. This practice gives management the kind of written record that can stand up in court, and



it gives the employee an opportunity for second and third chances. Thus, progressive discipline is the mechanism through which due process is achieved.

What the latest court decisions do, however, is to emphasize more strongly the need to tell it exactly like it is. Clearly, managers must resist the temptation to soften the blow of a poor review by using vague qualifiers and unwarranted compliments if they want to make their terminations stick. As the managers at Bissell learned the hard way, job evaluations must be tough and honest as opposed to gentle and equivocal.

In addition, managers must now more than ever resist promising what they can't deliver to employees. Whether it is to attract recruits or keep existing staff for some undisclosed time, courts are holding managers to their word, be it a written policy or an off-the-cuff remark. When Charles Toussaint, for example, applied for a job at Blue Cross/Blue Shield of Michigan, the interviewer told him that he would be with the company as long as he did his job. Later, when Toussaint was fired after a falling out with his boss, those words came back to haunt the Michigan insurance carrier. The state Supreme Court ruled that a jury could properly interpret that comment to mean "that the employer has agreed to give up his right to discharge at will" Eventually, a jury did just that and awarded Toussaint \$130,000.

It was in direct response to that suit that Blue Cross/Blue Shield of Michigan inserted a statement into its employee handbook that "reserves the right to release an employee at any time for any reason." The medical insurer hopes the new clause will immunize it from the threat of any future

wrongful-discharge claims. How much protection can be gained by explicitly declaring a right to fire at will, however, remains, at best, problematic. In the Toussaint case, apparently it would have made a difference because the presiding court said so. However, in another case, *Voorhees v. Shriner's Hospital for Crippled Children*, tried in Spokane County, Washington, the Superior Court found that even though the defendant had, in writing, reserved the right to fire at will and had even obtained the plaintiff's signature in recognition of that right, an implied contract of good faith existed.

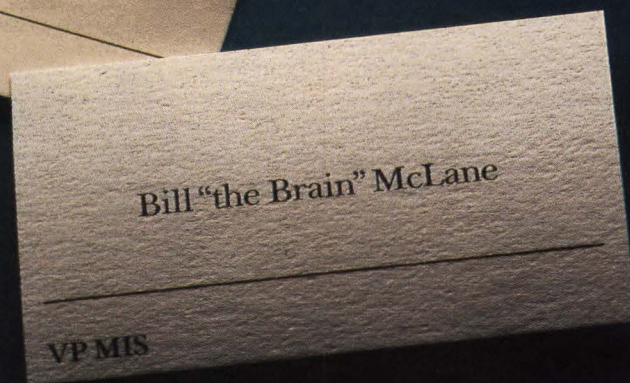
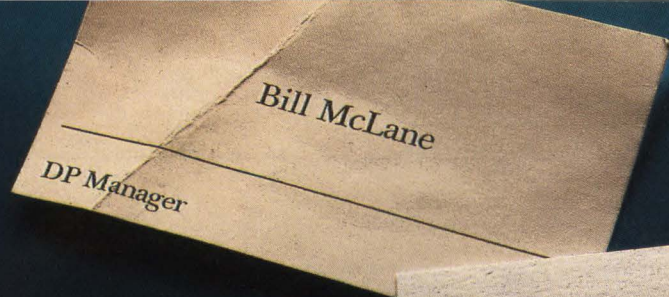
But say, for the sake of argument, managers do find that an explicit invocation of the at-will doctrine does prove to be an effective defense against lawsuits. Even then, they may find it impractical to implement simply because telling a prospective employee that you reserve the right to fire him or her without reason is hardly a good recruiting tactic. Even the

Job security has now become at least as valid a claim as business efficiency in firing decisions.

managers at Michigan's Blue Cross/Blue Shield have acknowledged this.

In the absence of an at-will declaration, another way that corporations are trying to protect themselves is by developing internal grievance systems that give employees the chance to overturn their bosses' decisions. Of course, this option involves the risk of generating the sort of turmoil that demoralizes managers. But for those who would take that risk, there is the prospect of seeing the spirit of due process carried to its logical conclusion.

At an east coast bank, a systems and programming manager articulates the worst fears of those who must live with and defer to the workings of an internal grievance system. "It's a



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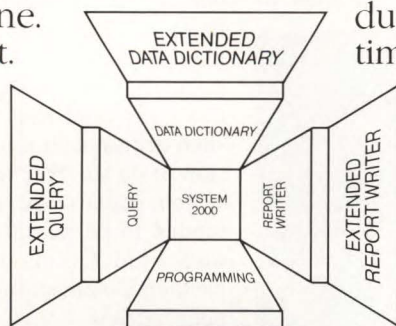
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Firing at Will

(Continued from page 136)

serious situation," says Barbara Gere (a pseudonym), who last year saw one of her terminations overturned. "The grievance process allows employees to second-guess you," she adds. "And once you get involved with it, you find yourself spending so much of your energy on something that has nothing at all to do with getting your work done. Frequently, it turns into a fruitless argument."

But Gere does read the newspapers. She is aware of the turmoil that a

How much protection can be gained by explicitly declaring a right to fire at will remains problematic.

wrongful-discharge suit can create. So when she's asked if she can live with the system, she answers, "I don't see how we can live without it. I understand that it's better to handle these disputes internally than see the good name of the company dragged down by bad press. I suppose it's a question of learning how to work with the system and documenting problems better."

To be sure, there is much ambivalence in her response, which, given the fact that the employee she tried to fire eventually was fired by another manager for the same reasons, is quite understandable. But, reservations notwithstanding, her conclusion that there is no better solution is one that more and more managers and policy-making executives are reaching.

Alan Westin, professor of law at New York's Columbia University and president of the Educational Fund for Individual Rights, has closely followed this trend. He estimates that within the last two years some 200 companies have begun to develop and/or to formalize internal grievance systems. "No manager is crazy about being overturned," Westin says, "but the more secure a manager feels about his or her abilities, the better he or she is able to cope with

being reversed." Often, Westin notes, the manager won't take the reversal personally because it was really the corporate policy that was too vague or misleading. The grievance system thus becomes the way through which rules are refined and improved. But, of course, the rules are not always at fault, and in those instances, managers are bound to take reversals personally. However, Westin says, such reversals may not be damaging to the corporation or the manager. "If managers feel put upon because they were told they didn't handle a situation with the skill that top management expects, I don't necessarily see that as bad," he says. In a survey of corporations he has conducted for an upcoming book, Westin has found grievance systems that reverse or modify managerial decisions as much as 75 percent of the time.

From corporation to corporation, however, the way in which these reversals are secured varies greatly. And, while all grievance systems are supposed to be fair and impartial, some, needless to say, are more fair and impartial than others. Usually, though, grievants move through ascending levels of management in search of redress. Some companies even assign trained ombudsmen to act as advocates for grievants. Most don't. In some corporations, final appeals are heard by high-level line managers, like the vice president of

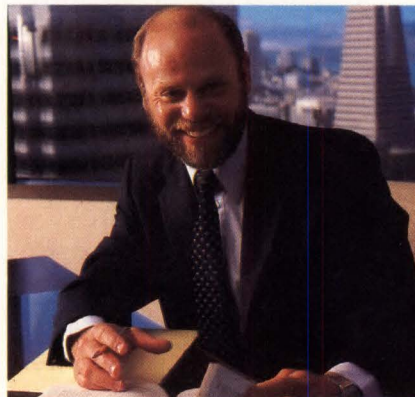


Photo by Bob Audie

The new court decisions, says San Francisco attorney Victor Schachter, "open up legitimate management decisions to reexamination by juries that are ill-equipped to sit in judgment."

finance or even the chief executive officer. And in others, grievances are ultimately decided by the vice president of personnel and his or her staff.

These differences in emphasis reflect both the differing perspectives and cultures of organizations. In one corporation, the widely perceived impartiality of the personnel department makes it the logical final arbiter. And in another, it's only the word of the top line executive that can effectively defuse contentious debate.

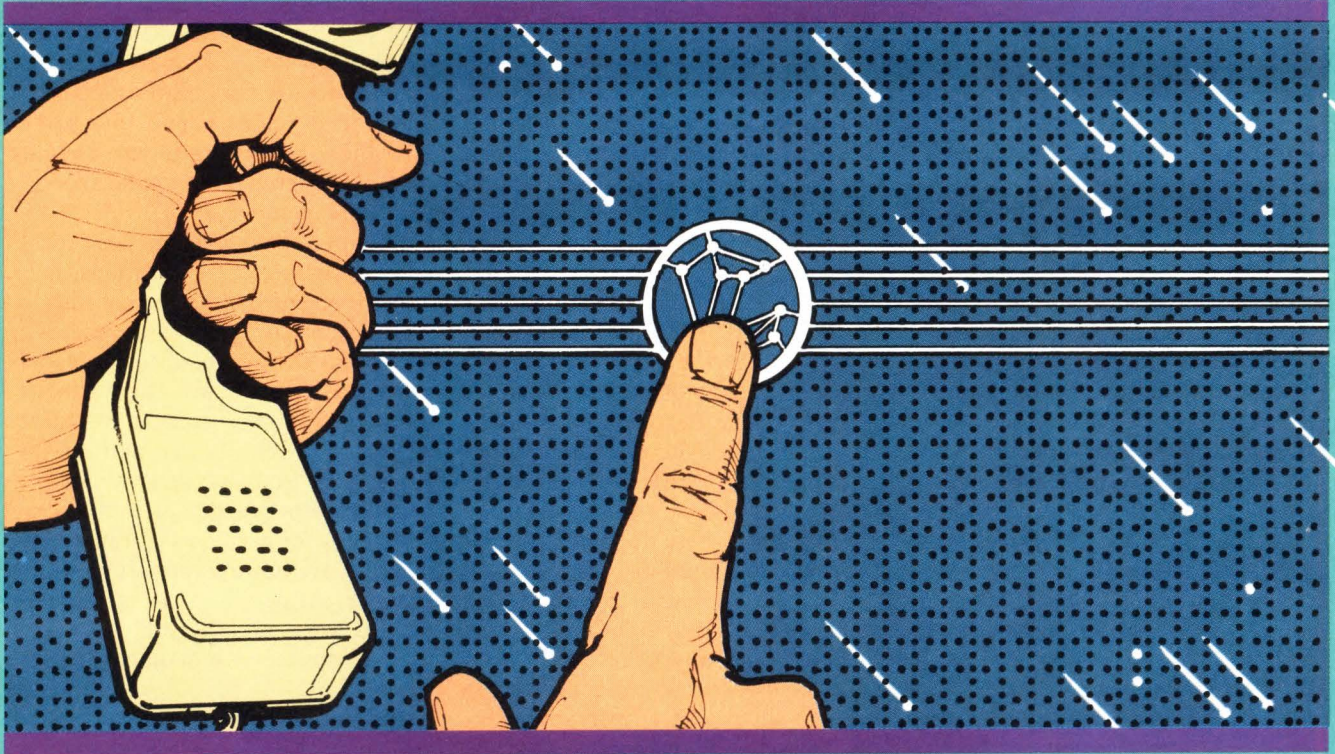
The latest court decisions emphasize more strongly the need for managers to tell it exactly like it is.

Last year, Control Data Corp., Minneapolis, introduced a new wrinkle into its grievance system by establishing a "peer review board" as the in-house court of last resort. The board is composed of three voting members. One is a high-level corporate executive; the other two are peers of the grievant, selected at random from other parts of the company. Panel members deliberate over each case, receiving "evidence" in writing rather than hearing oral testimony. As of this writing, 11 cases have come before the board, four of which were decided in favor of the grievant, saving three employees their old jobs and transferring a fourth. Control Data's top management reserved the right to overturn such decisions, but it hasn't had occasion to do so. "We instituted the new system because we felt the old system tended to perpetuate bad decisions," says Fred Olson, director of work-problems counseling, who chairs the peer review board as a nonvoting fourth member. "It probably wouldn't be inaccurate to say that the old system was biased against the grievant," he adds. Ironically, the old system had previously been praised for its innovative use of ombudsmen.

But what do Control Data managers think about the new system? "The

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Firing at Will

(Continued from page 138)

first couple of grievances were a bit unnerving," Olson admits, "because in both cases the board voted to reverse the manager's decision. I had to sit down with those managers and explain what had happened—act as a sort of lightning rod. Initially, there was a lot of discontent because the managers felt that they had the authority to act. But the system remains intact.

"Basically," Olson adds, "we've tried to explain to managers what the benefits are—there's some element of closure now. Before, these grievances used to drag on forever."

The rigor of corporate due process is extended even further when companies are willing to put their managers' decisions under the scrutiny of an outside arbitrator. The number of American corporations that have adopted this practice for the benefit of their nonunion employees is small—probably fewer than 10 companies. Of those that have, several have been doing it for a very long time. When, for example, Northrop Worldwide Aircraft Service, Lawton, OK, adopted a formal nonunion grievance procedure with arbitration as the final step in 1946, the impetus for the move was clear. The year before, organized labor had staged two aggressive campaigns to unionize the manufacturer's workers. Management sought to defuse that threat once and for all by giving workers the right to arbitrate—a right that survives, largely unchanged, to this day and closely parallels the stipulated procedures found in many union contracts. Last year, some 20 cases went to arbitration, and in five of them, management decisions were reversed.

"While few grievances actually go to outside arbitration—they usually are settled long before it comes to that—the fact that the option exists helps to validate the entire system," declares Lawrence Littrell, Northrop's director of industrial relations. "We are willing to put our decisions on the line." Included among those eligible to seek redress under this system are programmers and systems analysts. According to Littrell,



Northrop is formulating a grievance system for managers as well, but he notes that arbitration probably won't be an option here. "When it comes to managers," Littrell says, "we don't want outsiders fiddling around with our decisions."

Whoever is the final arbiter, and whatever appeals procedure ultimately is devised, the critical concern about all grievance systems is credibility. And credibility cannot be maintained if either the grievant or the manager whose decision is on the line feels conspired against.

That's how Cyndi Simpson felt when she worked as an operations manager for a west coast bank. "You couldn't talk to the personnel people unless you waited a week," she remembers. "And when my subordinates submitted grievances to personnel, I wasn't even consulted. They just handed down the decision, which made me believe that personnel only listened to the employee's side of the story."

Now working at the Bank of the West in San Jose, CA, as manager of central operations, Simpson has, on occasion, seen her decisions overturned here by her new superiors. But she is not nearly as resentful because she feels the system hears her side as well as the grievant's. At the Bank of the West, grievances are aired in a four-step process in which employees seeking redress go from their immediate supervisor to the division-level manager to the personnel department, and then, if need be, all the way up to the board of directors. "They work closely with managers and try to settle issues before they go any further," says Simpson.

Like Simpson, Frank Cetani, the Bank's vice president of information services, says he is satisfied with the

system. "I don't feel that someone on high is calling me a dummy," he declares. "But that's due to more than just the grievance system. It's the whole milieu around here.

"I suppose," he adds, "that if your relationship with your subordinates is based more on fear than on cooperation, then you're bound to see the grievance system as a threat. In that case, you'll probably have to modify your management style."

In light of how much money recent litigation has cost corporations, it is easy to believe that the current rush to establish in-house justice represents a cynical move by corporations to avoid expensive legal hassles. There may be some truth to that suspicion. But there is also the possibility that many managers, who actually share the same belief in corporate due process and in firing only for just cause as those they manage, are putting these values into practice. After all, many of the employees who actually end up suing their companies are managers themselves.

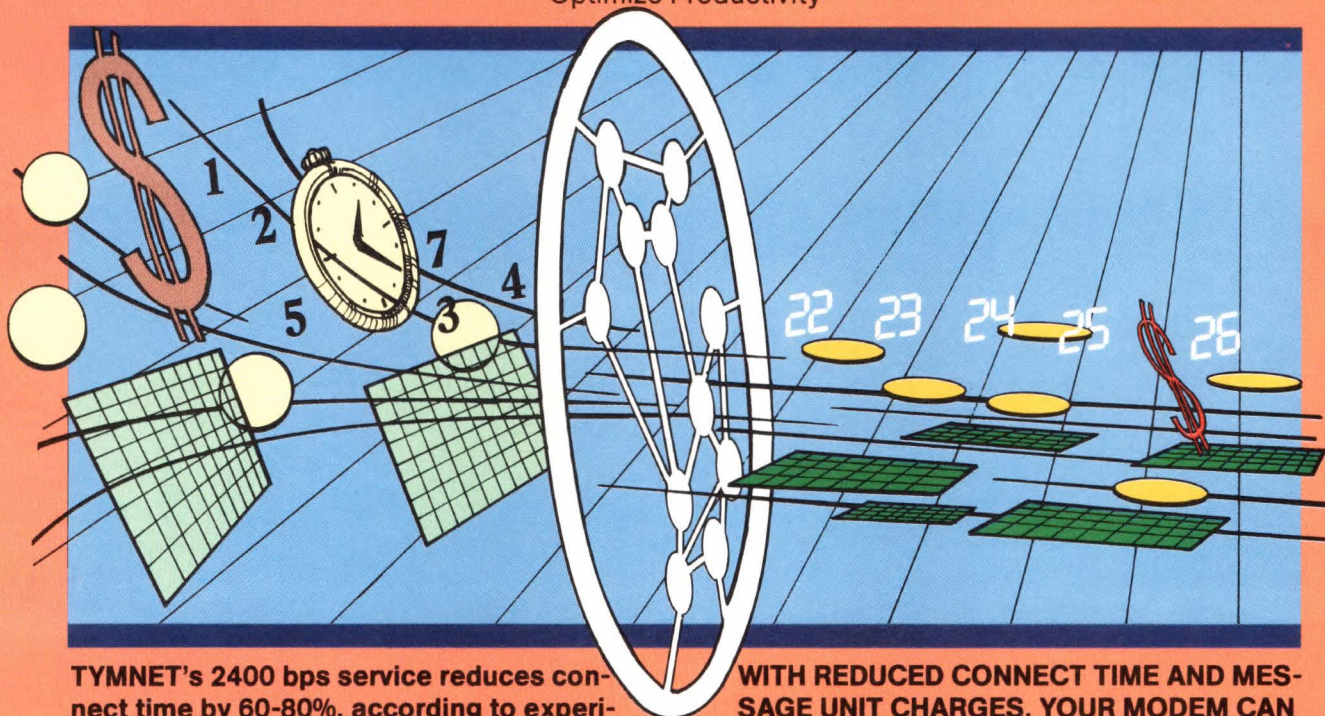
It is in this regard that the observations of Lloyd Loomis, senior in-

Employers are losing some 70 percent of the wrongful-discharge suits that make it to jury trial.

house employee-relations counsel at Atlantic Richfield in Los Angeles, are of interest. "There's no question that this whole development will have an impact on management discretion," Loomis says. "There's an extra burden now in not only being right, but proving that you're right. But maybe managers brought that on themselves by acting arbitrarily and capriciously in the past. Maybe in certain situations they should have been sacked. . . . But good managers will learn how to properly defend their actions, make their cases stand, and get their jobs done. Good management, I think, will survive." □

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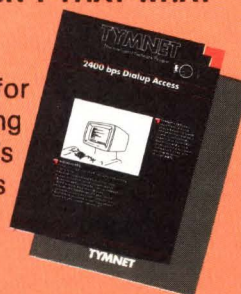
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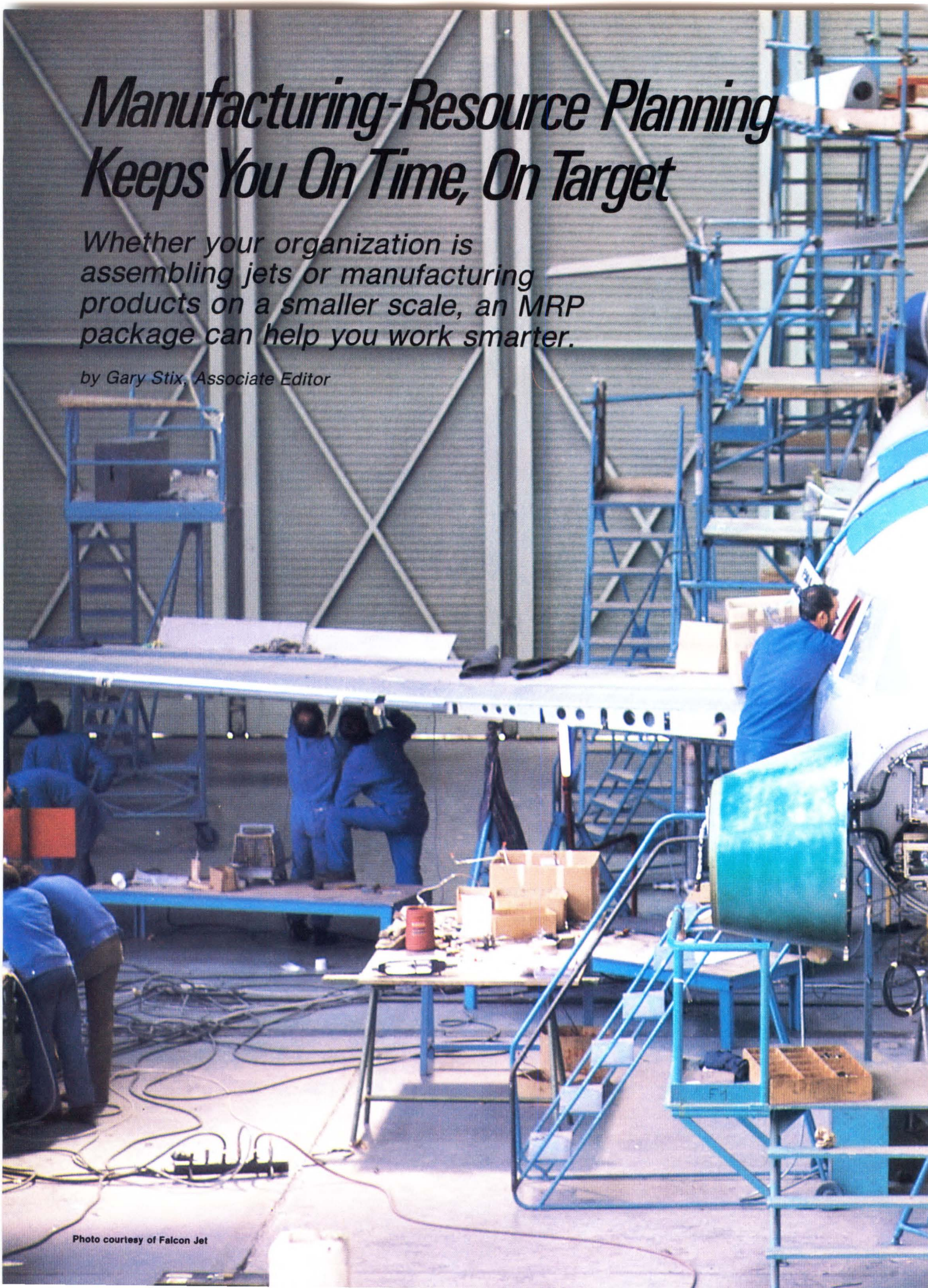
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Manufacturing-Resource Planning Keeps You On Time, On Target

Whether your organization is assembling jets or manufacturing products on a smaller scale, an MRP package can help you work smarter.

by Gary Stix, Associate Editor



A large-scale industrial scene showing the construction of an aircraft. The fuselage is partially assembled, with blue and white paint visible. Scaffolding and ladders are positioned around the structure. Several workers in blue uniforms are visible, some standing and others working at a table in the foreground. The background shows the structural elements of a large factory building.

How do you like your MRP?
Micro, mini, or mainframe?

Have it your way. For MRP (material-requirements planning or manufacturing-resource planning) is no longer an overcooked mainframe concoction with a hearty appetite for part numbers. As a planning and scheduling technique, MRP now fits virtually any manufacturing operation, whether a manufacturer is small, medium or large; whether the mode of operation is job shop, batch, or repetitive; and whether the business uses a personal

computer, a minicomputer, or a mainframe. No manufacturer should go hungry. Indeed, one of the most difficult decisions for managers is how to choose from a smorgasbord of MRP software packages.

So how do you like your MRP? *Micro.* With the advent of MRP on microcomputers, even the most cash-starved manufacturer can afford an MRP installation. Just a few years ago, buying and installing an MRP package could cost \$500,000 and up. Today, a micro MRP package can be had for \$10,000 or less.

(Continued on page 144)

MRP

(Continued from page 143)

And microcomputer-based MRP isn't just for garage-sized operations. As more corporations hold their manufacturing divisions responsible for overhead—including data processing—divisional vice presidents are beginning to give micro MRP serious consideration.

Mini. The early 1980s have marked the arrival of simplified MRP software for mini- and some mainframe computers, in contrast to the feature-laden mainframe packages of the mid-1970s, which made MRP resemble the software equivalent of the one-man band. One benefit of this back-to-basics movement is a significant drop in software costs.

Mainframe. MRP on mainframes is still on the bill of fare. And manufacturers now have more choices about how they use the software on their big computers. Management Science America (Atlanta), for example, has introduced software tailored for repetitive manufacturing. Manufacturers that want to reduce start-up time or that simply want to give software a tryout can lease MRP packages on a timesharing basis. MRP methodologies are even being applied to nonmanufacturing operations: Distribution-resource plan-

ning (DRP) uses MRP concepts to plan and schedule the distribution side of a business.

MRP is no cure-all for manufacturers. Indeed, it has fallen out of favor in some circles. Some manufacturers view MRP as an overly complicated and expensive long-range scheduling tool that's out of step with the current emphasis on *short-range* just-in-time- and zero-inventory techniques. Just-in-time inventory, an inventory-control technique pioneered by the Japanese, uses paper cards to track material requirements. Part of the allure of the cards, called *kanban*, is their elegant and inexpensive simplicity. In contrast, for large manufacturers with huge databases of part numbers, MRP consumes considerable amounts of capital.

Beginnings and definitions

MRP was one of the earliest applications of computers in the factory. The early 1960s marked the development of an elemental material-requirements planning package by Joseph Orlicky, of J.I. Case Co., a Racine, WI, tractor manufacturer. Other manufacturers experimented with in-house material-requirements projects throughout the late 1960s.

The first major commercial application was IBM's Production Information and Control System (PICS), which was announced in the late '60s. A few years later, material-requirements planning was refined into a more mature planning and scheduling system called "closed-loop MRP." It includes the following elements:

- **Master production scheduling.** A statement of what a company intends to manufacture, expressed in quantities, dates, and other essential production factors.
- **Material-requirements planning.** A scheduling technique that uses data from the master production schedule, inventory, and bill of materials (a listing of all components in a finished product) to issue and monitor orders for new parts and materials.
- **Capacity-requirements planning and control.** A method to determine the labor and machines needed for manufacturing production, based on the goals outlined in the master production schedule. It includes a measurement of whether capacity planning goals have been met.
- **Shop-floor control and vendor scheduling.** A system that relays information about the status of shop orders, purchase orders, and manufacturing schedules.

During the late 1970s, closed-loop MRP was integrated with the financial and marketing sides of manufacturing businesses. Production-planning information from the basic MRP modules was integrated with other business-planning information to assist in the overall management of marketing, sales, production, inventory, purchasing, cash flow, and return on investment. This latest incarnation of MRP is known as manufacturing-resource planning (MRP II).

While acknowledging the technical advances in MRP software, consultants such as the Oliver Wight Cos. (Essex Junction, VT), emphasize that MRP is more than just computer code. Even before a new system comes online, a manufacturer may find the benefits derived from preparing for the new system equal to the value of

(Continued on page 148)



The Unit Handling Systems division of Litton has joined a "back-to-basics" movement in MRP by installing a no-frills package from Ask Computer Systems. The package, Manman, helped straighten out a manufacturing inventory that was an acknowledged mess.

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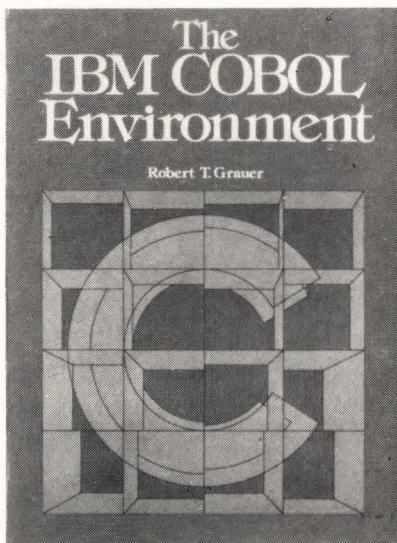
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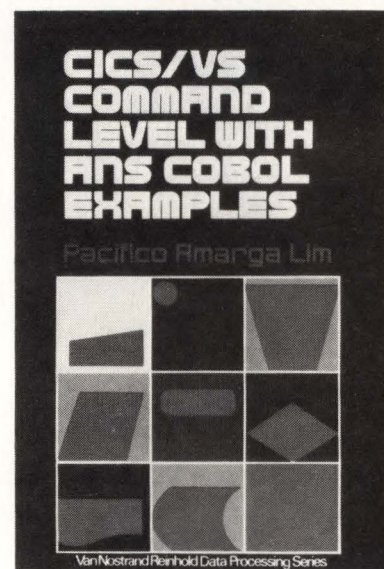
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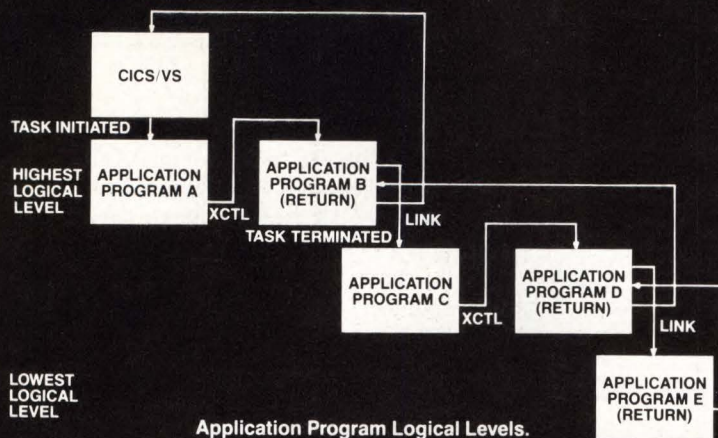
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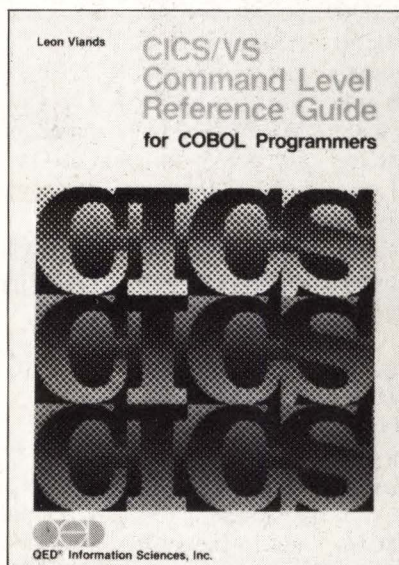
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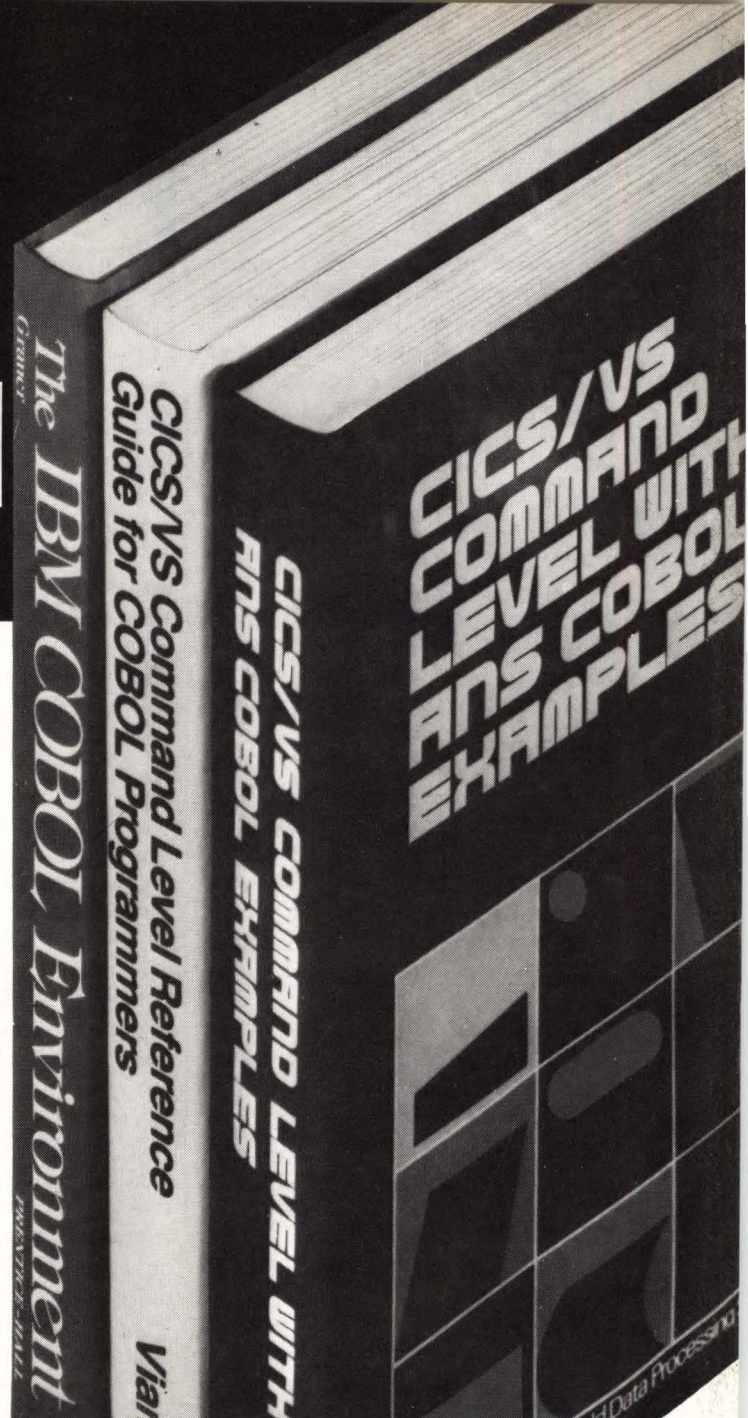
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(Continued from page 144)

the best package. Experienced materials planners and manufacturing engineers frequently go to considerable lengths to involve the entire complement of plant personnel in an MRP start-up. For example, when Warren, MI-based Holley Carburetor began implementing MRP earlier this year, the manufacturer made night watchmen undergo four hours of training. "We had no way of knowing when an individual like a night watchman might be eligible for another position in the company," says Mike Hecker, Holley's director of inventory management.

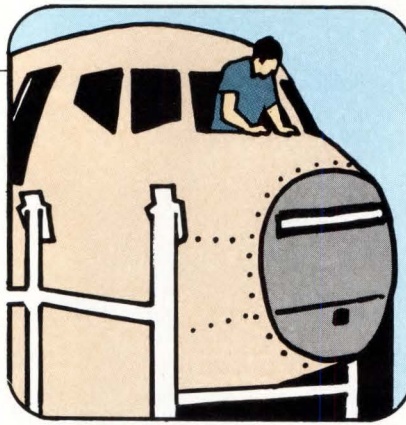
Micro MRP

At one time, initiating an MRP project meant capital expenditures for software, hardware, retraining, and consulting that sometimes ran into the millions. No more. The implementation of MRP on microcompu-

A weakness of conventional MRP is its unsuitability for the manufacture of masses of identical goods.

ters makes a start-up affordable to factories with sales of as little as \$1 million to \$2 million. The price of microcomputer MRP ranges from \$1,000 to \$20,000, a mere fraction of the cost of mini and mainframe packages. An entire installation, including networked or multi-user personal computers, can be had for \$50,000 or less. What's more, installation can be completed within a few months.

But small manufacturers aren't the only ones involved. Many larger businesses that have decentralized into smaller operating units are promising candidates for MRP. The marketability of MRP on microcomputers has spurred a software-development flurry: Between 30 and 40 of the approximately 165 MRP packages currently available run on microcomputers, according to Chris Gray of Oliver Wight.



Microcomputer-based MRP is attractive to even the largest industrial corporations. IBM, for example, is pilot testing Max the Production Manager, a software package from Micro-MRP Inc. The computer giant is using Max in conjunction with conventional mainframe MRP to analyze hypothetical production scenarios. Although Max can track only 10,000 component and material numbers, David Meyer, Micro-MRP's executive vice president, notes that it's still a useful tool for IBM. "You may have 20,000 parts, but only 500 to 600 are used in products that make up the bulk of sales," Meyer says. "In IBM's case, manufacturing management has segmented a group of parts considered most important from a planning point of view."

In addition, the micro, from a technical viewpoint, may be a more effective planning tool than the mainframe. "The mainframe may run jobs on a monthly basis that can be done daily on a micro," Meyer says.

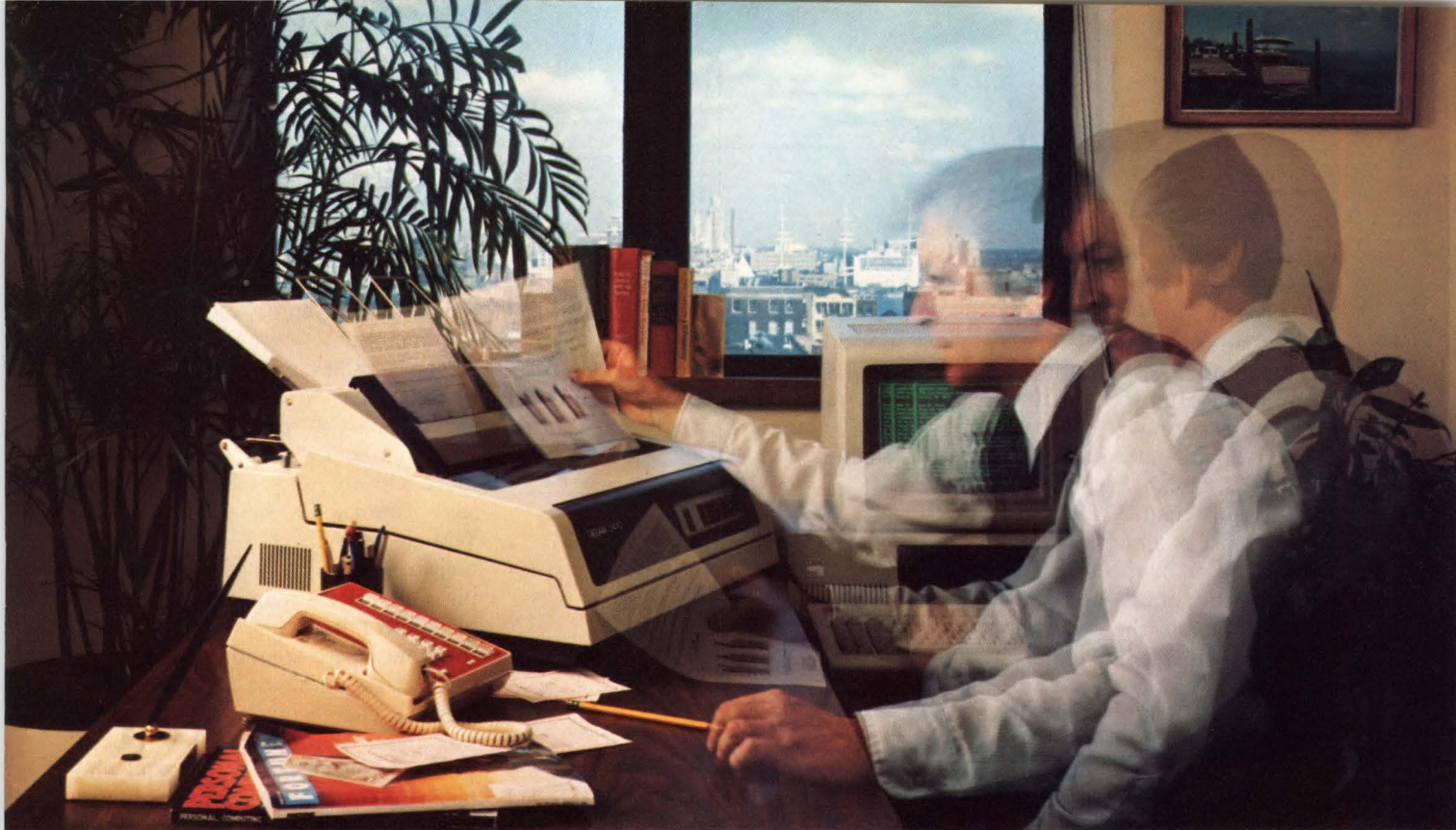
Roughly 20 of Micro-MRP's 80 installations are Fortune 1,000 industrials, Meyer says. They include TRW Inc. (Cleveland), which embarked upon a recent divisional reorganization of its Chicago-based Niehoff Automotive Products division. MRP was previously done by the division's data-processing department on an IBM 4341 computer using AMaps software from Comserv Corp., Eagan, MN. But when responsibility for Niehoff's warehousing and distribution operations was shifted to another division, the manufacturer of automotive-ignition products became a much smaller operating division. Without the distribution operation, total sales attributed to Niehoff are well below previous levels, which ranged around the \$50 million mark.

As a smaller entity, Niehoff didn't need a heavy-duty MRP application. However, that didn't mean the division was about to give up MRP, says Les Jankiewicz, a Niehoff production engineer. As alternatives to the bigger IBM machine, an IBM System/36 minicomputer, an HP 3000 minicomputer, and an IBM PC system were evaluated. Because of budgetary constraints, Niehoff opted for the Micro-MRP system running on four networked IBM PCs. The system, purchased in late February, became operational within 30 days. Using two PCs already on site, Niehoff obtained the software and additional hardware, including hard disks and interface boards, for about \$40,000. Although AMaps provided more flexibility in generating reports, Niehoff is using Max to perform the full range of MRP functions, from bill of materials for 1,753 components to shop-floor

Some manufacturers view MRP and just-in-time as at least partially compatible production methodologies.

control. This fall, Niehoff plans to add a standard job-cost-accounting module to the system. "MRP is MRP; it does the same thing either way," Jankiewicz comments. However, micro-based systems have one significant advantage, he says. "There's no dp department, no one to blame up on the second floor," says Jankiewicz. "We're responsible for what we put in. So, in effect, we're part of the system, from master production scheduling down to the shop floor."

However tempting micro MRP may be, there are caveats for the prospective purchasers of these systems. Many micro-MRP offerings are so new, users, in effect, become beta testers for them. "The software is at the same stage as software is any time a new application just emerges," says Darryl Landvater, also of Oliver Wight. "Look at the software in the



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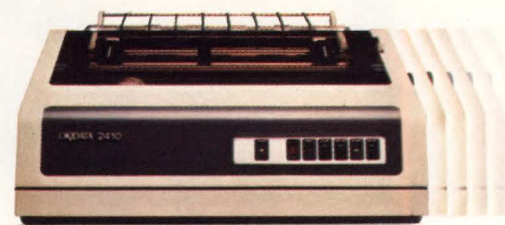
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(Continued from page 148)

early days of mainframes; the software wasn't that good. The developers of microcomputer-MRP packages are making all the same mistakes."

Thus, although IBM finds microcomputer software sufficient for "what-if" analyses, a prospective purchaser should determine whether a database that can track 10,000 parts is really sufficient. Will savings from the purchase of a micro-MRP system be sufficient to offset the administrative headaches—and expense—that accompany the conversion to a larger system at a date in the not-too-distant future?

Another difficulty facing the micro MRP user stems from problems encountered in hooking together stand-alone micros. Because MRP connects different plant operations, each department must be able to tie into the system. For the moment, those who opt for IBM PC compatibility must confront the technical challenges of setting up a local-area network (LAN).

The Guest Corp., West Hartford, CT, a \$5-million manufacturer of satellite transmitters, succeeded in networking IBM PCs running MRP software from TCS Software Inc. Total bill: under \$30,000. George Loubier, Guest's director of engineering, praised the software design, but

warned of the difficulties inherent in any networking project. "Integrating a multi-user network requires an enormous amount of knowledge," Loubier says, adding that the software must be evaluated carefully to find whether it's truly capable of running on an LAN.

The lengthy lead times needed to introduce an MRP system can be reduced through the use of a timesharing service.

M-B-W, an 80-employee construction-equipment manufacturer based in Slinger, WI, (annual sales are under \$10 million) took a different approach. M-B-W is using MPac, a full MRP system developed by McCullough & Associates. Instead of running on an LAN, MPac runs on an Alpha Micro AM-1062 multi-user microcomputer. The system comprises 10 terminals, four printers, and an Autodial 1212A modem from U.S. Robotics Inc. (Chicago) linking M-B-W's headquarters to its Toronto plant. The system, with a current replacement cost of \$65,000, including hardware, has been gradually replac-

ing a manual bill-of-materials system.

M-B-W has achieved a 25 percent reduction in inventory and is now able to track minute parts like nuts, bolts, washers, and decals. The manual system gave M-B-W current records for only 40 percent of its 7,000 part numbers. "Now we can order more closely to production time," says Thomas G. Artzberger, M-B-W's chief engineer. "There's been a measurable impact on our engineering. Our MRP system gives us a complete bill of materials. When you want to know where something goes, you can ask the machine and it will tell you. . . . There's much more information about what quantities have been sold, where goods have gone, and who has bought them. In the long run I'm sure it will help profitability—if you make better decisions you make more money."

Artzberger also suggests that there are limits to the software's usefulness as a planning tool. "Several times we had a little bit of a problem—the conclusions we drew from the data were too broad. Just because you have super sales volume one quarter doesn't mean you'll do the same the next quarter."

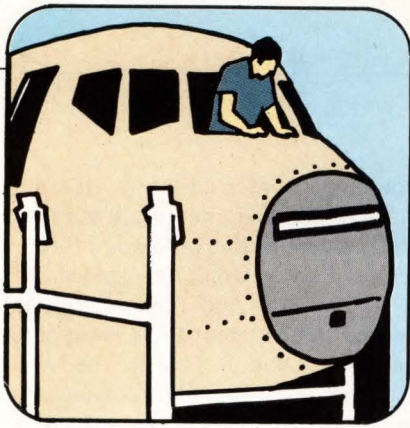
The evolution of MRP is analogous to that of the U.S. automotive industry. Both automobile makers and MRP users have moved from the idea that big is better to small is beautiful. An earlier generation of "Cadillac" MRP packages—incorporating sophisticated scheduling and analysis techniques—often fail to improve production reporting. More important, these software packages often promise to automate decisions made by planners and shop foremen, shifting responsibility for production foul-ups to the computer. These big-daddy packages are also expensive.

In response to these shortcomings, a new generation of "no-frills" packages has emerged, letting manufacturers achieve all the basic planning and scheduling benefits of MRP at a reasonable cost.

When deciding on a software package for an MRP start-up at Litton-Unit Handling Systems, Florence,



A modification of the basic MRP concept for an assembly-line operation has been installed at this Holley Carburetor plant in Paris, TN. The MSA Manufacturing System eliminates the unnecessarily detailed reports generated by job-shop MRP packages.



KY, John McDonald, MIS manager, instituted the "Kiss" principle of software evaluation: Keep it safe and simple. MRP was needed because Litton-UHS did not have systematic operating reports to help plant personnel in planning engineering, purchasing, or production. Moreover, inventory-control reports for the maker of automated conveyor systems were usually five working days old, because data had to be manually keyed. The bulk of these documents were produced only for cost-accounting purposes.

The Litton unit, which posts about \$100 million in annual sales, needed to be revamped. "It was a disorganized mess," says McDonald. "Quite simply, we needed an MRP system to locate parts."

McDonald evaluated seven software products, spending as long as a week on each. After testing how each system produced a bill of materials, a work order, a purchase order, and other relevant reports, McDonald chose the Manman (Manufacturing Management System) from Ask Computer Systems, Los Altos, CA. Manman, says McDonald, conforms to the Kiss principle. "It's one of the easiest systems for users to master," he explains. "The package doesn't contain features that would be appreciated by data-processing pros but be irrelevant to users."

With Manman, Litton-UHS achieved almost immediate productivity benefits. Within three months, inventory dropped by 20 percent and Litton-UHS knew where 90 percent of its inventory was, an increase of 40 percent over the pre-Manman era. Today, the system tracks some 8,000 parts in Ask's storage-retrieval system.

Despite its benefits, Manman is

deficient in one important way, says McDonald. Rather than giving aggregate figures for the entire job, the version of Manman used at Litton contains standard cost-accounting features that track each job on a part-by-part basis. "I don't care what the cost of an individual bolt is, although Ask tracks that very well. What I care about is what it costs for a section of conveyor belt or how much it costs for an engineer to design something. The Ask system requires a lot of data entry and our management hasn't chosen to pick up on this."

Another manufacturer that has joined the back-to-MRP-basics movement is Arco Metals Corp, a Chicago-based division of Atlantic Richfield Corp. (Los Angeles). After evaluating more than 100 software packages, the manufacturer chose Forman from Formation, Mt. Laurel, NJ. "Formation had the highest degree of manufacturing know-how and skill," says Elliot Stein, manager of manufacturing-resource planning. The vendor assisted with the modification of the package to Arco's speci-

fications. "It's the newest generation, state-of-the-art, fundamental package," crowns Stein. "It's sophisticated in its simplicity."

The American Brass Division of Arco Metals, a 650-worker plant based in Ansonia, CT, that manufactures 90 million pounds of multi-alloy coils and wire each year, needed MRP badly. Before bringing on Forman, the plant was getting only minimal feedback about the status of production orders. "Basically we had lost control of what we were doing," Stein says. Forman has been running on an IBM 4341 since January and is used for both production planning and generating marketing and financial information.

Since introducing Forman, Arco Metals has achieved a one-third reduction in finished-goods inventories and a 35 percent to 40 percent increase in on-time shipped goods. The estimated payback time is 18 months. (The software cost was \$250,000, half of which represented custom modifications.)

Implementing the project also

Picking the best MRP software

Oliver Wight Cos., Essex Junction, VT, has compiled *The Standard System*, a report that defines essential elements that should be evaluated when purchasing MRP software. At the same time, the report emphasizes that good management as much as good software is crucial to the success of a project. The report cautions prospective purchasers against software features that seek to automate decision-making, thereby eliminating the accountability of plant foremen for managing machines and workers. The following is a list of software features to avoid:

1. *Automatic master production schedules.* The fixed rules or scheduling formulas used in automatic scheduling violate a cardinal rule: Never sacrifice managerial control by letting the computer make decisions.

2. *Part period balancing.* A technique that makes automatic calculations of optimum inventory order quantities.

3. *Critical ratios and slack time priority calculations.* These scheduling methods use overly complex mathematical formulas to establish scheduling priorities.

4. *Finite loading techniques.* The foreman or planner, not the computer, should have ultimate discretion in determining how plant personnel and machinery are allocated. Finite loading techniques attempt to solve these capacity problems automatically, but have never worked effectively.

(Continued from page 151)

achieved another major goal, says Stein. It coalesced previously diverse elements of the business. Prior to using MRP, the manufacturing and marketing operations were run like two separate businesses. "The marketing and manufacturing people didn't talk to each other and, consequently, the end-of-the-month accounting reports always contained surprises," he says.

Stein sees MRP II as the first building block of a total computer-integrated manufacturing plan, a focal point for planning that will help coordinate Arco's move into robotics,

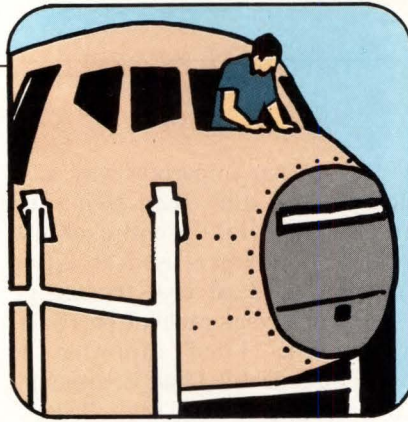
With the advent of MRP on microcomputers, even the most cash-starved manufacturer can afford an MRP installation.

process control, numerically controlled machine tools, and automated warehousing.

MRP for repetitive processes

An underlying weakness of conventional MRP software is its unsuitability for process and repetitive manufacturing: operations that produce large quantities of identical goods in a continuous flow. Because virtually all MRP software is designed for job-shop and batch operations, manufacturers in assembly-line industries must commission modifications to the software—modifications that are sometimes costly. For example, about half of Arco Metals' software expense went for custom programming to make Formation's software conform to the metal fabricator's process-type operation.

Holley Carburetor, a division of Colt Industries (Hartford, CT) based in Warren MI, faced the same constraint when it went looking for MRP software. "In a job shop, you're not building the same product day after day, you're building something for one customer today and something with different specs for another cus-



tomorrow," says Michael Hecker, director of inventory management.

After researching 12 MRP packages, Holley concluded that The MSA Manufacturing System from Management Science America was one of the few systems specifically designed for repetitive manufacturing. The MSA system eliminates the detailed reporting requirements of conventional MRP systems. An analysis by Holley compared the time investment for conventional MRP and the MSA system: The standard package required five times as many transactions to issue stockroom parts.

Scrap reports, too, were overly detailed. Each scrap item had to be linked to a specific order, the tracking system used for batch manufacturing. "The same screws are used on every single carburetor," Hecker says. "It's ridiculous if the system has to scrap a part against a specific part order every time we need to scrap something."

The \$200-million-a-year manufacturer took delivery on the MSA system in April. Running on an IBM 4341, the system is also distributed via IBM's Customer Information Control System (CICS) to five plants in the southern part of the country. Holley, the nation's largest independent manufacturer of carburetors, is now using the software's master-scheduling and inventory-record control modules. Full implementation is scheduled for December, but Holley is already enjoying benefits from the software. One month after installation, inventory levels were 29 percent lower than those of the previous year. The money saved on reduced inventories will more than offset the \$225,000 cost of the software. Hecker says the software will allow the manufacturer increased flexibility in re-

sponding to order changes. "It's not unusual for a customer to call us to say that the carburetors ordered for delivery on Friday won't be needed for several months and the carburetors ordered for shipment at a distant date are now needed on Friday," he says.

At the same time, the reporting system for the MSA software makes line foremen more accountable. Previously, Holley's in-house inventory system lacked a method to hold line foremen responsible for the inventory used in a given segment of the plant's operations, and the result was a lot of finger-pointing. "The foremen end up saying, 'That screw is owned by Joe over there and Joe is going to tell you to go talk to Fred.'" There was no easy way to determine what caused inventory counts to be inaccurate. This system lets a user sit down and find out what the problem is. It may be that a foreman has everything right, but the engineer may have incorrectly specified an amount."

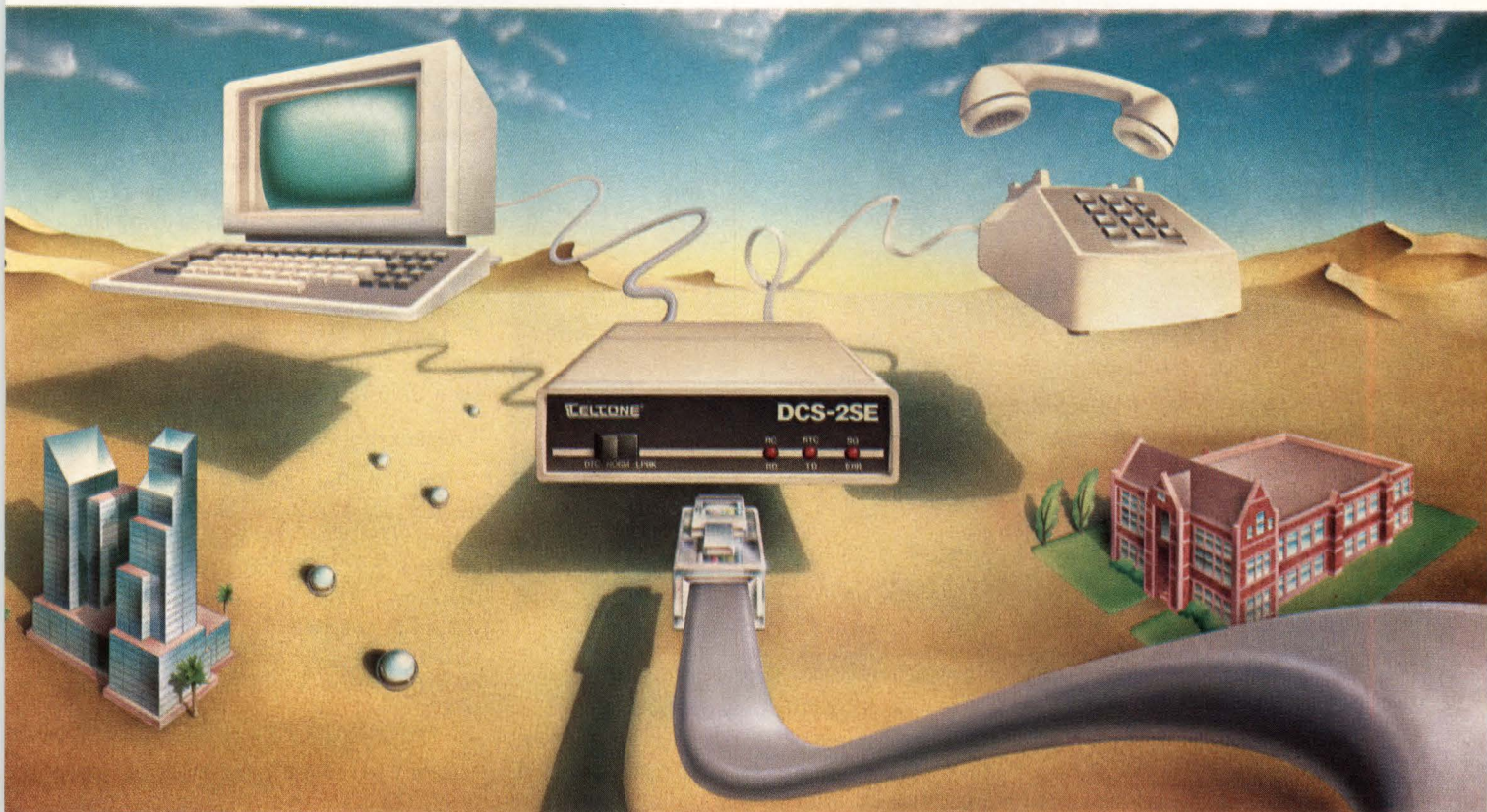
Tried and sometimes true MRP

In a manufacturing conglomerate with diverse operating divisions, the need for a software standard is strong. At Gulf & Western Manufacturing Co., headquartered in Southfield, MI, such a need resulted from a decision made five years ago to transfer dp costs to individual operating companies. Looking for an established systems product, G&W Manufacturing's dp department chose IBM System/34 minicomputers and Manufacturing Accounting and Produc-

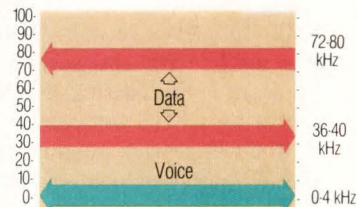
Some view MRP as a long-range tool that's out of step with the emphasis on short-range planning.

tion Information Control System (Mapics), IBM's manufacturing software for minis. Mapics—along with its mainframe counterpart, Communications Oriented Information Production Information and Control

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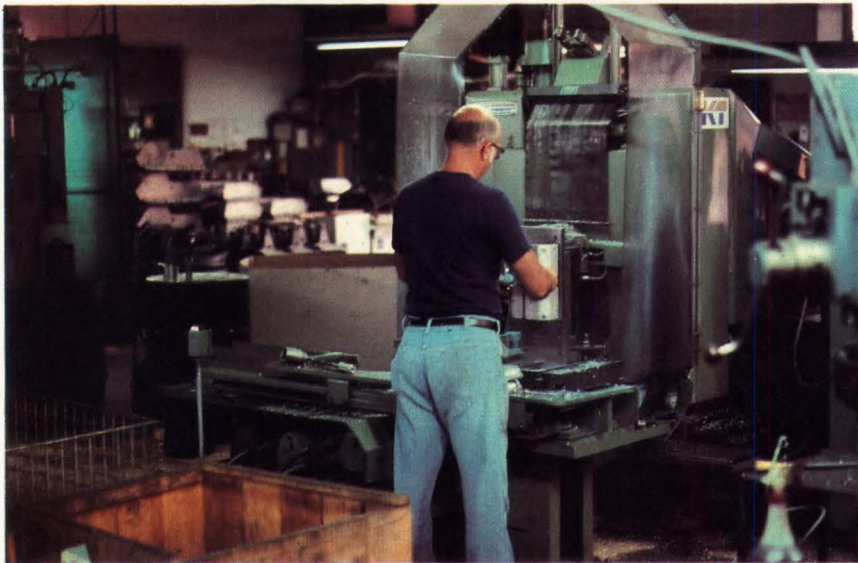


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(Continued from page 152)



Distributed MRP has been installed in a unique way by M-B-W, a Slinger, WI-based manufacturer of construction equipment. M-B-W runs MPac from McCullough & Associates on an Alpha Micro multi-user system with 10 terminals.

System (Copics)—has the largest installed base of any MRP-type software.

Since 1980, G&W has completed from 10 to 15 Mapics installations, each start-up costing about \$300,000, including hardware, software leasing, training, and indirect costs. During the same period, four Copics systems were installed, each costing about \$500,000. "We've met 85 percent of our goals with the software," says William J. Fitzpatrick, G&W Manufacturing's MIS director.

But Fitzpatrick acknowledges that G&W may soon look beyond IBM for MRP software. In 1980, G&W needed standardization for manufacturers producing vastly different products—from trucks to energy-related equipment. But Mapics has often proved inflexible for these varied applications. Fitzpatrick says the package is nearly impossible to customize, although several enhancement products are available from software developers. "Sometimes I think we've misused Mapics and forced it to work when a package from another supplier might have been better," says Fitzpatrick.

Mapics is menu-driven and relatively easy to learn, Fitzpatrick says. But the early start-ups were complicated by poor support. IBM failed to

dispatch its top-of-the-line service personnel to the rural localities where G&W plants are sometimes situated, he explains. "The systems engineers were not nearly as knowledgeable as they could have been," Fitzpatrick adds.

G&W was forced to write a custom RPG-language program to obtain a more suitable cost-accounting module. "We needed more-detailed reporting," Fitzpatrick says. "There were somewhat superficial summaries provided with Mapics."

Few of the operating companies are using the full capabilities of IBM's package. For example, at Taylor Forge Engineered Systems, Paola, KS, the Mapics software is used to track accounts payable and receivable. "Mapics lets you put your payables in, and when you put your general ledger in you take the same logic—you don't have to bridge the gap between the two accounting modules," Fitzpatrick says.

Whenever G&W has used the system's full MRP capabilities, results have been mixed, Fitzpatrick reports. At O&S Bearings, Whitmore Lake, MI, a manufacturer of small custom forgings, the principal element of a successful implementation was present from the beginning, namely plant workers who already had good control

over plant inventory. In contrast, Ottawa (KS) Trucks found coupling the manufacture of off-the-road trucks with the complexity of an MRP package to be daunting. Plant workers gradually drifted away from using the system. "Because of this, at one time there was a recommendation that the system would have to be reinstalled," Fitzpatrick says. (Both O&S Bearings and Ottawa Trucks have since been divested by G&W.)

Timesharing MRP

The lengthy lead times for introducing an MRP system can be reduced through the use of a timesharing service. The Data Systems division of Northern Telecom, Arlington, TX, needed an immediate restructuring of its in-house inventory-control system last year, says Lloyd Brink, the division's materials manager. "There was a lot of management pressure to reduce inventories and improve customer service," he explains.

After reviewing 10 systems, including an in-house MRP package, the division settled on a timesharing version of the Xerox Manufacturing System from Xerox, Stamford, CT. Brink, a veteran of three previous MRP installations, says the timesharing arrangement was the quickest set-up he had ever experienced. Approval was given to install the system in February 1983; four months later the system was functioning.

Using the Xerox Manufacturing System, the Data Systems division allocates spare parts and repairs for word-processing and minicomputer equipment to 234 stocking stations nationwide. In this instance, Xerox' MRP package is sued for distribution management like the DRP packages discussed earlier. Whether attributable to MRP or DRP, or to a combination of the two, savings have been substantial. Inventories dropped by \$10 million during the first year and there's been an 18 percent to 20 percent increase in on-time repair deliveries.

Despite Brink's experience with MRP installations, he wasn't prepared for the special nature of a time-

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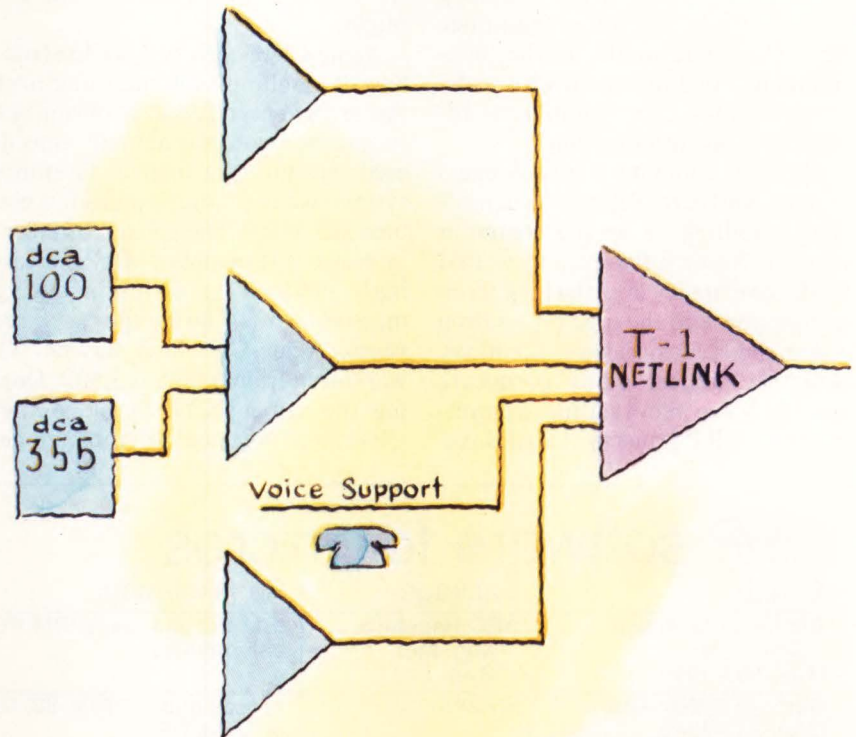
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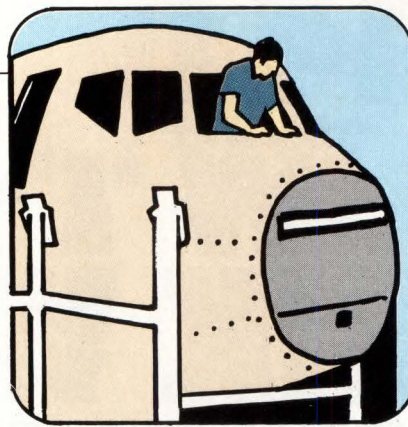
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sharing start-up. "We started realizing real soon that everything you do with the timesharing system—every request for information—costs you money," Brink comments. "At the beginning, we were a little over budget, but a little fine-tuning brought us within budget."

Another early problem resulted from a degradation in terminal response time around midday. Because Xerox' Los Angeles-based host computer was serving European customers, response time decayed to as long as 22 seconds, despite a guarantee that 1½ seconds would be the maximum lag. An adjustment was made, however, and the system now responds within specification.

The host computer's effectiveness proven, Northern Telecom is considering installing an on-site computer using the Xerox software, a move that would save money over the long term.

In response to the precipitous drop in demand for American-made heavy industrial goods, many corporate managers are reevaluating commitments to MRP projects. As sales vol-



umes have decreased, management has frequently become disillusioned with what is regarded as an expensive planning technique that has done little to stem the business' current plight.

Acme-Cleveland Corp., a Cleveland-based machine-tool manufacturer that experienced setbacks during the recent recession, has actually considered reinstating a manual inventory system, while retaining just a few elements of MRP. The reason: Its labor-intensive nature makes MRP increasingly difficult to maintain during massive layoffs. During the past three years, Acme-Cleveland has cut its workforce from 5,000 to 3,500. During the same period in the Acme-Cleveland National division alone,

(an auto-industry supplier), employment dropped from 1,500 to 500. Other expenses were also trimmed. A costly corporate computer center was eliminated, for example.

"MRP requires a tremendous training process that must be re-taught when employees are shifted," says Harry West, MIS manager for the Acme-Cleveland National division, referring to the layoffs. The labor requirements for MRP were relatively easy to cover when the division was fully staffed. But everything's changed with the reduced staffing levels. "Employees have to work very hard to do the essentials," says West. "Where there were three people before, there's now one."

Acme-Cleveland, however, hasn't cut the knot. West's division is sticking with Comserv's AMaps software running on Prime 750 and 9950 minicomputers. "We've often discussed getting rid of MRP," West says. "But pulling out of MRP is expensive and we'd have to find some substitute."

Competing manufacturing approaches have begun to challenge

MRP software for micros

Vendor	Package	Requirements	Price	Circle
American Business Computer (313) 569-1040	ABC Repetitive Mfg. Mgt. Syst.	IBM PC and some IBM PC compatibles	\$7,000	584
Bernard Giffler Assoc. (215) 343-3345	MR2PS	Micros under CP/M-80, CP/M-86, or MS-DOS	\$5,000 to \$20,000	585
Bristol Information Syst. (617) 679-1051	BIS Mfg. Package	IBM PC and compatibles	\$4,000/full package \$800/module (10 modules total)	586
C-Max (205) 883-2146	Proman	Micros under Pick	\$15,000	587
Compumax Assoc. (415) 854-6700	MRP-II Micro Pomp	IBM PC; micros under CP/M-80 Same systems	\$1,000 \$350	588
Computer Covenant (203) 677-6563	Integrated Mfg. Syst.	IBM PC and PC XT; DEC Rainbow; micros under MS-DOS	\$2,000/module (4 total) \$1,000/single user	589
Computer Methods (414) 327-4471	CMI Profit	Altos 586, Fortune 32:16, Micro File, NCR Tower, and some other Unix-based micros	\$20,000 to \$60,000	590
Data Integration (714) 524-2470	Mast	Micros under MP/M and Turbo-DOS	\$750 to \$1,250/module	591

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(Continued from page 156)

MRP's entrenched position as a production-planning tool. Creative Output Inc., a Milford, CT, software and consulting firm, claims to have prospered by marketing Optimized Production Technology (OPT), a software product that the developer claims offers more realistic production scheduling than MRP. (For more on OPT, see "Computers accelerate manufacturing" in *Computer Decisions*' Sept. 15 Presidents' issue.

In debating MRP's merits, however, the most heated discussions involve

just-in-time methods of inventory control. Implementation of just-in-time inventory requires more than just shuffling paper cards. Safety stocks of inventory cover a multitude of production inefficiencies. Their elimination in favor of just-in-time delivery of required parts means that each stage of a manufacturing operation must be made highly efficient. If the production process—from vendor deliveries to quality control—doesn't move in a continuous flow, the integrity of the entire manufacturing cycle

is threatened.

Even so, it was just-in-time, not MRP, that helped rescue the Harley-Davidson Motor Co., Milwaukee, from bankruptcy, says Thomas Gelb, the motorcycle maker's vice president for operations. Once supplying nearly 100 percent of the American market for heavyweight motorcycles, Harley-Davidson was besieged during the early 1970s by low-cost Japanese imports. "We are one of the few companies blessed with four Japanese

(Continued on page 162)

MRP software for micros

Vendor	Package	Requirements	Price	Circle
Dataworks (619) 457-3070	Dataflo	IBM PC under Pick	\$1,000 to \$2,000/module (11 total)	592
DBSI Information Syst. (612) 475-3144	Close Loop Mfg. Syst.	IBM PC and XT/370	\$9,900	593
Devcom Mid-America (312) 953-1500	Tims	General Automation Zebra	\$42,000	594
Digital Business Syst. (617) 942-0220	T.A.G. Mfg. Syst.	Data General Desktop Generation under DOS, RDOS, or AOS	\$3,000 to \$8,000	595
Digital Equipment (617) 897-5111	Mfg. Inventory Control Syst.	DEC Rainbow	\$650	596
	Materials Mgt. Syst.	RGTI Systems and Software	\$2,995	
	IMS Mfg. Syst.	DEC Rainbow under CP/M-80	\$2,500	
	Realworld Pro Data MJA	DEC Rainbow Professional 100 Series	\$650 \$600	
Digital Microsyst. (415) 261-1034	Hinet/MRP	IBM PC and compatibles or Digital Microsyst. 816 workstations and LAN	\$10,000 to \$25,000 (full price includes workstations, hardware, LAN, and software)	597
Driver-Harris Syst. (201) 641-8660	Matrics	IBM PC and PC XT	\$2,000	598
		AT&T B3 under Unix Alpha Micro models under AMOS	\$10,000	
Eltech Assoc. (213) 663-0347	Mfg. Control Syst.	Micros under CP/M, MS-DOS, or TRS-DOS	\$2,200/full system \$600/module	599
Global Computer Syst. (714) 754-0292	MFG	Micros under Pick	\$70,000/full system \$1,000 to \$5,000/module (30 modules total)	600
Gull Resource Mgt. Syst. (516) 435-0600	GMS	Micros under Pick	\$70,000/full system \$4,000 to \$6,000/module (13 modules total)	601

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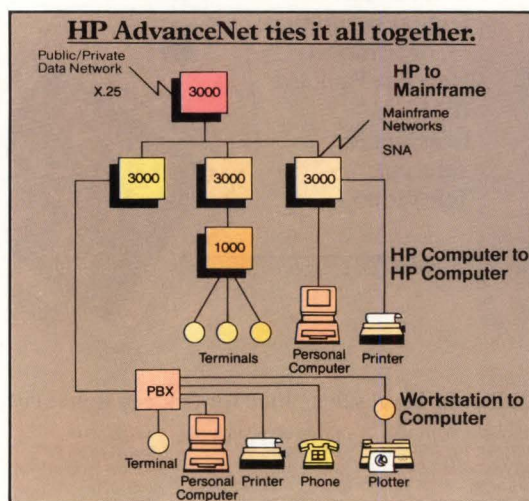
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(Continued from page 158)

competitors," Gelb says. At first the company responded with indignation. "We studied the Japanese for a long time," Gelb says. "Like a lot of other companies, we were slow learners. In response to the Japanese, we filed 'dumping' suits and took similar countermeasures. Then we realized that the Japanese were just managing better." (In fact, pressure from Harley-Davidson resulted in a steep increase of import duties on large motorcycles in April 1983.)

Management thoroughly reevaluated every aspect of its operations, knowing that its own actions would affect survival. MRP was among the production options examined. Harley-Davidson had spent years trying

to get its operations to conform to the constraints of an in-house MRP system. "There were logic problems with the scheduling module of the system,"

One of the most difficult decisions for MRP purchasers is how to choose from the smorgasbord of packages.

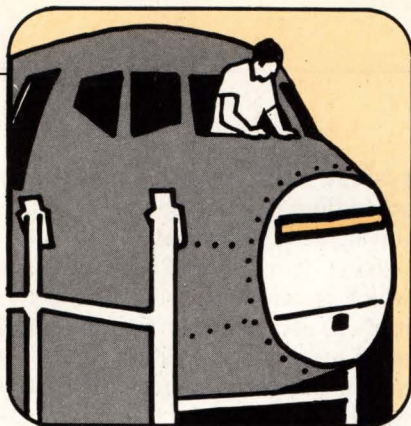
says Gelb. "I don't know whether it was our ineptitude or something else. One of the most difficult tasks was getting accurate reporting from the shop floor."

Because of the system's lackluster performance, Harley-Davidson decided to imitate its Japanese competitors. The manufacturer instituted a major experiment in just-in-time scheduling, reorganizing people and machinery to promote just-in-time production principles. The experiment worked. "Without just-in-time we wouldn't be in business today," Gelb says, adding that work-in-process inventories were reduced by \$20 million from late 1982 through the end of 1983.

Although the crisis may have spurred Harley-Davidson to streamline operations, MRP, unlike just-in-time, never served as a rallying point for the company's workers. "MRP

MRP software for micros

Vendor	Package	Requirements	Price	Circle
Helmsman Syst. (408) 246-8300	H-MRP	Micros under CP/M, MS-DOS 2.0 and above, or Unix	\$9,995/full system (6 modules total)	602
ICS Computers (312) 931-1400	Control MFG	Micros under MS-DOS, Unix, or TI format with ARM Cobol	\$1,500/module (13 modules total) \$3,500/module for source code	603
Interactive (619) 560-8525	Infoflo	Micros under Pick	\$60,000 (ave. price)	604
Interactive Information Syst. (513) 761-0132	IMCS	Micros under RSTS with Basic Plus	\$30,000/6 mfg. modules \$13,000/ (3 financial modules)	605
Interlocking Consultants & Assoc. (216) 526-7222	ICA	IBM PC; micros under MS-DOS, 16-bit CP/M-86, or 8-bit CP/M with 10-Mbyte hard disk	\$600 to \$800/module (9 financial and mfg. modules total)	606
Intro-Logic (313) 352-2740	Mfg. II	Micros under CP/M or MP/M	\$3,000	607
Key Syst. (305) 743-5890	Profit Key	Micros under MS-DOS, Unix, or Xenix with RM Cobol	\$7,500 to \$36,000	608
Martek (312) 852-6027	Aims	Micros under CP/M, MS-DOS, PC-DOS, or Unix	\$6,000	609
MCBA (818) 957-2900	Base MRP Full MRP	IBM PC; micros under Unix, Xenix, or Zeus	\$700 to \$1,250	610
McCullough & Assoc. (816) 637-8638	MPac	Alpha Micro models under AMOS	\$23,000/full package (9 modules total) \$1,000 to \$3,000/module	611
Microcomputer Consultants (916) 756-8104	MRP module of Inmass package	Micros under CP/M, CP/M-86, MP/M-86, MS-DOS, Concurrent-DOS	\$600	612



controlled production, but it didn't stimulate quality of production and improvements," Gelb says. "We still need some of the MRP system's capabilities, but we're ignoring a lot of the output. We don't use it at all to schedule the shop. At this point, we're not real proponents of MRP. We'd have been a lot better off today if we'd spent less time trying to perfect the MRP

system and more time trying to solve the business' basic problems."

Another advantage of just-in-time for financially strapped Harley-Davidson was its cost. For the most part, implementing the project required only worker retraining and realignment of plant machinery.

Harley-Davidson's view is not universally shared by other manufacturers, some of whom see MRP and just-in-time as at least partially compatible production methodologies. In fact, Deere & Co., Moline, IL, the giant agricultural equipment manufacturer, has used MRP and just-in-time concurrently, according to a paper delivered by a Deere company official at the American Production

& Inventory Control Society's 1983 conference. "MRP will continue to provide the planning and coordination for factories with large product mixes and complex bills of materials," says Ronnie D. Sonnenburg, Deere's manager of production control. Using the two systems together, however, has required changes in MRP; just-in-time, for example, requires daily production scheduling, unlike MRP's weekly or monthly reporting.

MRP: Quo vadis?

Despite the misgivings of some manufacturers, it appears MRP will have a place in the factory of the future. Why? Integration of new technologies, such as robotics and numer-

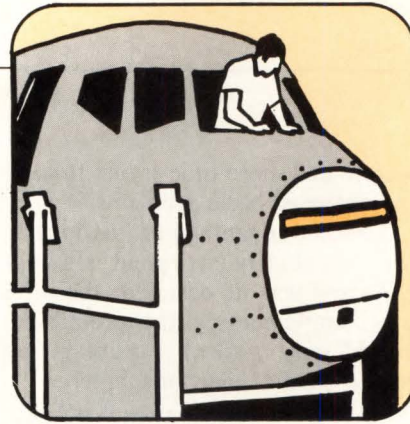
Vendor	Package	Requirements	Price	Circle
Micro Mfg. Syst. (614) 895-0738	Micro-MRP	IBM PC; 8- or 16-bit micros under MS-DOS, CP/M-80, CP/M-86, MP/M-86, TRS-DOS, Unix, or Xenix	\$750 to \$2,500/module (11 modules total)	613
Northeast Data Syst. (617) 273-2920	MMC	Altos models under Pick	\$25,000 to \$50,000	614
Optimized Planning Syst. (914) 762-0862	OPS-1	IBM PC; micros under MS-DOS, CP/M-86, or Unix	\$895 and up	615
	OPS-II	Same systems	Same price	
Pine Instrument (412) 458-6391	Picam	Micros under RXS-IIM	\$25,000	616
Production Syst. (707) 526-1294	MCS 8	IBM PC XT	\$1,000/module	617
	Job Shop Control Syst.	Same system	Same price	
RSD (206) 451-0404	Proman	Many micros	\$15,000	618
Satcom (201) 447-5379	Prodstar MRP	IBM PC XT, HP 150, DEC Rainbow	\$9,900	619
Solidus Int'l. (206) 734-3744	Stockmaker	Apple II, IIe, II Plus	\$595	620
	Stockfile	Same systems	Same price	
	Stockseller	Same systems	Same price	
Solvation (617) 366-6621	Mfg. Planning & Control Syst.	IBM PC, and compatibles	\$295 to \$1,795/module	621
		Micros under Unix or MP/M	\$495 to \$2,995/module	
Symbolics (303) 987-2600	RTMM	HP 250	\$5,000 to \$15,000	622
TCS Software (713) 977-7505	TCS Materials	IBM PC; micros under MS-DOS	\$750 to \$1,000	623
Tracline (516) 935-7500	M-Trac	Micros under Oasis	\$8,200	624
Trans Micro Syst. (408) 998-7118	Profitkey (includes MRP and job-shop packages)	Micros under MS-DOS, CP/M, Unix, Xenix	\$7,500 to \$30,000	625
Twin Oaks (612) 458-1604	mrp2	IBM PC, PC XT, and compatibles	\$1,100 to \$10,400	626

MRP

(Continued from page 163)

ical control, into the rest of the factory requires a production-planning mechanism. Although it's 20 years old, MRP still serves as the focal point for coordinating plant production. "If you don't have MRP, you get islands of automation," says Elliot Stein, of Arco. "You have to have overall control."

If MRP serves as a unifying factor for plant automation, it will be transformed by the new technologies implemented around it. Walter Goddard, an executive vice president at Oliver Wight, believes the scope of MRP will expand. Telecommunications will link vendors and customers directly to manufacturers. Customer orders, received online, will be linked to the manufacturer's database, which will, in turn, generate online purchasing orders. Adjustments in quantities or delivery dates will be made at any point in the chain. Goddard stresses that this will also necessitate a fundamental change in



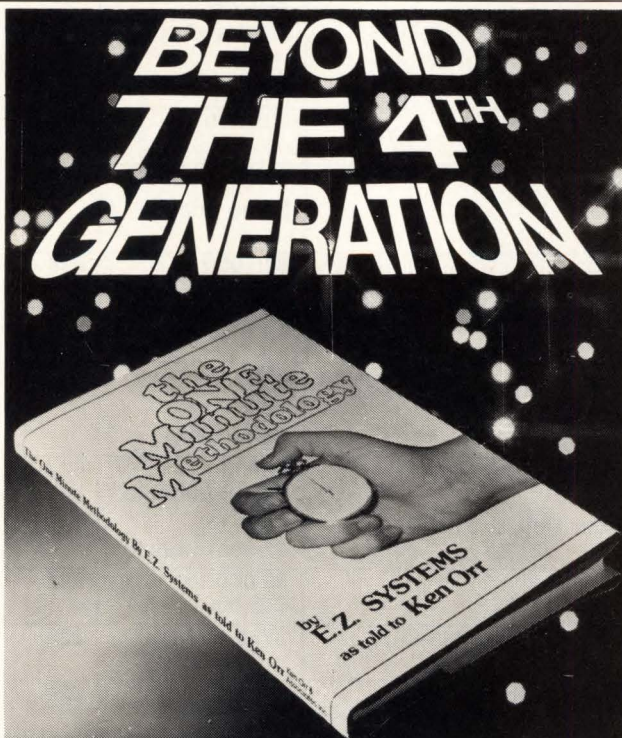
the relationships with vendors and customers, many of whom have been reluctant to share information.

In fact, as software developers have begun to market telecommunications products to accompany MRP packages, Goddard's vision has begun to materialize. Micro-MRP, for example, has introduced Interplant Module, an enhancement to its MRP product for the IBM Personal Computer that permits two-way communications between vendor and manufacturer.

Artificial intelligence is also beginning to help production planners. At Digital Equipment Corp., an expert

system helps manage shop-floor scheduling at one computer-manufacturing facility. The system culls information from the MRP database, which is combined with other information, such as the production status of an item. It then makes scheduling and planning recommendations, says Michael J. Houlihan, group AI-technology manager for computer-systems manufacturing. Moreover, the AI system will soon be integrated as a material and capacity-planning tool. (For more on AI, see "Artificial Intelligence: Out of the lab, into the workplace" in the August issue.)

Although criticisms have surfaced and many companies are drastically shifting its role as a planning tool, MRP appears to be here to stay. The reasons for retaining one of the oldest marriages of computers with a manufacturing methodology are simple. Explains Arco's Stein: "We're making a profit now when we weren't in the past." □



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The Fin



Latest Revolution In Financial-modeling Software, Part I

Financial-modeling software is in the midst of its third revolution with the promise of a fourth on the horizon.

by Robert L. Perry

Since Visicalc first computerized the accountant's traditional tasks, improvements to spreadsheets and financial modelers have appeared almost every week. Now, with integrated packages and micro-to-mainframe links further revolutionizing financial-modeling software, managers have more to choose from than ever before.

For microcomputers alone, more than 85 spreadsheet packages are available. More than 50 integrated packages with spreadsheets, several dozen spreadsheet packages for mainframes and minicomputers, and more than 50 mainframe-to-microcomputer communications packages with built-in links to spreadsheets were on the market by August 1984. Managers must consider packages carefully to select the right ones to meet their organizations' needs.

The popularity of integrated packages for personal computers, with the spreadsheet as the most frequently used application, means that financial modeling and spreadsheets are among the most important uses of microcomputers. Although the terms are often used interchangeably, spreadsheets and modelers are not the same. The lines between the two are blurring, but there are still differences, even in integrated packages.

Financial modelers, such as Encore!, are based on programming languages with built-in financial functions and formulas. Modelers' languages are based on English terms instead of equations and formulas, and they usually have built-in report generators instead of separate text pro-

Financial Modeling

(Continued from page 167)



The electronic spreadsheet module of Software Product International's Open Access integrated package has virtual memory and allows 28,000 data entries per model or spreadsheet. Yet the package is based on just two dozen basic commands, as shown in this photo.

cessors. In strictly technical terms, a spreadsheet or series of spreadsheets is the *result* of the modeling process. Spreadsheets are more flexible and

can be used for accounting, forecasting, budgeting, and many more purposes, whereas modelers are more useful for overall, or "macro," fi-

nancial situations.

For example, financial modeling would not be very useful for statistical analyses of inventory, but a spreadsheet would serve this purpose. Conversely, consolidating the budgets of a multibillion-dollar conglomerate's subsidiaries would be a task for a modeler, not for an independent spreadsheet.

A financial model, like the model of a building or a bridge, simulates the current status or future development of an entire organization, or of a department, division, or subsidiary. It predicts and explains the financial performance of a business entity.

The types of financial models users can develop are practically infinite. Managers deal with budgets, forecasts, sales figures, productivity reports, industry and national economic forecasts, strategic and tactical planning, and personnel costs. Each corporation analyzes these models, spreadsheets, and reports in its own way. In turn, each manager must de-

Financial-modeling software

Microcomputer financial modelers and spreadsheets

Vendor	Package	Requirements	Price	Circle
Addison-Wesley Publishing (617) 944-3700	DSS/F	IBM PC, PC XT Apple IIe and III	\$995 \$795	477
	DSS/A	IBM PC; Apple IIe and III	\$495	
Antech (404) 993-7270	Cope	IBM PC under PC-DOS; TI PC, or micros under MS-DOS	\$395	478
Apple Computer (408) 996-1010	Senior Analyst II and III	Apple IIe Apple III	\$225 \$350	479
	Decision Evaluator	Apple IIe and III	\$195	
Artsci (213) 985-2922	Magicalc	IBM PC and micros under MS-DOS	\$395	480
Ashton-Tate (213) 204-5570	FPL	Micros under CP/M, CP/M-86, or MS-DOS	\$745	481
	Bottom Line Strategist	Micros under CP/M, CP/M-86, MS-DOS, or TRS-80	\$400	
	The Financial Planner	IBM PC and micros under CP/M, CP/M-86, or MS-DOS	\$700	
Business Planning Syst. (302) 674-5500	Plan 80	Apple models and micros under CP/M or CP/M-86	\$295	482
Chang Labs (408) 246-8020	Microplan	IBM PC and PC XT, and micros under CP/M, MP/M, or MS-DOS	\$495	483
	Profitplan	Same	\$195	
	Graphplan	Same	\$395	

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Company _____

Address _____

City, State, Zip _____

Telephone () _____

Computer Brand _____ Model _____

CDS 4

Financial Modeling

(Continued from page 168)

cide how to assess this information. This need for versatility and flexibility is the essential strength of spreadsheets and financial modelers.

With their built-in formulas and functions, financial-modeling software packages ease the drudgery of building models. However, they also reduce the flexibility of the types of models users can build. If the desired

models are relatively simple, templates for spreadsheets allow users to execute the models, but users themselves must create the templates or buy them from a vendor.

Executives and managers also use electronic spreadsheets and modelers for the following tasks:

- Budget planning and comparisons to actual results.

- Consolidation of planned and actual budgets among various departments, divisions, groups, subsidiaries, or other operating units.

- Job-cost and bid-specification planning and estimates.

- Depreciation calculations.

- Real estate financial analysis.

- Commercial-loan evaluations with amortization schedules, rates of re-

Financial-modeling software

Microcomputer financial modelers and spreadsheets

Vendor	Package	Requirements	Price	Circle
Comshare (313) 994-4800	Plannercalc	IBM PC and micros under CP/M, CP/M-86, or MS-DOS	\$99	484
	Target Financial Modeling	Same	\$325	
	Micro W DSS	Micros under CP/M-86 or PC-DOS	\$995	
Computer Mktg. Svcs. (609) 795-9480	Calc-Result	IBM PC; Commodore	\$150	485
Datamension (312) 564-5060	Report Manager Advanced Version	IBM PC and micros under MS-DOS	\$495	486
Digital Mktg. (415) 938-2880	Plan 80	Micros under CP/M, CP/M-86, or MS-DOS	\$295	487
Dow Jones (609) 452-2000	Dow Jones Spreadsheet Link	IBM 3270 PC, IBM PC, and PC XT; Apple II, IIe, II Plus	\$249	488
DSD (206) 822-2252	C-Calc v. 1.5	Micros under Unix with C; DEC Pro 350	\$600	489
EPS (603) 898-1800	Micro FCS	IBM PC and micros under MS-DOS; Apple IIe; North Star Advantage; DEC and Wang personal computers; HP 150	\$2,000	490
Ernst & Whinney (216) 861-5000	Micro Business Advisor	IBM PC and compatibles; TRS-80 micros	\$800	491
Executec (214) 239-8080	Execumodel	IBM PC; TI PC; micros under MS-DOS	\$495	492
Ferox Microsystems (703) 841-0800	Encore!	IBM PC, PC XT, and compatibles	\$695	493
Fox & Geller (201) 794-8883	Oz Management Control	IBM PC and compatibles	\$495	494
Hayden Software (617) 937-0200	The Planner	IBM PC, PC XT, and compatibles under PC-DOS	\$100	495
Horizon Software Syst. (415) 543-1199	Horizon Spreadsheet	Micros under Unix or Xenix	\$245	496
Information Unltd. Software (415) 331-6700	Easy Planner	IBM PC; TI PC	\$250	497
I.S.A. Software (214) 960-6696	Omnicalc	Commodore	\$100	498
Lifeboat Assoc. (212) 860-0300	Unicalc	IBM PC and micros under CP/M or Unix	\$99	499

turn, and net present-value functions.

- Marketing plans and performance analyses.

- Capital investment and budgeting.
- Pricing analyses to determine profitability levels and to compare pricing strategies to the competition's.

Despite the variety of capabilities already available to users of spreadsheets and financial modelers, im-

provements are introduced practically every week. The rapid transition from the 8- to the 16-bit microcomputer, as in the IBM Personal Computer and MS-DOS compatibles, and then to the 32-bit micros, led by Apple Computer's Macintosh and the AT&T 3B series, made these revolutionary advancements possible.

The first revolution was Visicalc,



Microcomputer financial modelers and spreadsheets

Vendor	Package	Requirements	Price	Circle
Logic Extension Resources (714) 980-0046	Multicalc	Micros under Oasis	\$595	500
Metasoft (602) 961-0003	Benchmark Financial Planner	IBM PC, PC XT, 3270 PC, and micros under MS-DOS; DEC Rainbow 100 and Rainbow 100 Plus; NEC APC under DOS 2.0; TI PC; Victor 9000	\$295	501
Micro Architect (617) 273-5658	SS-X Spreadsheet	IBM PC, PC XT, PCjr, and compatibles under MS-DOS	\$59	502
Micropro Int'l. (415) 499-1200	Calcstar	Micros under CP/M-86, MS-DOS, or PC-DOS	\$195	503
	Planstar	IBM PC; Apple IIe; micros under CP/M	\$695	
Microsoft (206) 826-8080	Multiplan	Micros under CP/M-80, MS-DOS, PC-DOS, or Xenix	\$275	504
Peachtree Software (404) 239-2000	Peachcalc	IBM PC and micros under CP/M or MS-DOS	\$150	505
	Series 9 Peachcalc	IBM PC and micros under CP/M; Wang; HP-125; Xerox; NEC; Zenith; TRS-80; Apple	\$375	
Perfect Software (415) 527-2626	Perfect Calc	IBM PC; Apple; TI PC; TRS-80; Commodore; micros under CP/M, MS-DOS, or Unix	\$295	506
Phase One Syst. (415) 562-8085	Masterplan	Micros under Oasis	\$495	507
Reston Publishing (703) 437-8900	Business Forecasting	IBM PC, PC XT, and compatibles running Lotus 1-2-3	\$100	508
Ross Syst. (415) 856-1100	Maps/Pro Model	DEC Pro 350 under P/OS	\$1,250	509
Scientific Syst. (617) 661-6364	SSI/SSF	IBM PC, PC XT, and compatibles	\$495	510
Software Arts (617) 237-4000	Visicalc Advanced Version	IBM PC; Apple; Commodore; TI PC	\$400	511
Software Products Int'l. (619) 450-1526	Logicalc	IBM PC; Sage II; Altos 8000; TRS-80 Model II; Apple IIe and III; DEC Pro	\$190	512
	Procalc	IBM PC with UCSD p-System Pascal	\$350	
	Open Access	IBM PC XT and micros under PC-DOS	\$595	

Financial Modeling

(Continued from page 171)

which computerized both the traditional row-and-column format of the accountant's spreadsheet and the mathematical functions previously performed manually or with a calculator.

Early last year, Lotus 1-2-3 and Context MBA heralded the second revolution. These packages linked several functions with common commands within the same program. This approach differed from Visicorp's "integrated-family" concept (including Visicalc, Visiplot, Visiterm, Visi-file, and Visidex), which provided common file structures that permit data from one program to be transferred to another program in the family. However, two applications could



not reside on disk or in memory at the same time.

As the popularity of these products soared during 1983 and early 1984, mainframe-software houses realized that corporate users required similar spreadsheet functions for their mainframe terminals. Dozens of these vendors responded with integrated packages, stand-alone spreadsheet

packages, and full-fledged decision-support systems for micros.

Many mainframe houses also began to work with microcomputer-software houses to develop links between mainframe databases and the micros' integrated packages. Results of these efforts have just begun to appear in useful applications software. Two of the best-known micro-to-mainframe links, Visicorp's VisiOn and Micro-soft's Windows, were delayed for months, only arriving this year. These efforts represent the third revolution in financial-modeling software.

The demand for micro-to-mainframe communications products is growing rapidly. Much of this de-

(Continued on page 176)

Financial-modeling software

Microcomputer financial modelers and spreadsheets

Vendor	Package	Requirements	Price	Circle
Software Publishing (415) 962-8910	PFS:Report	IBM PC and compatibles; any Apple running PFS:File	\$100 to \$150	513
Software Toolworks (213) 986-4885	Zencalc	Micros under CP/M	\$50	514
Sorcim (408) 727-7634	Supercalc	Micros under CP/M, MP/M-86, MS-DOS, or PC-DOS	\$195	515
	Supercalc2	Same	\$295	
	Supercalc3	Same	\$395	
Structured Syst. Grp. (415) 547-1567	Magic Worksheet	Micros under CP/M	\$250	516
Supersoft (217) 359-2112	Scratchpad	Micros under CP/M-80, CP/M-86, MS-DOS, PC-DOS, Oasis, or ZMOS	\$295	517
	Scratchpad with Voice Recognition	IBM PC and micros under MS-DOS with Tecmar Voice Recognition Board	\$495 \$995 for board	
Systems Plus	The Wedge	Micros under CP/M, MS-DOS, or PC-DOS	\$295	518
T-Maker (415) 962-0195	T-Maker III	IBM PC and micros under CP/M, CP/M-86, or MS-DOS	\$275	519
UCCEL (214) 353-7100	UCC MBA	IBM PC	\$900	520
Via Computer (619) 578-5356	Microprophit	IBM PC, PC XT, and compatibles	\$695	521
Visicorp (408) 946-9000	Visicalc	Many micros	\$250	522
	Visicalc Advanced Version	Apple III	\$400	
	Visicalc IV	IBM PC; Apple IIe	\$250	
	Flashcalc	IBM PC; Apple IIe	\$99	
Westico (203) 853-6880	Minimodel	IBM PC and micros under CP/M or CP/M-86	\$495	523

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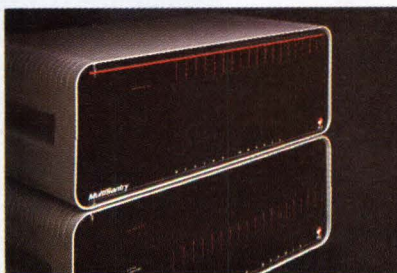
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CIRCLE 86

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☐ For the convenience of your personnel, MultiSentry gives you a choice of three access capabilities: one is direct connect and two are call back modes.

☐ MultiSentry's ingeniously simple database management assures that your security is reviewed and updated regularly.

☐ MultiSentry is so sophisticated that its technology is protected by no fewer than eight exclusive patents.

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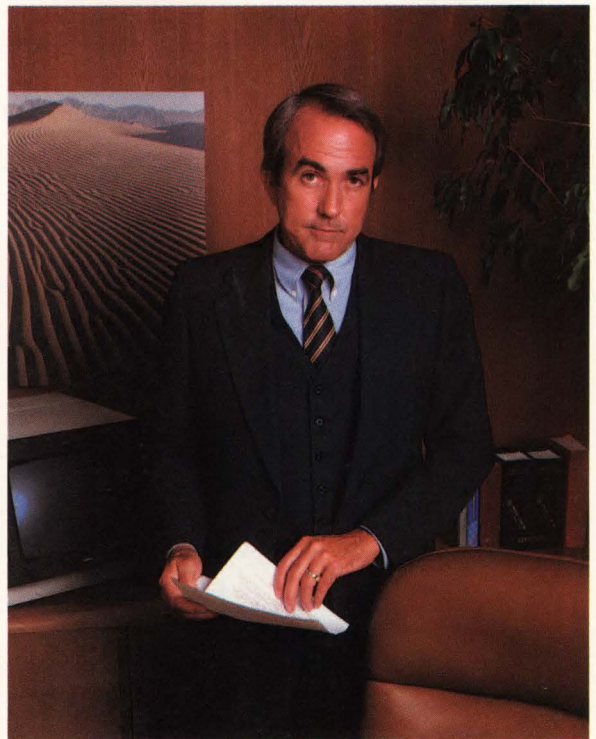
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CIRCLE 87

*When it's up to you...
to make the financial decisions.*

Financial Modeling

(Continued from page 172)

mand is based on users' demands for access to mainframe financial databases. Users will be able to execute tasks on the mainframe with their micros in a terminal emulation mode or with data downloaded from the mainframe.

With the arrival of the third revolution, confusion has arisen because of the diversity of software these three generations represent. The basic varieties are:

Stand-alone modeler or spreadsheet. This is the oldest variety, represented by Visicalc, Supercalc, Logicalc, and a host of others. They can usually share data but not program routines with format-conversion software.

Integrated packages. Context MBA and Lotus 1-2-3 are the most popular of these packages. One package builds a common command envi-

Windows may be confusing nuisances for novices and unnecessary encumbrances for experienced users.

ronment for several applications running in memory at the same time.

Operating environments. The three dominant operating environments are Microsoft's Windows, Visicorp's Visi-

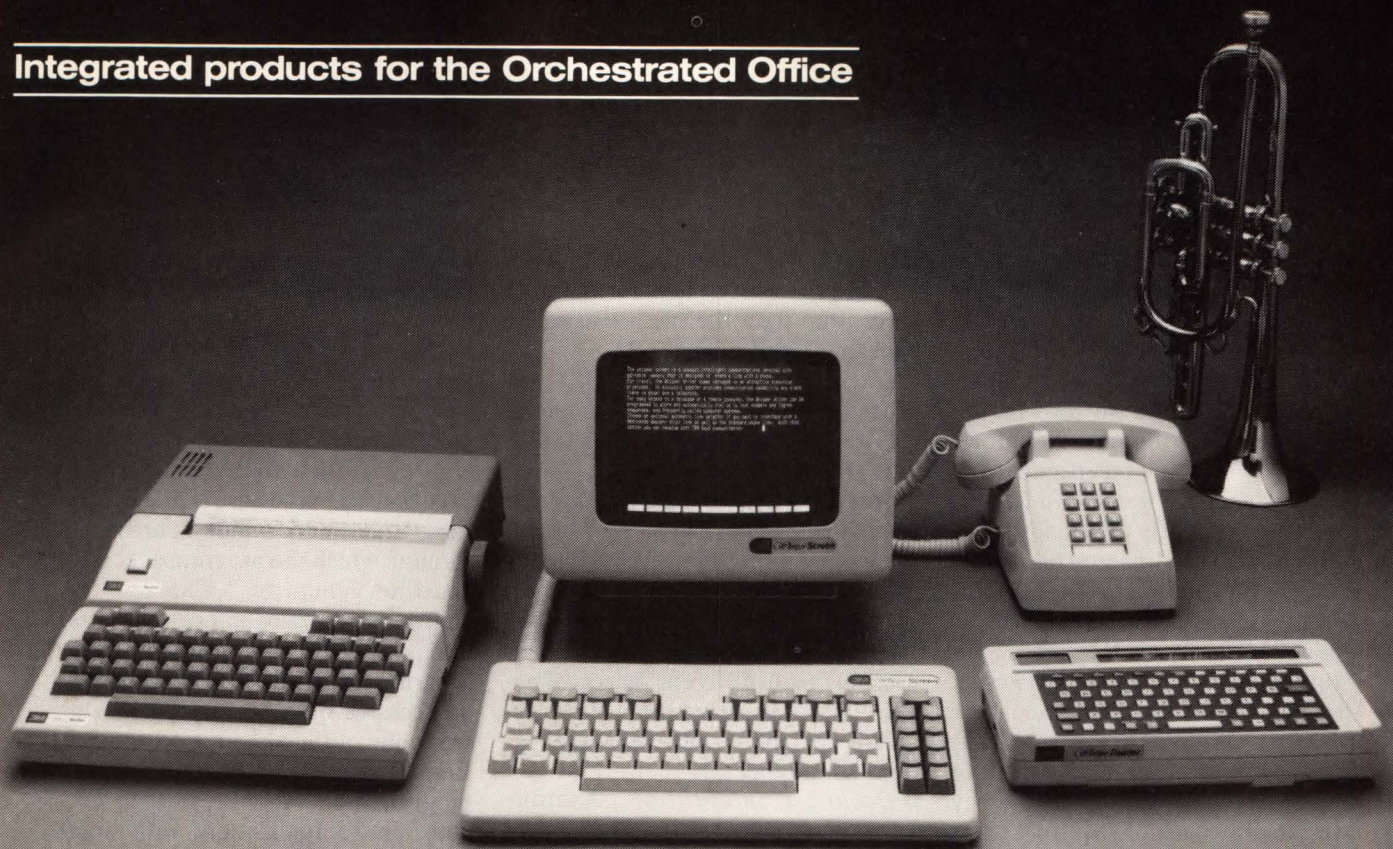
On, and Quarterdeck Software's Desq. These environments are aimed at users who have favorite programs among which they need to transfer data, or users who need to work with special micro-to-mainframe communications and applications programs.

Each of the three leaders takes a different approach. VisiOn integrates its applications series with other vendors' software with just eight commands, using overlapping windows for data transfers. Microsoft's Windows uses "tiles"—windows that don't overlap—and includes a library of data types and transfer protocols, including Software Arts' Data Interchange Format, ASCII, and Microsoft's own Syk, to allow most incom-

Financial-modeling software

Integrated microcomputer software packages

Vendor	Package	Requirements	Price	Circle
Ashton-Tate (213) 204-5570	Framework	IBM PC, PC XT, and compatibles	\$695	524
Business Solutions (516) 269-1120	Jack2	IBM PC, PC XT, and compatibles	\$395	525
Context Mgt. Syst. (213) 378-8277	Corporate MBA Context MBA	IBM PC XT IBM PC, PC XT, and compatibles	\$895 \$695	526
Economic Sciences (415) 841-6869	EMS	IBM PC XT/370	\$7,500 to \$12,500	527
Executec (214) 239-8080	Series One Plus	IBM PC; micros under MS-DOS	\$495	528
Handle (916) 583-7283	Handle Calc/ Graph	Micros under Unix	\$695	529
Institute for Information Mgt. (408) 749-0133	OPT/	IBM PC, PC XT, and compatibles under DOS 2.0 running Lotus 1-2-3	\$2,000	530
Lotus Development (617) 492-7171	1-2-3 Symphony	Many micros IBM PC and PC XT	\$495 \$695	531
Peachtree Software (404) 239-2000	Decision Manager	IBM PC, PC XT, and compatibles	\$625	532
Mosaic Software (617) 491-2434	Integrated-7	IBM PC and compatibles	\$695	533
Noumenon (415) 521-2145	Intuit	IBM PC and compatibles	\$395	534
Ovation Tech. (617) 769-9300	Ovation	IBM PC and compatibles; Tandy 2000	\$795	535
Softrend (603) 898-1777	Aura	IBM PC, PC XT, and compatibles	\$695	536
T-Maker (415) 962-0195	T-Maker Integrated	IBM PC and micros under CP/M, CP/M-86, or MS-DOS	\$450	537



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And has your company been seeking a cost-effective means of implementing electronic mail?

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An integrated family of multi-purpose terminals.

3M's Whisper Writer, Whisper Reader, and Whisper Screen are communications devices that serve users in four different ways:

- As TWX and Telex terminals.
- For remote access to computer databases and information services, using their own built-in modems.

As substitutes for (or supplements to) dedicated ASCII terminals.

- For message forwarding and retrieval via an electronic mail network.

Whisper Writer: a fully portable teleprinter.

Whisper Writer is about the size of a portable typewriter. It incorporates all of 3M's four Whisper Terminal functions and can be used in an office or on the road. Its built-in text-editing software, battery-maintained memory, and quiet 35-cps printer make it a versatile performer at a competitive price.

Whisper Reader: a terminal that weighs just 2 lbs.

This book-size unit does most of what Whisper Writer does, with the obvious exception of printing. Like Whisper Writer, it lets users prepare text offline to save on telephone,

TWX, and Telex charges.

Whisper Screen: a smart terminal that communicates.

3M's intelligent CRT terminal has a standard RS-232C interface, plus a built-in modem for communications at 1200 or 0-300 baud. A 16K memory with print spooler is standard, as are a variety of automatic dialing, log-on, polling, and answering features.

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Financial Modeling

(Continued from page 176)

patible applications to swap data. Microsoft's Windows is an extension of the vendor's MS-DOS operating system and includes all the interfaces—graphics, help menus, data-swapping files, and so on—in the operating environment. Windows does not involve any independent applications package in these functions. Desq works similarly to Windows, but it adds a versatile “macro-command” processor that allows users to customize any data-transfer sequence or application.

Integrated stand-alone packages. These packages integrate separate programs through a central data-transfer “driver” that moves data from one program to the next. They have the drawback of requiring users to load two programs in memory be-

fore a transfer can take place. They also require more memory and take more time than the method used by packages like Lotus 1-2-3.

Universal workspace. This approach, used by Ovation Technologies' Ovation and Noumenon's Intuit, puts all applications functions—word processing, spreadsheets, graphics, list management, and so on—on the same screen. It allows users to put any data onto the same “electronic sheet of paper.” This approach also uses the “windows” concept, which allows users to create different “sheets of paper.” However, windows are not required to look at different applications simultaneously.

Database integration. Ashton-Tate's new Framework package is the first step toward integrated packages

based on full-scale database managers, an approach now being used for some mainframe modeling packages. Framework, however, is only an evolutionary step. It has word processing, graphics, spreadsheets, a forms generator, compatibility with all PC-DOS and ASCII files, and a database manager that accepts dBase II and Friday! files. It also adds windows or frames through which the program acts as an “outline generator.” The user organizes a report or information base in outline form with headings as key program points. The user then merges or accesses data or text by moving from one outlined frame to another. Framework also has its own Fred programming language, which executes entire applications with single keystrokes.

Financial-modeling software

Mainframe financial modelers

Vendor	Package	Requirements	Price	Circle
ABC Mgt. Syst. (604) 682-3808	ABC Financial Planning and Modeling System	IBM mainframes under CMS or VMS; DEC mainframe	\$25,000	538
Applied Data Research (201) 874-9000	ADR/Empire	IBM 370, 30XX, or 43XX; DEC VAX	\$52,900 to \$77,200	539
Business Model Syst. (312) 789-9160	Business Modeler	IBM System/34, /36, /38; Wang VS; HP 3000; Prime and other minis IBM 43XX or 30XX	\$9,500 \$20,000	540
Comshare (313) 994-4800	System W	IBM mainframes under VM/CMS or MVS/TSO	\$55,000 to \$100,000	541
D&B Computing Svcs. (203) 762-2511	CSS Final	IBM 370 under VM/CMS or VMS	\$135,000	542
Economic Sciences (415) 841-6869	EMS v. 4.0	IBM mainframes under VM/CMS or MVS	\$50,000 to \$125,000	543
Engineering Design Concepts (617) 749-1794	EDC Financial Modeling	Wang VS	\$8,950	544
EPS (603) 898-1800	FCS-EPS	IBM mainframes under TSO/CMS	\$55,000 to \$100,000	545
Executive Tech Data Syst. (313) 626-0770	Finplan	IBM System/23, /34, /36, or /38 with CPF or SSP	\$1,450	546
Execucom Syst. (512) 346-4980	IFPS	DEC VAX 11/730; Data General; Prime 2250; Harris; HP; Wang; and IBM mainframes under DOS Most mainframes	\$40,000 and up \$64,000	547
IER (415) 968-2685	Plan-It	HP 3000	\$15,000	548

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Financial Modeling

(Continued from page 178)

Each type of package has its advantages and disadvantages. When considering a choice, the key criterion is the function for which the package will be used. Clearly, packages like Lotus 1-2-3 and Context MBA have the advantages of saving time and making current microcomputer spreadsheets easier to use than those of the Visicalc generation. Common command structures and the elimination of intermediate file movement among independent applications make these benefits possible.

Critics point out that the most se-

rious drawback of integrated packages is that they cannot be used in the same way as independent applications programs contained in the same memory. For example, some users complain that Symphony is very unwieldy because all of the package's functions must be loaded into memory before the package can be used. Even an average spreadsheet in Symphony requires most of the memory in an IBM PC with 256 Kbytes of random-access memory. This leaves little room for executing other functions and requires the user to buy memory-

expansion boards or a hard-disk drive to use all of Symphony's functions.

The operating environments are preferred by critics of integrated programs. However, what they gain in functionality they often lose in difficulty of moving data, and in learning and using different command structures. Symphony, Framework, and other improved integrated products are adding the interface functions of the operating environments to overcome these weaknesses.

The user interface for many of

(Continued on page 182)

Financial-modeling software

Mainframe financial modelers

Vendor	Package	Requirements	Price	Circle
Lloyd Bush & Assoc. (212) 962-4004	Model	IBM 370, 30XX, and 43XX series	\$35,000	549
Management Science America (404) 239-2000	MSA Forecasting & Modeling System	IBM System/36, 303X, and 370; Burroughs; mainframes under OS/VS, MCP, or SSX	\$35,000	550
Martin Marietta Data Syst. (301) 982-6500	MAS-Model	IBM 43XX or 30XX under DOS/ VSE, MVS, or VMS DEC VAX; HP 3000	up to \$100,000 \$9,000 and up	551
Oxford Software (201) 288-1515	Maxicalc	IBM mainframes running CICS	\$9,000 (DOS) \$12,000 (OS)	552
PCR (312) 932-2200	Easy Plan	IBM System/34	\$795	553
Ross Syst. (415) 856-1100	Maps/Model	DEC PDP-11 or VAX under RSTS/E or VMS	\$12,000 to \$25,000	554
SAS Institute (919) 467-8000	SAS/FSP Software (FSCalc)	IBM 370, 30XX, and 43XX under TSO, CMS, or DOS/VSE with Base SAS	\$4,900	555
Scientific Syst. (617) 661-6364	SSI/SSF (mainframe version)	IBM and VAX mainframes	\$3,000	556
Simplan Syst. (919) 493-2495	Simplan v. 1.10	IBM 360, 370, 43XX, and 303X with MFT; Prime 2250 under Primos	\$10,000 and up	557
Smith, Dennis & Gaylord (408) 727-1870	Business 3000	HP 3000 with MPE	\$12,500	558
Tower Syst. Int'l. (714) 752-8263	Omnicalc	IBM 370, 43XX, or 30XX under OS/VS1, OS/VS2, MVS, or DOS/VSE	\$6,500	559
Xerox Computer Svcs. (213) 306-4000	Control Control/ Strategist	IBM 43XX or 30XX under VM/CMS or MVS/TSO IBM 43XX or 30XX under VM/CMS or MVS/TSO	\$60,000 \$25,000	560

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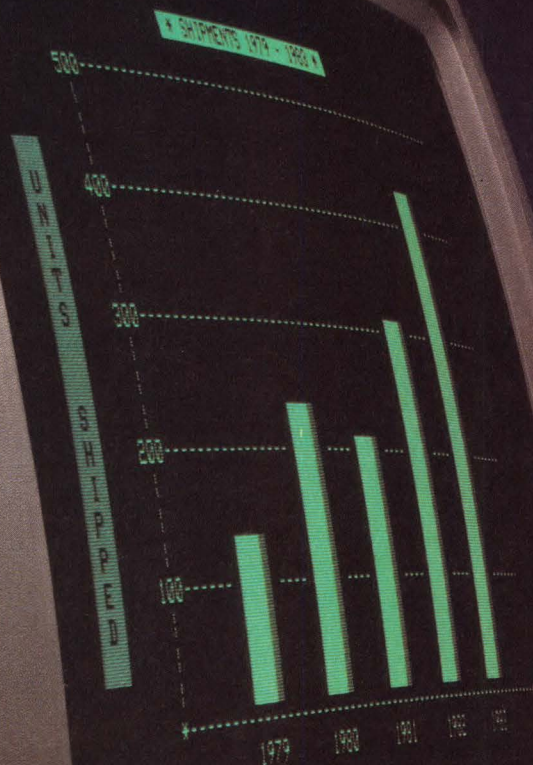
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CIRCLE 90



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Financial Modeling

(Continued from page 180)

Step-by-step aids to Lotus 1-2-3

Lotus 1-2-3 may help you understand your business, but what will help you understand Lotus 1-2-3? Some new products may fill the bill.

Putting 1-2-3 to Work is a self-study course emphasizing hands-on experience to train executives and managers to use Lotus software effectively. The program, developed by National Training Systems Inc., Santa Monica, CA, teaches participants the skills to create "what-if" models.

The course sells for \$95 and includes a study handbook, a practice diskette, eight preformatted models on diskette, and performance aids for quick referencing. For more information, contact National Training Systems Inc. at (213) 394-7685.

Lotus 1-2-3 at Work by Thomas Cain and Nancy Woodard Cain (Reston Publishing Co., \$16.95) is written for both the beginner and the more experienced Lotus 1-2-3 user. The early chapters of the book focus on fundamental commands, providing the framework for understanding the package's more sophisticated features.

Another step-by-step guide, *1-2-3 Revealed* by Dan Shaffer (Reston Publishing Co., \$16.95), attempts to go beyond the available documentation and show the user how to develop worksheets faster.

For more information on *Lotus 1-2-3 at Work* and *1-2-3 Revealed*, contact Reston Publishing Co. at (703) 437-8900.

these packages—windows—has not yet established its dominance or even demonstrated that it meets a clear-cut need. In fact, windows may be confusing nuisances for novices and unnecessary encumbrances for experienced users. To use windows well, critics maintain, users need months of learning and too many keystrokes and manipulations. Using more than two windows simultaneously, especially overlapping ones, can be very confusing even to experienced users. Therefore, software with as many as 20 windows may simply be too far ahead of its time, a technological development without true usefulness.

Still, operating environments have two key advantages. First, users can usually work with the software and machines they already own. It isn't necessary to scrap a lot of expensive software. Second, with operating environments, users can search for the best package for their company's requirements. With an integrated

Financial-modeling software

Microcomputer-like spreadsheets for mainframes/minis

Vendor	Package	Requirements	Price	Circle
Access Tech. (617) 655-9191	Supercomp-Twenty	DEC VAX; Prime; other superminis IBM 370, 30XX, or 4300 under VM/CMS	\$4,800 \$12,500 to \$17,000	561
Breuer (617) 275-5810	Finpro	DEC PDP-11, VAX with RSX-11M or VMS	\$1,000	562
Business Model Syst. (312) 789-9160	Business Modeler + Minitplan	IBM System/34, /36, /38; Wang VS; HP 3000; Prime IBM 43XX, 30XX, and other mainframes	\$9,500 \$20,000	563
Chicago Software (312) 525-6400	Dynacalc	IBM 4331, 4341, 4361, and 4381 IBM 3083, 3081, and 3031	\$8,000 \$9,000	564
Cincom Syst. (513) 662-2300	Mancalc	IBM mainframes and compatibles under OS or DOS	\$12,500	565
Computer Tech. Syst. (303) 663-1400	Mastercalc	Mainframes and minis under Iris and Bits	\$1,000 to \$1,200	566
Datamate (918) 664-7276	Easycalc	NCR 8XXX; HP 3000; Prime; DEC VAX	\$2,500 to \$9,500	567
Fusion Products Int'l. (415) 461-4760	FPI-3	IBM System/34 IBM System/38	\$2,500 \$4,500	568
Hourglass Syst. (414) 781-6815	Calc Master	Wang 2200 MVP, LVP, SVP, VP, and VS	\$595	569

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Financial Modeling

(Continued from page 182)

package, users must take the applications that come with the package, even if they aren't the best or most suitable programs or applications for their purposes.

When purchasing financial-modeling software, buyers must proceed carefully for many reasons. The most important of these is that, in corporations, applications tend to stay in place after they're introduced. Once a package is installed and users learn how to make it do what they want, they are very reluctant to change.

According to a 1983 Datapro research survey of 6,000 spreadsheet users, Visicalc had almost 45 percent of the installed base of users of electronic spreadsheets. Supercalc had the second-largest user base with almost 25 percent, while Lotus 1-2-3 had about 7 percent. Although these figures are changing, this survey suggests that despite the hullabaloo over Lotus 1-2-3 and all the new integrated packages, the independent spreadsheets still dominate.

The fourth generation of integrated

software for modeling and decision-support systems will probably consist of exploratory and homogeneous systems. As 512-Kbyte and 1-Mbyte memories and 20- to 40-Mbyte hard disks become standard for business microcomputers, exploratory systems—long used with mainframes in computer-science labs—may begin to dominate the integrated-software field. An exploratory system is based on the concept of interacting objects. Developed as part of Xerox' Small-

(Continued on page 188)

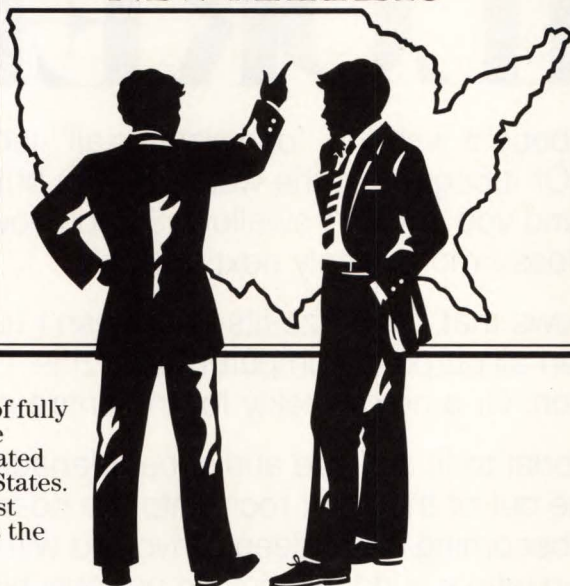
Financial-modeling software

Microcomputer-like spreadsheets for mainframes/minis

Vendor	Package	Requirements	Price	Circle
Lattice (312) 858-7950	Unicalc TM	IBM mainframes; DEC under VMS or Unix	up to \$60,000	570
Maryland Computer Svcs. (301) 879-3366	Crystal	HP 250	\$1,500	571
Megagroup (714) 474-0800	Megacalc	IBM mainframes and compatibles under DOS or MVS/TSO IBM 30XX with same operating systems	\$15,000	572
John McLean & Assoc. (713) 871-9134	Opticalc	HP 3000 or DEC VAX	\$3,500	573
	Opticalc Jr.	HP 3000 or DEC VAX	\$1,000	
	Optique	HP 3000 or DEC VAX	\$6,000	
Oxford Software (201) 288-1515	Maxicalc	IBM 370, 43XX, or 30XX under DOS/VSE	\$9,000	574
		IBM 370, 43XX, or 30XX under OS/MVS	\$12,000	
Para Research (617) 283-3438	Easy Calc	IBM System/34, /36, /38	\$750	575
Parallax Syst. (212) 475-4001	Execucalc	IBM mainframes under VM/CMS or MVS/TSO	\$5,000	576
PBS Computing (612) 484-8800	Saturncalc	DEC PDP-11 with RSX-11M	\$1,200	577
Saturn Syst. (612) 944-2452	Saturn-Calc	DEC PDP-11, VAX, Pro 350 with RT-11, TSX-11, or VMS	\$978	578
STSC (301) 984-5000	Dataport	IBM 370, 30XX, 43XX under VM/CMS, VM/SP, or MVS	\$15,000	579
Tower Syst. Int'l. (714) 752-8263	Omnicalc	IBM mainframes under DOS/VSE	\$4,600 and up	580
Trax Softworks (213) 475-8729	ESS	IBM mainframes under VM/CMS or MVS/TSO	\$220/month lease	581
Uniq Digital Tech. (312) 879-1566	Unicalc	DEC PDP-11, VAX under Unix	\$2,500	582
Westmoreland Syst. (305) 645-0040	Calc/34	IBM System/34 or /36	\$1,500	583
Why Syst. (206) 881-2331	Digicalc v. 2.2	DEC PDP-11, VAX, and 350 with VMS or RSTE	\$4,000	792

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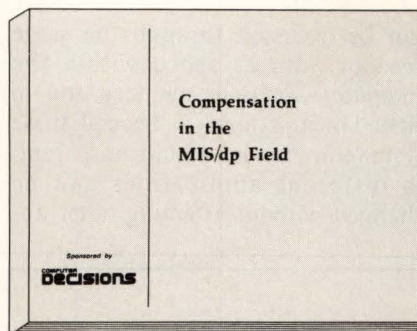
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Financial Modeling

(Continued from page 184)

talk-80 software, it is made of a virtual image and a virtual machine.

For users, the principal benefits of an exploratory system and object-oriented software are threefold. First, there is a high percentage of data sharing. Each object or application

can be accessed through the same area or address space within the computer—both in memory and in virtual memory on disk. Second, these systems are modular but transparent, so different applications can be changed without affecting other ap-

plications. Third, these systems make it easy for users and software developers to customize applications.

Homogeneous systems allow the merging of applications packages without loss of capability or flexibility. They allow the use of "composite documents," documents that include more than one kind of software structure. A composite document can include a portion of a spreadsheet in one place and different types of text in other locations on the document without window or frame boundaries. Although several corporate workstations already use composite documents, the boundaries remain rigid, and parts of one document or object cannot change according to context.

These two new types of systems software will be developed for 32-bit systems based on Bell Labs' Unix. Before the heyday of artificial intelligence arrives, by 1990, another development may spur further interest in windows. This development is true concurrent, multi-tasking processing, exemplified by Digital Research Inc.'s Concurrent PC-DOS. This system allows four separate applications programs to be executed on the IBM PC simultaneously. A user can work on a spreadsheet on one window, download data from a mainframe database on another, and print a report on a third.

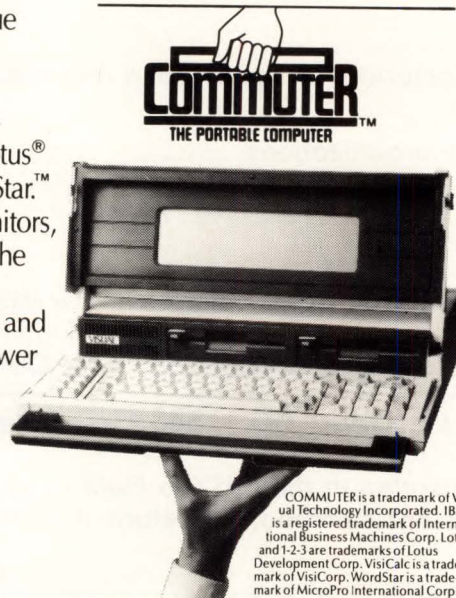
Managers now have a greater variety of financial-modeling software packages to choose from than ever before. Despite technical definitions and operating differences, the most important criterion when choosing any independent or integrated spreadsheet or financial modeler is whether it will fulfill the user's requirements. It is up to each manager to make the most informed decision for his or her organization. ☐

Robert L. Perry is a market-research consultant for International Resource Development, a market-research house in Norwalk, CT. He is the author of Owning Your Home Computer, published by Dodd, Mead.

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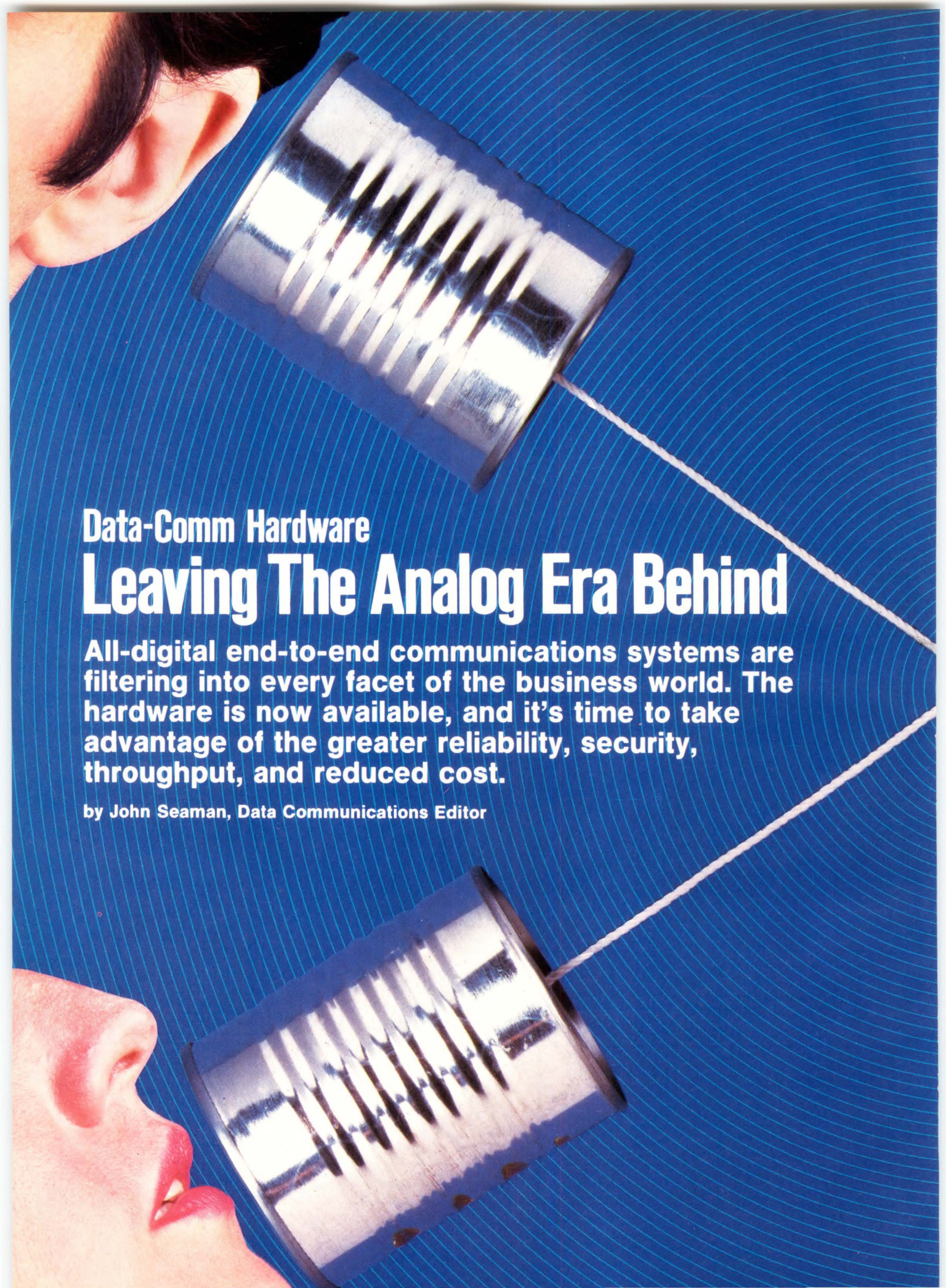
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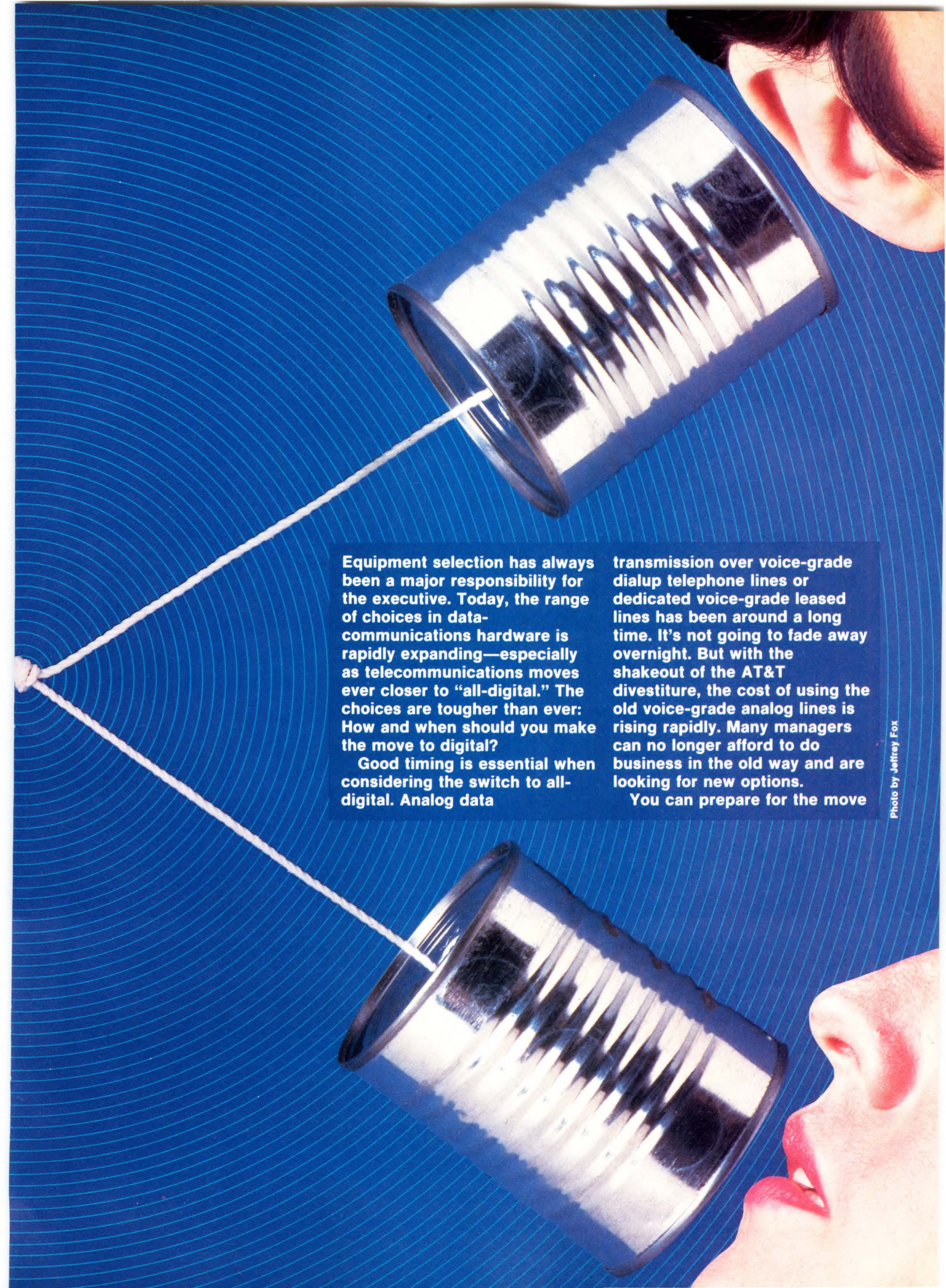


Data-Comm Hardware

Leaving The Analog Era Behind

All-digital end-to-end communications systems are filtering into every facet of the business world. The hardware is now available, and it's time to take advantage of the greater reliability, security, throughput, and reduced cost.

by John Seaman, Data Communications Editor



Equipment selection has always been a major responsibility for the executive. Today, the range of choices in data-communications hardware is rapidly expanding—especially as telecommunications moves ever closer to “all-digital.” The choices are tougher than ever: How and when should you make the move to digital?

Good timing is essential when considering the switch to all-digital. Analog data

transmission over voice-grade dialup telephone lines or dedicated voice-grade leased lines has been around a long time. It's not going to fade away overnight. But with the shakeout of the AT&T divestiture, the cost of using the old voice-grade analog lines is rising rapidly. Many managers can no longer afford to do business in the old way and are looking for new options.

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Data-comm Hardware

(Continued from page 191)

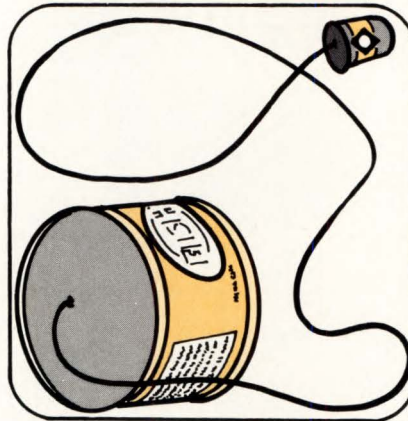
to digital by focusing on the products most important to the success of your operation. It's important to remember that all-digital communications requires special hardware.

Three product categories of paramount importance to all-digital communications are: T-1 multiplexers, with very cost-effective, high-speed T-1 carrier links that transmit data at 1.544 million bits-per-second (Mbps); packet assemblers/disassemblers (PADs), for linking your terminal equipment to X.25 packet-switching networks; and data-service units (DSUs), for accessing AT&T Communications' (relatively) high-speed, all-digital Dataphone Digital Service (DDS). There are many other hardware products available, but familiarity with these three categories should provide a basis for determining your needs in the all-digital era.

With the shakeout of the AT&T divestiture, the cost of using the old voice-grade analog lines is rising rapidly.

The multiplexer, or "mux," is a communications condenser. Instead of requiring many separate lines for 9,600-bps or lower-speed communications channels, all these lines can be bundled into a T-1 mux. Then, by means of time-division multiplexing (signals on the trunk line of the mux spaced at different intervals), the T-1 enables the user to send as many as 128 9,600-bps transmissions simultaneously over a single line. The price for a single T-1 link is high, but it's a lot cheaper than the cost of all those 9,600-bps links.

There are different ways to use T-1 channels. Some users will want to employ T-1 channels for long-distance communications over several hundred miles or more. This is still an expensive option. What's more immediately cost-effective is the use of T-1 transmission in local-area networks (that extend throughout a single building or



a campus) or metropolitan-area networks (MANs) within a geographic range of no more than five to 10 miles.

Long-distance communication is heavily tariffed, and the T-1 muxes specially designed for this type of communication are more sophisticated to optimize its use. However, the long-distance mux uses more bandwidth on instructions for the machine, so less bandwidth is available for the actual transmission of data. A short-range mux, less expensive and less elaborate, is suitable for a company that doesn't make many long-distance calls.

"T-1 is the only standard"

"T-1 is so important because it is the only high-speed standard that exists today in the United States," says Ashok Dhawan, assistant vice president for switch and network products at Micom Systems Inc. (Chatsworth, CA). Dhawan points out that the number of data terminals and the volume of data to be transmitted have grown exponentially in the last few years, making new modes of handling the data imperative.

A cautious comparison

The First Tennessee Bank (Memphis, TN) will soon be able to offer a valuable perspective on the comparative effectiveness of various mux units. This multibillion-dollar (in assets) bank with over 120 branches is the largest in Tennessee.

Harry Waring, a network-research specialist at First Tennessee says, "We're conducting an evaluation of vendors of T-1 muxes. Rather than

testing the equipment in the lab, we found a real-life situation in our network." Waring's group administers two locations equipped with advanced Rolm computerized branch exchanges (CBXs) that are 30 miles apart. Formerly linked by 10 tielines and 10 off-premises extensions, communications on the link have now been consolidated into one T-1 line. "It's perfect for running T-1 mux tests," says Waring.

Waring plans to test T-1 muxes from a variety of vendors on the test link. Digital Communications Associates' Netlink, which costs \$3,800, was the first T-1 mux to be tested.

Although he ultimately intends to use T-1 communications for both voice and data, Waring currently uses the link between the CBXs to carry only digitized voice, with one exception: "I occasionally slip a data card

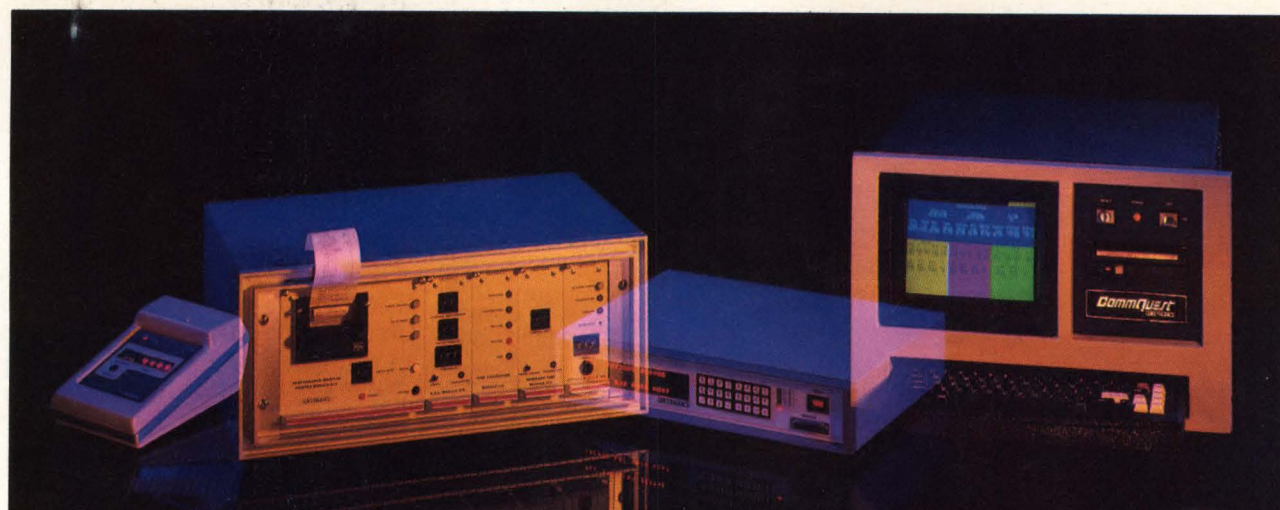
"The all-digital T-1 has allowed us to replace hard-wired lines and eliminate many modems."

Merrill, General Electric

into each Netlink mux and send 'pseudo-data' over the line for test purposes. This gives me some idea of what my experience with real data would be," he says. Waring is also considering installing video on future operational T-1 links.

The trials showed that Netlink was an effective unit, but not without shortcomings. "The voice quality of the digitized-voice transmission was terrible," says Waring. "The balance was off, and DCA had to come in and do some fine-tuning. Then, the voice quality was fine."

Waring is enthusiastic about the ease of setup. "Four hundred miles from either end of the 30-mile test link, using a dialup line, I am able to downline-load all configuration changes to the T-1 muxes automatically," says Waring. "I never touch the Netlinks. Moreover, if there is a problem I can't resolve, I can call



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Data-comm Hardware

(Continued from page 194)

DCA and they can dial into the mux directly."

Now that he has worked out his test procedures, Waring is looking forward to evaluating other T-1 muxes: "Most units on the market would meet our needs, but there are certain shortcomings that this kind of testing exposes. In the end, we'll get the most efficient, reliable, and cost-effective units for our needs," he says.

Plenty of flexibility

The new T-1 muxes have great flexibility. General Electric's Simulation and Control Dept., a division of the Aerospace Group, employs a number of Instatrunk480 T-1 muxes from Micom Systems Inc. in its Daytona Beach, FL, facility. According to Don Merrill, advanced computer-techniques analyst, the 480s are used at either end of a 2,300-foot Gemlink microwave connection (from GE Microwave Products) between two buildings on the GE campus.

Packet switching enables communications resources to be used at their absolute capacity.

"The Micom 480s have worked out well," says Merrill. "The all-digital T-1 connection has enabled us to replace a lot of hard-wired lines and eliminate many short-haul modems. We haven't run any cost analyses of the new T-1 link, but we did get rid of a lot of superfluous data-comm hardware." Prices for the Instatrunk480 in a 32-channel version start at \$3,200.

According to Merrill, the 480s are used for data only (no digitized voice) and are tied in with two Micom Micro600 Port Selector data PABXs. "We've just put in a second T-1 link—this one is a hard-wired connection—and we have an appropriation for another Gemlink microwave T-1 connection," says Merrill. The price of the larger version of the Micro600, with a 1,500-line capacity, is about



Through advanced design techniques, the installation, operation, and maintenance of T-1 multiplexers no longer requires sophisticated test instruments and technical personnel.

\$10,000.

Racal-Milgo (Miami) has introduced a T-1 mux that offers additional cost savings and convenience to users of high-speed digital networks. Called Omnimux T-1, it mixes digitized voice with asynchronous and synchronous data for efficient high-speed transmission. It combines many data and voice channels over wide-band circuits operating at 1.544 Mbps. Media used include cable, microwave, satellite links, and fiber-optics.

Omnimux T-1 permits soft-configuring and downline-loading of network functions. It supports voice channels with bandwidth requirements of 16, 32, 48, and 64 Kbps, as well as all standard data channels having data rates from 110 bps to 460.8 Kbps. It accepts independent transmissions from a variety of data-terminal equipment operating in the same network. Central-site network management and control are also pro-

vided from a supervisory console.

Pricing depends on configuration. For example, an Omnimux T-1 with 44 channels in a single chassis to support RS-232C synchronous data costs about \$35,000. A unit with 96 channels costs about \$70,000.

Inside a packet net

There are an many options available to meet expanding telecommunications networks. One of the best options is X.25 packet switching. Packet switching has developed as a telecommunications method with vast potential. Since it enables communications resources to be used at their absolute capacity, packet switching can be applied to a wide range of user services and needs.

A packet-switching network works by a "virtual" circuit between the transmitter and the receiver. The message is broken up into "packets" of no more than 256 bytes in length, each encapsulated in an X.25 format. Various packets of the same message may go by different routes, depending on which is the most expedient route at the moment. This feature produces the most efficient, cost-effective use of network resources, provided that the network is large enough to offer many alternate transmission routes and can carry a number of messages simultaneously.

The term X.25 defines the interface standard between a packet-switched network and a data-terminal device located off the network. It's also possible to connect a large, completely different non-X.25 network to a packet network with a PAD.

Managers will choose packet transmission over dialup or leased lines when there are enough stations to justify its use because it is more reliable, more cost-effective, provides higher data rates, and offers more security. Packet transmission is superior to leased lines where the average volume of data transmission is not high enough to justify the cost of a leased line.

To use X.25 packet switching effectively, you will probably need a PAD. PADs come in different varieties,



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Data-comm Hardware

(Continued from page 196)

each capable of receiving different types of data. Some, for example, receive the output of asynchronous terminals and format it for X.25 transmission.

A PAD is a type of protocol converter. Whatever form the data stream takes coming into one side of the PAD (from the terminals), the PAD will encapsulate it in an X.25 format and send it through the packet-switching network (whether it is a public or private network), allowing the user to employ that specialized packet network to transmit data.

There are many other possible inputs to a PAD. For example, many PADs can accept baud input from slow-speed Teletype machines. PADs can also be set up to accept synchronous 3270 or SNA/SDLC inputs, where the user's network consists mostly of IBM equipment. Or, the data input can be from a host computer.

According to Paul Singh, assistant vice president of X.25 products at Micom Systems Inc., packet switching is reaching a peak level of development today partly because AT&T is pushing its packet offerings very hard. Also, the regional operating companies (ROCs) left by the AT&T di-

vestiture are aggressively setting up X.25 networks and will have public X.25 offerings in the near future. Many of the ROCs are operating in-house X.25 networks that will soon be offered to the public.

In addition, with a PAD, users can send packet transmissions by interfacing to any of the major value-added networks (VANs), such as GTE Telenet, Tymnet, Uninet, or Canada's Datapac.

With DDS you get end-to-end digital transmission with improved reliability, error control, and security.

There are critical decisions to be made before selecting a PAD. Singh says, "In selecting a PAD, you should look for one that won't require re-writing applications programs. This is very important if expenses are to be kept low."

According to Singh, PAD savings may be lost if the user incurs a high operational cost. "To avoid this, make sure that the PAD you select has ex-

tensive network-management capabilities that allow you to manage a remote PAD from a central site," says Singh.

PAD network-management systems, offered by some of the PAD vendors, are specially designed for use with PADs. With a good PAD network-management system, says Singh, "There shouldn't be any need to dispatch expensive technicians to trouble areas."

Quick payback

Quick investment returns are possible when PADs are installed to access a carrier-packet network. Michael Stieger, MIS director at Liquid Carbonic Canada (Toronto), reports that within six months his two MX24 and four MX8 PADs (for remote sites) from Timeplex paid for themselves.

Stieger's group is leasing the equipment with an option to buy. Purchase price for each MX24 is under \$4,000 in the basic setup or \$5,500 in the setup Stieger uses. The four smaller MX8 units start at \$1,750.

What costs did Stieger's group recoup so quickly? Stieger explains that there were the cost of the muxes, the Datapac access charge (\$100 per month), the variable Datapac usage charge, and the "hidden" costs of minor adjustments to the system software (perhaps 150 work-hours).

For the most part, Stieger's shop is all-DEC. Dumb asynchronous terminals, such as VT-100s and VT-52s, access a VAX-11/780 supermini host. Packet communications are via Datapac 3000, the transcontinental packet network operated by Bell Canada.

Stieger faced a dilemma in installing the new PADs. He wanted to take advantage of X.25 packet communications, but he did not want to alter his present software or application code. He also wanted all his future software to take advantage of X.25.

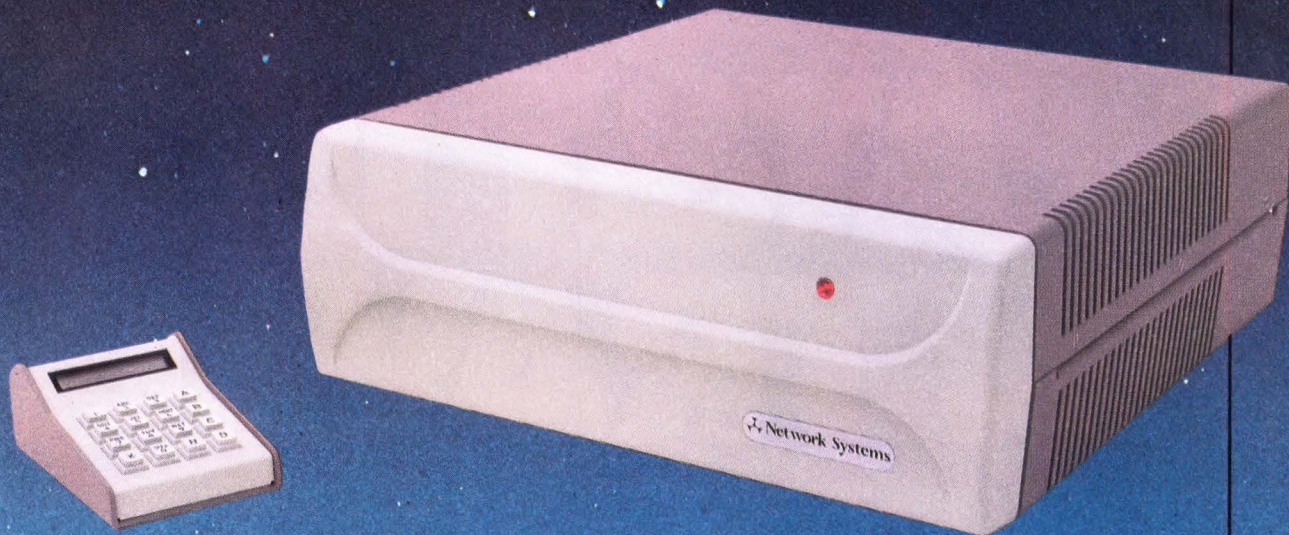
To make these changes, Stieger needed to understand the software parameters in the Timeplex PADs. "Timeplex helped, but we had to do a lot of the basic work ourselves. Time-

(Continued on page 202)



The Netlink, which costs \$3,800, provides multiplexing for networks that have a variety of data, voice, and/or video requirements.

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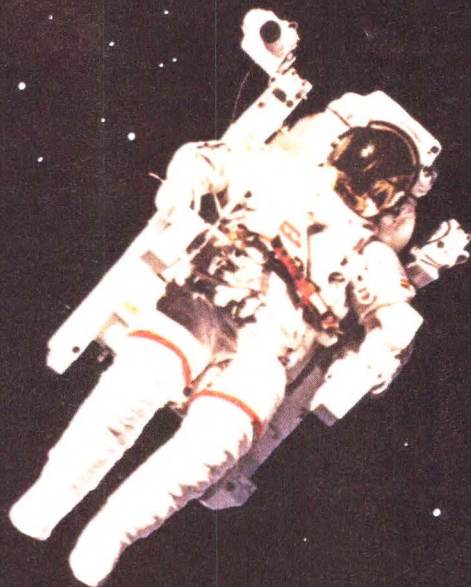
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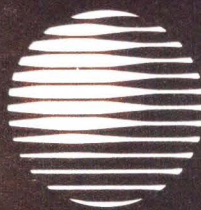
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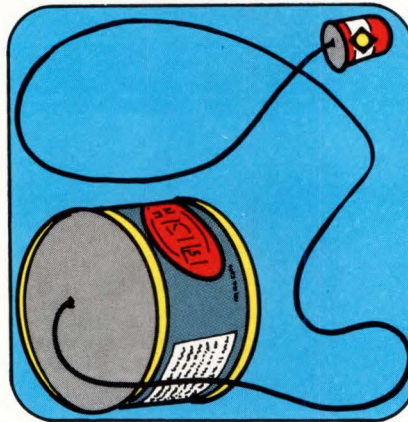
AT&T

Data-comm Hardware

(Continued from page 198)

plex should prepare more documentation on how a DEC shop can access X.25," he says. Stieger adds that Timeplex supplied sophisticated line-monitoring equipment that Liquid Carbonic needed and also ran remote diagnostic tests over the phone lines from its Woodcliff Lake, NJ, headquarters.

Why did Stieger choose Timeplex? One consideration was that Bell Canada uses Timeplex PADs as standard equipment. Stieger's group also looked at Micom, Memotec, and Gandalf PADs. "The support for the Memotec PAD was not good. And we couldn't get the Gandalf or Micom units running to our satisfaction," says Stieger. "The only alternative was Timeplex. So far, this implementation has been



a success."

With the rise in the cost of analog communications lines following the AT&T divestiture, managers began looking for easy ways to get into all-digital communications. Data-

phone Digital Service (DDS), a product of AT&T Communications, is one possibility.

DDS offers users the choice of four all-digital transmission speeds, 2,400-, 4,800-, 9,600-, or 56,000-bps. Since the communication is all-digital, no modems are required to translate the digital-terminal output into an analog signal. What is needed is a Data Service Unit (DSU) to translate the terminal's signaling into the bipolar signaling used on the DDS network. And, if you're staying with AT&T, you'll have to buy or lease your DSUs from AT&T Information Systems (not AT&T Communications). They can also be purchased through a local operating company or from an independent vendor.

Digital data-comm hardware

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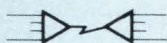
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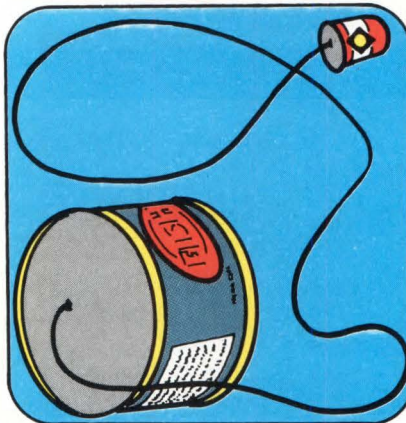
Data-comm Hardware

(Continued from page 202)

Before August 1983, a second box was also needed to access DDS. This was the Channel Service Unit (CSU), supplied as part of the telephone company's charge and used for diagnostic tests by the phone company. Since then, however, new standards have required that the CSU be integrated with the DSU in a single box, to be installed on the user's premises. Accordingly, all DSUs sold or leased today are actually DSU/CSUs.

Why should you consider using DDS? Chances are your communications are not carried via digital carrier trunks, operating at T-1 or higher rates, but your local loops are probably still analog. With DDS, however, you get end-to-end digital transmission, with improved reliability, error control, and security. Digital circuits also bring you a quicker response time. And with DDS, a multidrop line can be polled instantaneously. On an analog line, more time (perhaps many milliseconds) is required to perform this function.

A new wrinkle in many of the available DSUs (or DSU/CSUs) is that they include some measure of intelligence to facilitate more effective network diagnostics. All DSUs are capable of responding to central-site test and measurement equipment used by



the phone company as part of its DDS service offering. Some DSUs provide extra diagnostic features in addition to those required by the phone company. More extensive light displays on the front panel (for showing status of the circuit and the interface) are one such feature. Additional loopback switches for running the user's own diagnostics are another. These features may include automatic anti-streaming, multipoint status and lock-out, and bit-error-rate testing (Bert).

Another important DSU feature, according to Bob Hendee, marketing vice president at General Datacomm (GDC), is a capability for close integration with an appropriate network control or network-management system, such as GDC's Netcon. Says

Hendee, "We tie in our DSU's diagnostic features with those of Netcon. This can be very cost-effective." (See the feature on network control in the August 1984 issue of *Computer Decisions*.)

DSU intelligence may be used in other ways, in addition to diagnostics. The Models TP-501 and TP-557 from Teleprocessing Products Inc. offer a special telemetry-type capability in which output from the device can be used with a special lead to perform certain remote-control functions, such as turning the lights on and off at a bank's unattended automated teller machines.

The stand-alone version of the TP-501 (for subrate speeds) is priced at \$1,025; in rack-mount version, at \$865. The TP-557 (for the full DDS data rate of 56 Kbps) sells in stand-alone version for \$1,095; in rack-mount version, for \$890.

One effect of the AT&T divestiture, besides stiff increases in the cost of analog transmission, has been a big backlog in digital-line orders. AT&T Communications has been unable to fill some digital-line orders for almost a year. Users have had to make do with whatever they already had while waiting for DDS and T-1 lines. Whatever the benefits of the divestiture, this has been one of the drawbacks.

Making your move

Suppose you realize the advantages of going all-digital, as with DDS, but you're wondering when to make the change. Are there any guidelines? While this is a relatively new field, there are a few points that might be helpful:

- You can move to digital when the contracts on your analog equipment and lines run out.
- You should conduct extensive cost studies *before* making the move.
- You might want to make the changeover when acquiring new, upgraded hardware. (For example, if you needed to acquire new circuits, you might consider all-digital.)
- You can save money by making the move to all-digital when new tariff

(Continued on page 211)



Here, an emulator is being used to test the SP/8200 and MPAC 2000 async PADs.

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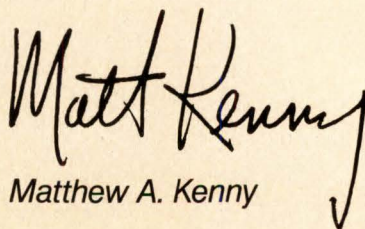
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Matthew A. Kenny

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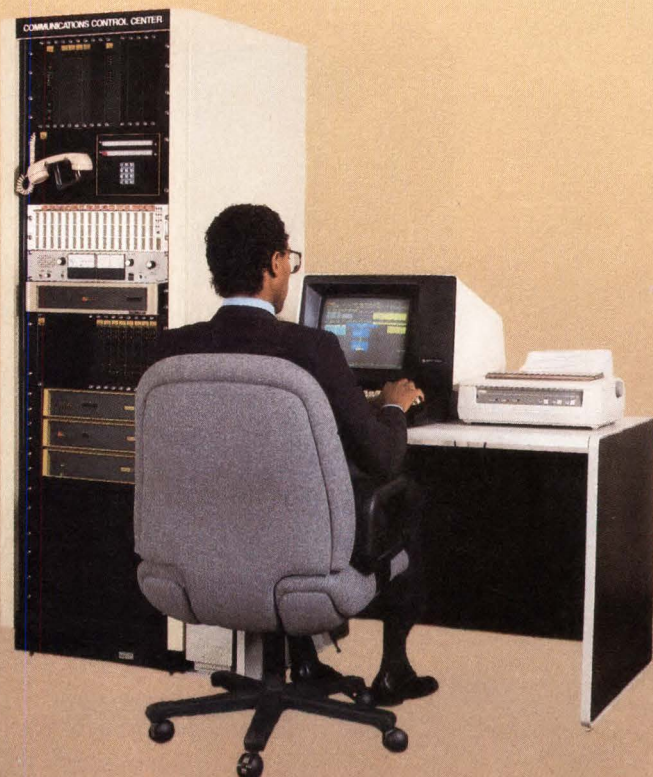
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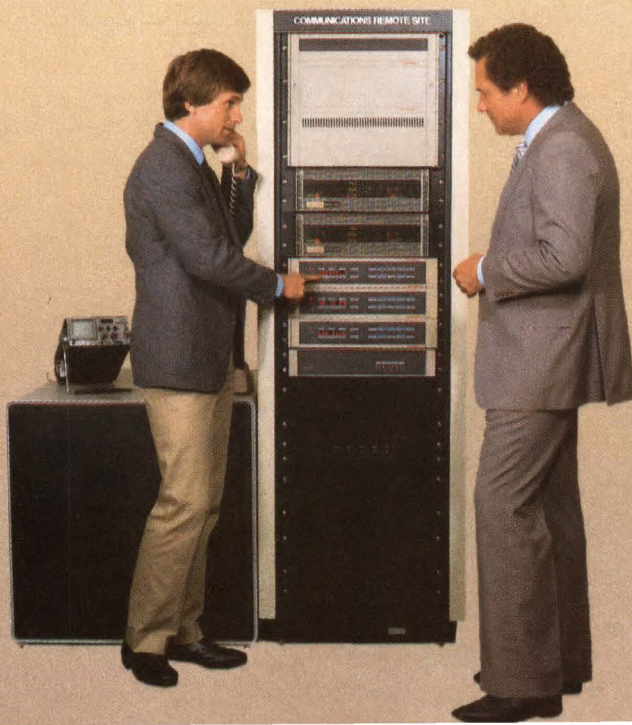
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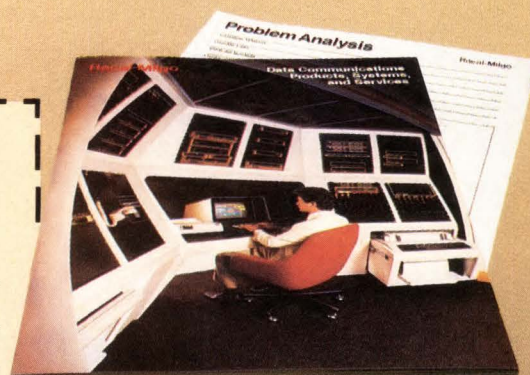
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RACAL

Data-comm Hardware

(Continued from page 204)

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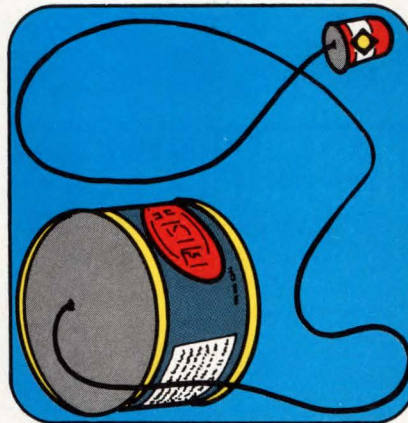
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Some managers are moving into all-digital communications as fast as circumstances will allow. Terry Travathan is a Woodland Hills, CA-based data-communications supervisor at Blue Cross and Blue Shield of Southern California. Travathan is in charge of a network that connects over 140 hospitals and related facilities. At this time, Travathan's communications-line mix is about 60 percent digital and 40 percent analog. Some lines are multi-drop, and some are point-to-point. However, he has \$150,000 to spend to convert 15 additional circuits from analog to digital, and his goal within the next year is an all-digital network, emphasizing DDS.

"All-digital is cheaper in the long run," says Travathan. "It's more efficient, more error-free, and the phone company maintains all-digital better. The latest tariffs on DDS place it in the same price bracket as dedicated analog lines—and you get all the reliability and error-control benefits."

Travathan explains that he was working with several Model TP-501 DSU/CSUs from Teleprocessing Products Inc. (TP), and he was so satisfied that he now has 20 on order. "Before placing the order, we checked out several competing products, including the General Datacomm Model DC 500A/SR (for low speeds) and the Model DC 500A/56K (for transmissions at the maximum DDS rate of 56 Kbps). We found that the logic was better on the TP unit and that the visual display was also more user-friendly."

There were problems, however, with the TP equipment. A malfunction due to faulty soldering shorted out one of the TP boards and burned out a power supply for 16



cards. "But service and replacement were fast and efficient. TP also reengineered the product so that the same malfunction, if it happens again, would only take out four cards."

Another user that opted to buy its DSU/CSU equipment was Cigna, the Philadelphia-based insurance carrier. Rich Batchelder, senior technical consultant at Cigna's Windsor, CT, data center, says payback is estimated within 18 months. "In the long run, it's cheaper to buy, either from AT&T Information Systems or, as in our case, from an outside vendor such as General Datacomm. GDC was the only non-AT&T vendor who could deliver DSU/CSUs when we were ready to move."

Prices for the GDC units are \$995 for the DC 500A/SR (for the subrate speeds under 56 Kbps) and \$1,050 for the DC 500A/56K (for 56-Kbps transmission).

Batchelder has absolutely no complaints with the GDC product: "Plug them in and they run. And they're flexible. You can run a GDC unit on one end of a line and an old AT&T Information Systems unit at the other end, and the DDS line will run fine. You don't have to change your whole network overnight—you can do it piecemeal," he says.

Many versions of DSUs, T-1 muxes, and PADs are now available. Getting an all-digital network up and running does not present the problems it did in the past. It's time to consider the opportunities for implementing an all-digital telecommunications network that is more reliable, secure, and cost-effective. □

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MATCHING WORKSTATIONS TO EXECUTIVE STYLES

Successful executives know how to make the most of their individual work styles. Now they can apply that personal touch to their personal computing.

by David Kull, Software Editor

Most problems that executives face have any number of possible solutions but only one correct answer. The approaches decision-makers take toward analyses, therefore, can be as individual as their tastes in shoes. Workstations with electronic information-processing capabilities that

support executive deliberations will be most effective when they match each decision-maker's thinking and working styles.

Researchers have identified a variety of thinking styles that work in numerous combinations. For example, many of us think in images and

translate our thoughts into words or numbers. Some say we all think in images. Some people, however, don't visualize well or prefer verbal or numerical analyses. One theory of problem-solving contrasts those who tear apart a problem, examine its parts, and put it back together again



Photo by George Hausman
Shoes courtesy of Stadler-Florsheim, N.Y.C.

with those who'd rather look at situations only in their entirety. Another theory relates "multidimensional" thinking, the ability to consider several aspects of a situation and many potential outcomes at the same time, with successful decision-making. (See "Suite smarts.")

The variety of working styles, unlike thinking modes, can be easily observed in a stroll along the typical corporate corridor. The cluttered desk in one office contrasts with the neat-as-a-pin appearance of another, while the rolled-up sleeves of one executive differ sharply with the buttoned-up collar and straightened tie of another.

Executives know their own working styles well, having spent most of their lives evolving them. Similarly, most have insight into their thinking styles, at least knowing how they like to approach problems. Can an information manager who advises executives about personal-computer software or who builds corporate systems for them customize operating characteristics?

"Ideally, individual users should be

able to tailor the system, changing its personality to suit their own," says Donald A. Norman, professor of cognitive science at the University of California, San Diego. Designing systems to fit specific styles would be futile, he points out, not only because there are so many personal styles, but also because an individual's mood can change. An executive might feel super-efficient one day and slow-paced the next, for example. The executive should be able to adjust the workstation to fit the mood, Norman contends.

Norman points to a system's command format as a starting point for individualization. Menus of command choices inform the new or casual user of an application's capabilities. Menus require time to use, however, and eventually may impose barriers between users and their computing. The alternative approach lets the user direct the computer to the specific task. Systems can provide both methods, allowing users to choose between them, depending on their familiarity with the application or task, or

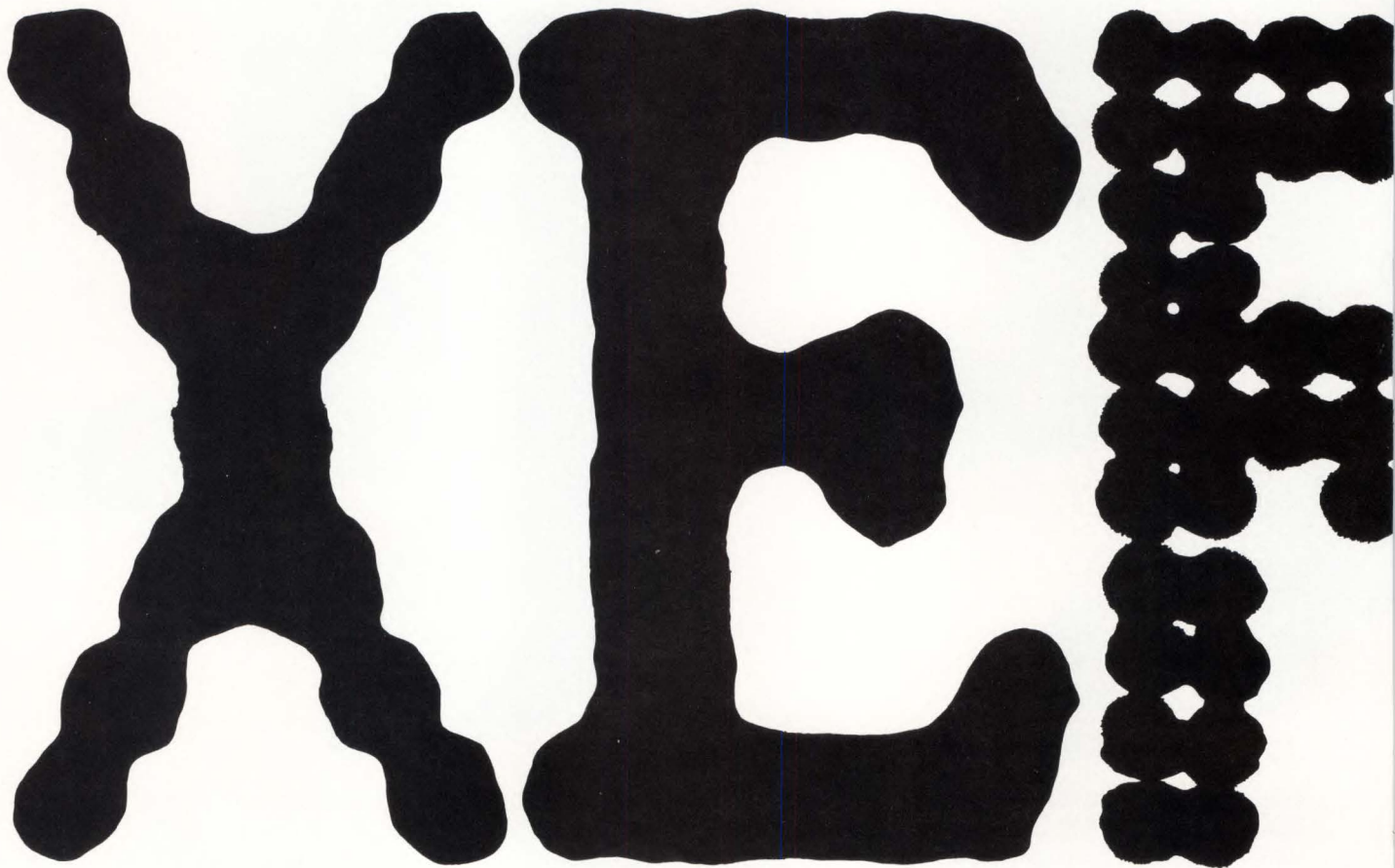
on their mood at the time.

The commands themselves can also provide a fundamental level of individuality. Norman points out that his Unix-based workstation allows him to create his own commands for manipulating applications, including a calendar, electronic mail, and word processing. The Unix command-customization feature may require more technical expertise than most executives possess, Norman says, but providing this capability via an easier-to-use vehicle is a worthy goal.

A system's "chattiness," the amount of feedback and operational messages it provides, like a human assistant's "chattiness," should conform to the executive's desires. Systems can "talk" users through procedures step by step, keeping them informed of every operation along the way, or they can quietly go about their business, providing results only. Ideally, Norman says, the system will allow the user to find the point between those extremes that's most comfortable—and then to adjust the

(Continued on page 216)

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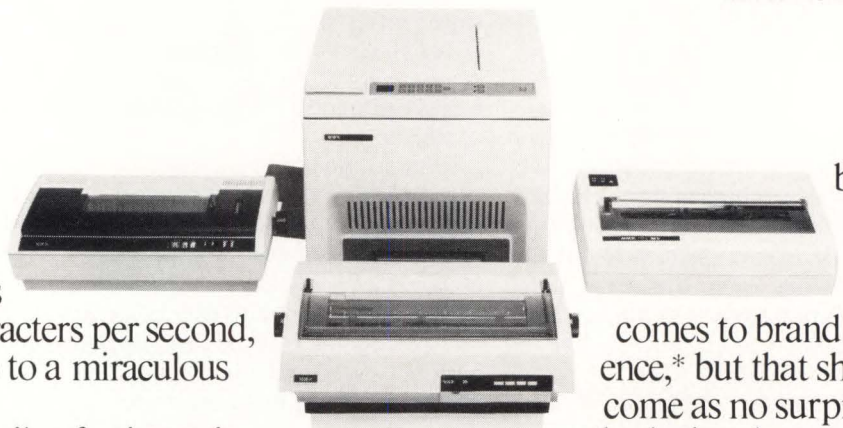
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Executive Workstations

(Continued from page 213)

chattiness level as his or her needs change.

The computer's manner of communication—verbal, numeric, graphic, or pictorial—should also be appropriate to the job and the individual's style. Visual displays that are consistent with the user's established ways of looking at things work most effectively. For example, an executive accustomed to a monthly desk calendar with the days arranged in seven columns by five rows may have trouble adjusting to an electronic calendar that lists dates vertically.

Some newer personal-computer systems, such as Apple's Macintosh, use symbols to convey some concepts

that may be expressed as easily in words but perhaps are not grasped as readily. For example, the user sees a wastebasket on the screen and understands that unwanted information can be tossed into it. The user might have to think twice about the meaning of the word "delete." Some executives, however, feel patronized by these efforts to make computing simple for them.

The choice of the computer's form of communication depends not only on the user's preferences but also on the message. According to Kent Norman, associate professor of psychology at the University of Maryland, graphic representations of values are

frequently superior to numeric ones. "The assignment of numbers to values is often artificial, and done only to gain the manipulative properties of mathematics," he points out.

This artificiality can be misleading. A comparison of three items might yield rankings of "one," "two," and "three," for example. An executive considering those rankings, however, might assume that the second item is twice as good as the first because its assigned value, "two," is twice as great as "one." A pictorial representation of the comparison, perhaps with images presented on the screen one above the other, would not project that ambiguity, Norman explains.

The gestalt thinker

Some executives, though, prefer to dive right into the numbers. It's a matter of style. Kent Norman identifies two other problem-solving styles—the analytical thinker, who dissects and analyzes every aspect of a situation, and the gestalt thinker, who looks at the situation as a whole. Most of the current personal-computing packages for executives support the first style, he contends. Electronic spreadsheets, for example, allow the analytical user to identify many individual elements in a problem as well as their relationships.

A gestalt thinker would benefit from help that comes from programs utilizing the opposite approach, that is, those that evaluate the executive's analysis. As the executive considers a series of alternatives, the computer presents information about them and follows the user's reasoning as he or she makes what appear to be intuitive judgments. The program points out those elements associated with the executive's changes of mind during the analysis. Norman doesn't know of any commercial packages that work this way. Modeling programs that allow "goal seeking" come closest to fitting the gestalt thinker's methods. The user can set a target figure for profits, for example, and ask the computer for various combinations of sales, prices, costs, and other elements that affect

(Continued on page 220)

Suite smarts

Success for executives doesn't depend so much on how smart they are as on how they're smart, according to a behavioral scientist at Pennsylvania State University's College of Medicine in Hershey, PA. Siegfried Streufert contends that traditional intelligence quotients don't correlate with good judgment, but a measure of how executives approach problems is a better indication of their effectiveness. Superior executives tend to think "multidimensionally," Streufert says, by simultaneously considering many interrelated factors and options. Those who consider only one goal and one course toward it at a time are less successful.

Streufert measures multidimensional thinking by having subjects work through a computer simulation of a complex international-business case. The program provides information about the situation and tracks the decisions the subject makes in response to it. The data, presented over several hours, describe various aspects of the case—for example, availability of raw materials, political instability, and exchange rates. The executive must make decisions

on a variety of factors—inventory, staffing, and so on. Those who think multidimensionally consider diverse data, relate decisions about each factor to decisions on the others, keep options open, and direct intermediate choices toward one ultimate decision.

According to Streufert, the computer's analysis of how the executive handles the simulation indicates his or her degree of multidimensional thinking. It also points out where in the problem the individual thought more or less multidimensionally. "Some executives think multidimensionally when they gather data, but not when they apply it," Streufert says. "Some handle information from outside the company multidimensionally, but not information that originates internally."

Some executives can overcome deficiencies that the test uncovers, Streufert claims. Others may be locked into their ways of thinking. In either case, Streufert sees the computer as a diagnostic tool, not as a cure. "An expert program can suggest solutions based on predetermined criteria," he says. "This is fine—as long as the world doesn't change."

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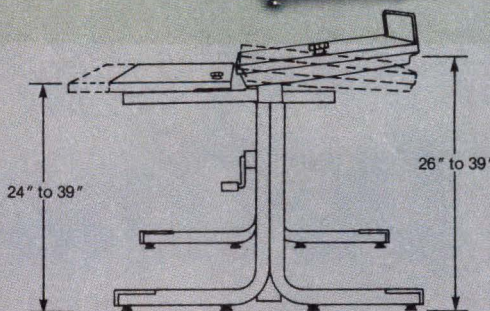
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Executive Workstations

(Continued from page 216)

the bottom line.

Just as executives vary in the amount of responsibility they're willing to delegate to subordinates, they also differ in the measure of trust they're willing to place in a computer program. The computer can provide three levels of support for decision-making—delivering information for the user to integrate, distilling the information according to rules stipulated by the user, or following built-in algorithms to postulate a decision. Workstation packages can provide any of these three types of help, or all of them, but a decision-support package might do even more.

Many executives like to follow their intuition. Since "intuition" usually incorporates well-grounded, if not well-defined, information gained during years of experience, they're usually safe in doing so. Kent Norman would like to see programs that enhance and elucidate the user's intuitive reasoning. As the executive works through

the decision-making process, the program would follow his or her reasoning, clarifying the rules and relationships that the user creates "on the fly" along the way. If the package provides built-in decision algorithms, it may also include a process for resolving differences between the executive's expectations and the program's results. The program would quantify

"Most decision-support systems operate as if they had all the information. That's not true."

Norman, Univ. of Md.

the differences and elicit from the user information to explain them. "Most decision-support systems operate as if they had all the information that exists about a problem," explains Norman. "That's usually not true."

One popular decision-support system, IFPS from Execucom, Austin, TX, allows users to challenge assumptions. For example, a situational model built by a staff planner represents a set of beliefs. The staff planner can build options into the program that allow the decision-maker to test those beliefs by posing "what-if" questions, testing the sensitivity of the model's elements to change, and varying the goals. This helps the user perform analyses more easily. Or, if the staff planner builds the entire range of IFPS options available into the program, more sophisticated users can rework the entire model, customizing their own analyses.

Executives will also differ in the amount of time and effort they're willing to invest in learning a computer system. According to Gerald J. Moran, vice president for research at Scudder, Stevens and Clark, investment counselors in New York, even the friendliest systems are not friendly

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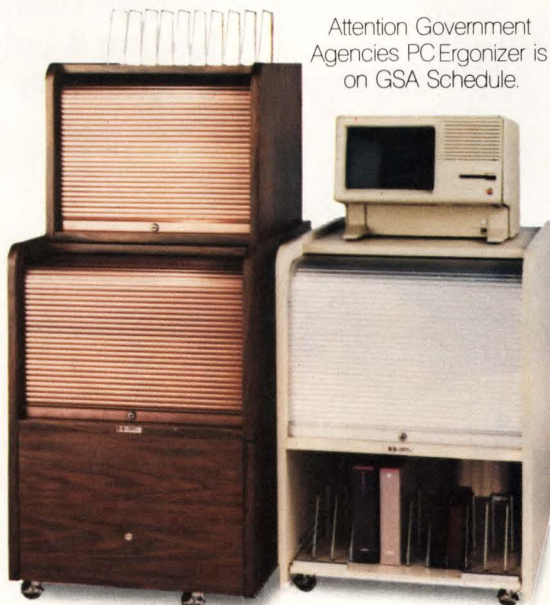
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Executive Workstations

(Continued from page 220)

enough for the older generation of executives. "Most of today's high-level executives will retire without ever having touched a keyboard," Moran contends.

It's possible that some of the older generation of executives may use a "mouse" pointer, of course. But the convenience of these devices does not address the underlying reluctance of executives to take up computing. Many simply don't want to spend their time learning a system, particularly if they'll use it only occasionally. And most systems won't be useful to the new or casual user who has difficulty remembering commands between sessions anyway. In Moran's opinion, financial analysts are more likely than other executives to put in the necessary time because computing is a more integral part of their jobs. Indeed, many decision-support packages were designed expressly for financial planners.

Moran sees some promise in per-



sonal-computer links to databases—maintained by the corporation or outside services—that give executives easy access to information they need for decisions. Dunsplus from McCormack & Dodge, Natick, MA, provides integrated applications that can tie into databases from Dun and Bradstreet and other sources, for example. Chase Econometrics, Waltham, MA, recently introduced a microcomputer

package, PC Planr, that lets a user download data from the Chase financial databases into personal-computing applications, including 1-2-3 from Lotus Development Corp., Cambridge, MA. Log-on procedures can be automated so that even the most casual user can master them. In Moran's judgment, however, even such popular packages as Lotus 1-2-3 present more technical challenge than the typical executive will accept.

Some vendors of sophisticated applications packages originally designed for professional planners have developed newer versions meant to provide beginners with an entree to computing. SPSS Inc., Chicago, offers a micro version of its statistical package, SPSS/PC, for example. And Execucom, Austin, TX, offers a microcomputer version of IFPS. Lloyd Bush and Associates, New York, whose Model program performs complex modeling on main-

(Continued on page 225)

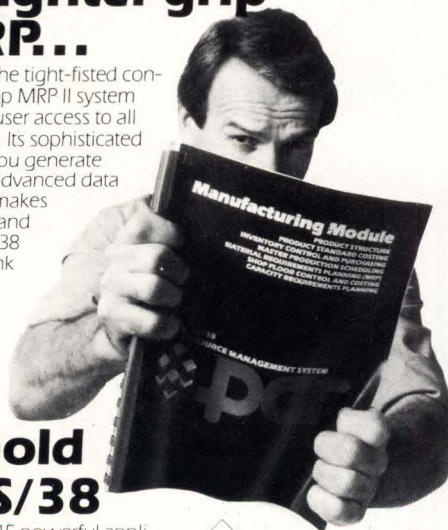
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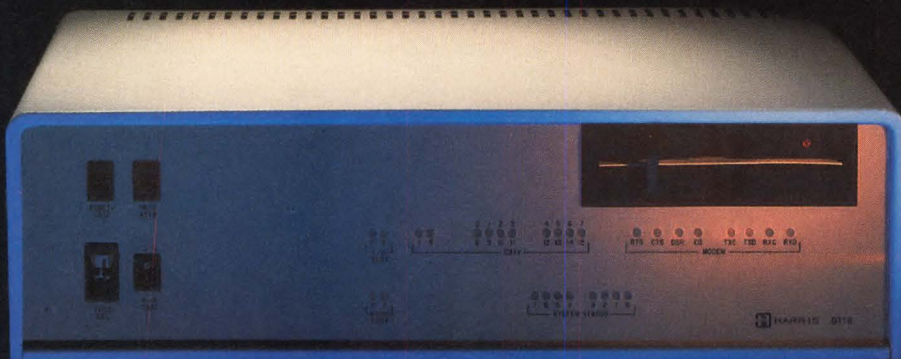
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Workstations

(Continued from page 222)

frames, offers two lines of personal-computer products that contain some elements of the more sophisticated Model. The microcomputer packages, Simple Basics and the Professional Model series, come with "self-starter" modules that lead beginners through application development with a series of prompts. If the user doesn't understand the prompt, online help explains it. When users become proficient with the system, they can bypass the prompts and move easily into the more challenging capabilities Model offers. If they tap the system only occasionally, they can continue to use the prompts.

Executives' needs vary so much that it may be impossible to design a generic tool that even most of them would find useful. Another approach would be to target tools to executives who perform specific tasks within par-

"Most high-level executives will retire without ever having touched a keyboard."

Moran, Scudder, Stevens & Clark

ticular industries. Metaphor Computer Systems, Mountain View, CA, is taking this approach with decision-support tools aimed at planners and decision-makers from the middle-management level up, not necessarily at senior executives. The applications programs, according to a company representative, help provide data in the forms decision-makers need—for example, providing sales figures to marketing managers by market rather than by state.

Meeting the information and computing needs of executives should become easier over the next few years. A new generation of decision-makers is developing its working styles in an age when computer terminals are as prevalent as telephones. As these new executives climb the corporate ladder, they will bring with them a computer literacy that will allow them to use the most flexible tools available. □

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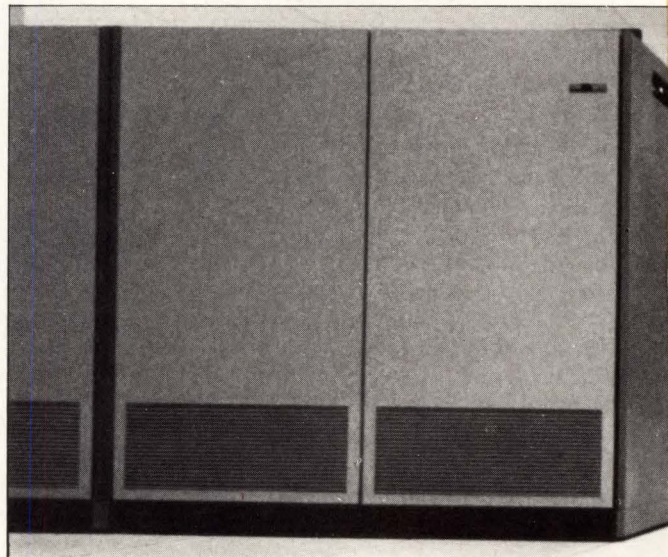
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TRAINING NEW USERS

With today's easy-to-use technologies, how much training do new computer users need? Probably a lot.

by David Roman, Staff Writer

With management's help (and sometimes without it) employees who have no prior experience with computers are getting computing power. Employees who use personal computers, fourth-generation programming languages, or other user-oriented information systems expand their organizations' computing power without expanding their data-processing staffs—an advantage every corporation welcomes. But end-user computing is a bonus *and* a burden. First-time computer users need careful guidance to learn even the simplest technology. Organizations must educate them or forfeit any return on their employees' new skills.

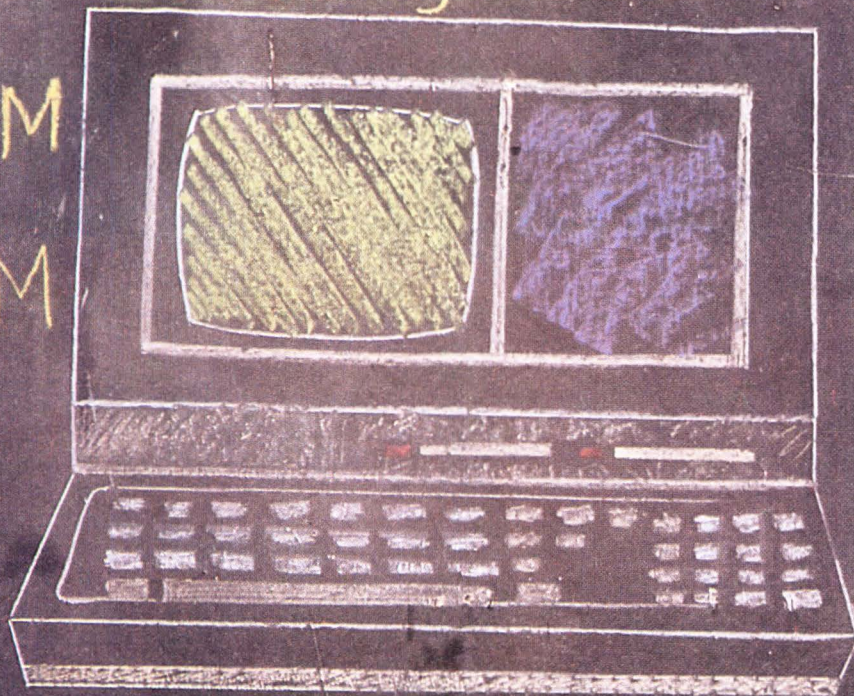
The personal computer is the technology



Integrated

RAM

ROM



Database

Photo by Rick Barrick



Training New Users

(Continued from page 231)

chosen most frequently by new computer users. Its ever-increasing powers are an enticing alternative to the services traditionally offered by a corporate data-processing department, according to Vicki McConnell, president of The McConnell Group, a training and consulting organization based in Palos Verdes, CA. "All those stories you've heard about the dp department are true. You can't get what you want—not on time, and not within the budget. So if organizations have the chance to buy \$5,000 solutions to their business problems, they're going to take them."

Computers, however, have a disconcerting effect on employees. "They're intimidating," says P.J. Cormier, systems analyst/user liaison at the polyfibron/industrial chemicals group at W.R. Grace & Co. in Boston. Fear of the computer is not easily overcome—certainly not by forcing employees to confront it. Apprehensive workers who are given personal computers and asked to learn to use them on their own are unlikely to do so, says Eric Vogt, president of Micro Mentor Inc., a Belmont, MA, consulting group that provides customized personal-computer training.

"They won't even bother trying," Vogt says. "They think the organization has created a system that's against them."

Vogt believes the high tech/high touch formula presented by John Naisbitt in *Megatrends* applies when educating new computer users. A new technology will be accepted, Naisbitt says, only if it's counterbalanced by a human response. In training, Vogt believes that response is the support offered to the new user. "It's a necessary component of learning," he says.

James Brockmeyer, manager of data-processing services at General American Life Insurance in St. Louis, discovered that he couldn't take people out of the training equation. Three years ago his organization brought in the Easytrieve fourth-generation language from Pansophic Systems Inc. of Oak Brook, IL. Easytrieve comes with a self-study course constructed around videotapes and a workbook. Brockmeyer thought the course would teach employees how to use the language. Employees thought differently. Brockmeyer recalls, "They looked at the course and said, 'We don't have any idea what this is about. You have to organize a class.' So I did.

It was very successful."

The class is still a part of Brockmeyer's repertoire. He emphasizes his and his instructors' availability to anyone who takes an in-house class. "We encourage students to call us if they have a problem," he says. "We'll take the time to help them through it." Cormier at W.R. Grace also stresses his accessibility. "We let users know that if they have problems or questions, we're there to help."

This kind of support is a key component of a larger plan corporations must have to control the introduction of technology to new users. As computing power is distributed to more users throughout the organization, managing each of the pieces becomes more difficult. "There's more technology in the hands of users now," Vicki McConnell says, "but there's less control over what they're doing."

Advantages of control

Training costs are easier to justify if they're controlled and coordinated, says Art Benjamin, president of On-line People Inc., a training consultancy in Willowdale, Ontario. "It's difficult to justify bringing someone in to develop a good training program if you're training on an uncoordinated, individual basis," Benjamin says.

Left to their own devices, new users may foil their employer's plans to make them more productive. "If there isn't a plan to train people how to use computers, they won't be able to use them," Benjamin says. "Even worse, they'll prevent the job from getting done. Instead of promoting progress, they'll block it."

Some organizations don't recognize their employees' need for help. They accept at face value the new technology's supposed ease of use and conclude that there's no need for computer training. "That's the easy way out," says Eric Vogt. "There's no risk. They just throw it back on the employees."

Personal computers and mainframe-based fourth-generation languages are supposed to be easy for

(Continued on page 234)



Eric Vogt, president of Micro Mentor Inc., offers personal attention to two marketing managers from General Electric's lighting group. Vogt believes personal support "is one of the necessary components of learning."

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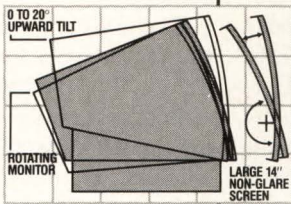
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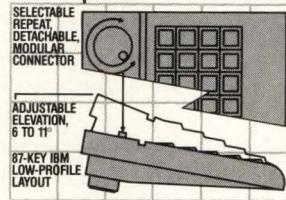
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Training New Users

(Continued from page 232)

nontechnical employees to use. How much responsibility should an organization take for training users? "The idea is that you give these technologies to the users and let them work on their own," says Nick Ziccardi, vice president and manager of end-user computing services at the European American Bank (EAB) in Westbury, NY. "If you have to put a lot of time and effort into a user's project, you might as well have the dp department do the whole thing. We're trying to avoid that. We help our users, but they're responsible for learning on their own."

EAB's approach is similar to those of other organizations with end-user computing programs. First, employees must be aware of what end-user products are available to them. "There has to be an orientation to the corporation's computing resources," says Art Benjamin. EAB, for exam-

ple, allows employees to experiment with personal computers, office systems such as word processors, and mainframe-based languages and timesharing services.

Next, employees must be taught enough about the technology they are interested in to make them independent users. Several teaching methods can accomplish this task. EAB favors stand-up lectures. Some companies offer secondary instruction to supplement their primary efforts. Brockmeyer at General American Life uses videocassette courses from Deltak Inc. to introduce new users to computers, but trainers are used as well. In-house classes can offer specialized training geared to that organization's practices. If a company isn't large enough to support such an effort, it can send its employees to classes at local computer stores.

An organization should first decide

how much time it wants to spend on an employee's training, and then choose its form. "Your training method depends on how much discretionary time your employees have," says Eric Vogt. "If they have a lot of time, you can give them a \$10 book to help them teach themselves. If they have less time and you don't mind spending more money, there are better ways to help them understand their computers."

The more valuable a worker's time, the more costly his or her education will be. For example, that \$10 book, although initially inexpensive, could be a costly teaching method if the employee's time is worth \$50 an hour and it takes the employee 40 hours to become proficient. Vogt charges about \$1,500 for each employee who attends Micro Mentor's three-day course in personal computing. The course is worthwhile, Vogt says, if the

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Training New Users

(Continued from page 234)

client company highly values its employees' time. At the completion of the course, employees are prepared to operate a personal computer on their own.

The purpose of any instructional method is to create new computer users. Nick Ziccardi believes that employees will apply what they've learned if the information they're taught is practical and applicable to the job. "Teach them how to apply a particular product to a specific business problem," he says. "If employees don't have a practical application for what you teach them, they'll forget it."

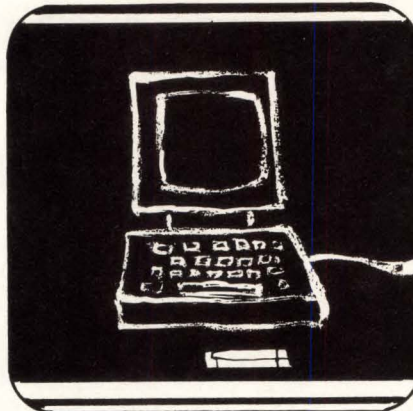
They may forget it even if it is applicable. That's why formal instruction shouldn't be the end of a new user's education. Many trainers believe it's just the beginning. "The biggest part of our job is the continuing support we offer," says Ziccardi. Once new users are left alone with their computers, even the simplest questions can become major obstacles. Companies must offer some form of support to their new users. This support is more important than which systems employees work on, according to Vicki McConnell. "I'd rather work in an organization that had me-

Left to their own devices, new users may foil their employer's plans to make them more productive.

diocre systems and an excellent user-support group," she says, "than one that had the finest systems in the world and no commitment to user support."

In many corporations, the data-processing department, frequently under the "information center" banner, is responsible for supporting new computer users. This may lessen the dp department's resentment when the company shares its power with non-dp employees.

James Brockelmeyer at General



American Life found that his dp department opposed the organization's end-user computing effort at first. When the Easytrieve language was first brought in, he recalls, members of the dp department "felt slighted." However, after they had provided support to the new users, "they recognized that end-user computing would take the burden off them. They don't have to write those simple little query programs anymore."

Properly trained end users will relax their demands on the data-processing department once they're comfortable with their own computing skills. Robert Forney, manager of corporate computer services at Gencorp (formerly General Tire & Rubber) in Akron, OH, says some departments have learned to use mainframe-based languages so well that they are now "completely self-contained. The systems group never gets a request for help from them."

Gencorp offers training in several mainframe languages, primarily to instruct users to generate their own reports. "We've significantly cut down the number of service requests we get," Forney says. Although end-user computing takes some heat off the dp department, data-processing expertise is still needed to help support new users.

Forney began offering "awareness courses" on the user technologies available to Gencorp employees about five years ago. He says most of the employees have taken these courses. About 500 have gone on to courses at the next level and are now using mainframe-based languages. He now

offers follow-up courses on advanced features of these languages.

Forney concedes that the line between enough support and too much support is subtle. "We'll send a trainer to a department to work on a specific problem," he says, "but if you do too much of that, you're back to having dp do everything. We train people and then set them on their feet. If they're motivated, they'll learn to do it themselves."

At EAB, Ziccardi uses a similar approach. "We give users an alternative to traditional data-processing solutions to their business problems," he says. His group has taught about 100 EAB employees how to use the Focus fourth-generation language from Information Builders Inc., New York. The group offers end users constant but limited support, Ziccardi says.

Employees have to be as committed to learning as their organization is. Somewhere down the educational line, employees have to start putting the pieces together themselves. Their success, however, is still largely attributable to the training approach of their organization. "You can't shove training down their throats," Ziccardi says. "It doesn't work that way."

Ingersoll-Rand Co., the machinery

"We give users an alternative to the traditional dp solution to their business problems."

Ziccardi, EAB

manufacturer based in Woodcliff Lake, NJ, agrees with this philosophy, so it leaves employees to learn on their own. "No form of instruction is going to teach people how to use computers if they don't want to learn," says Brian Jordan, supervisor of data processing. Managers there are given vendor-supplied instruction manuals with their IBM Personal Computers. Vicki McConnell disapproves of this approach to training. "Documentation is not a substitute for training," she says. "You should never try to re-

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CIRCLE 117

Training New Users

(Continued from page 236)

place trainers with documentation."

Some employees who are given personal computers don't have any idea how to apply them. It's up to the organization to give them a clue. ANR Pipeline Co., Detroit, offers an introductory class. The half-day class reviews micro hardware and demonstrates several popular software packages. "We get people to think about how they can use a computer for day-to-day chores," Craig Wilson says. "We let them know that a computer is more than just a big adding machine."

At the introductory level, instruction has to be general. Wilson says his topics are rather broad, but they can be targeted to a specific department. "If there are people in a department who are using a personal computer for the first time," he says, "we'll give them a special training program."

Wilson's subsequent classes at ANR offer, on a rotating basis, instruction on particular software products. The European American Bank also offers introductory and follow-up classes, but the follow-ups are presented only after enough workers to fill a class request training.

However an organization trains its

new computer users, it must actively support their efforts. It's impossible to individualize each new user's instruction, but attentive support can approximate personal care. Different workers learn at different speeds, and an active support effort can compensate for their unequal paces. In many corporations, information centers can provide both training and support.

Trained end users will relax demands on the department once they're comfortable with their computing skills.

Wilson's staff at ANR Pipeline is part of the information center. Nick Ziccardi's end-user computing-services group at EAB oversees the information center. Whether part of the department or separate from it, the information center is usually responsible for supporting new computer users. The most successful information center, Art Benjamin believes, is one with an entrepreneurial attitude.

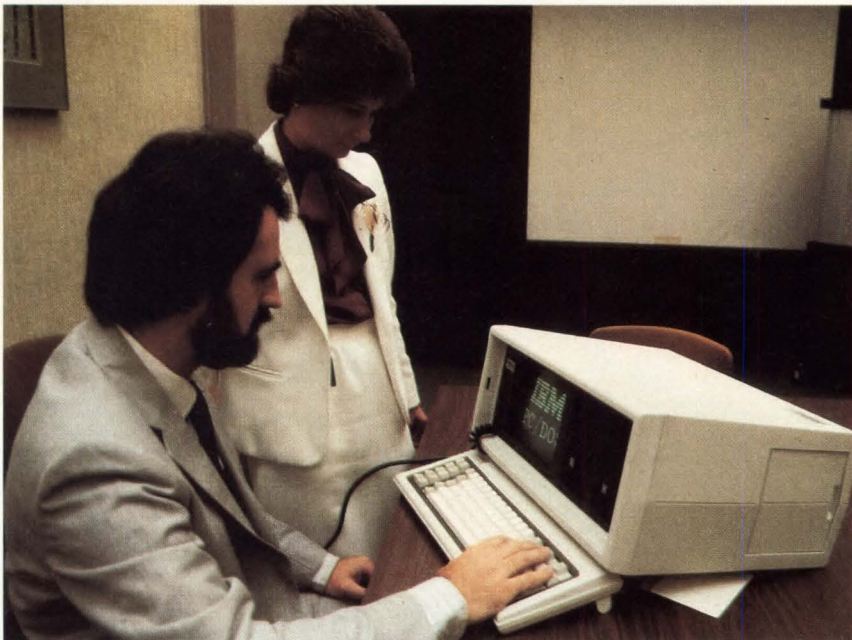
"One of the most powerful moves an organization can make," Benjamin says, "is to make the information center responsible for helping employees learn the equipment that's been brought into the company. The information center doesn't stand back and say, 'We didn't tell you to buy it, so it's your problem.' Instead, they say, 'What can we do to help?' If they have to develop a quick little course, they'll do it. If they have to provide some individual tutoring or arrange a workshop, they'll do that, too."

The right combination of instruction and support encourages users to expand and explore the computer's power. This can't be accomplished by teaching users specific applications, Eric Vogt says. He compares it to learning a new language. "Teaching a specific application is like giving students a foreign phrase book to learn a new language," he says. "They're hobbled. They have a certain level of knowledge, but that doesn't mean they can write poetry, give a speech, or even intelligently listen to the radio. It's much more productive to encourage them to be creative."

That's accomplished in the same way students are taught to be adventurous with a new language, Vogt says. His training class is the equivalent of "dropping people into the middle of Budapest and asking them to order lunch. You create a sense of urgency. People learn by solving problems, getting immediate feedback, and wanting to do more."

If your organization is a little slow in implementing an adequate training program for new users, it's never too late to take charge of training. "You've got to jump in and get the training under control," says Vicki McConnell. "If you don't, you pay the price of an untrained user. You're losing money."

Art Benjamin believes that most organizations have a lot of catching up to do with their training. It reminds him, he says, "of a quote from H.G. Wells: 'Human history becomes more and more a race between education and catastrophe.' That's really true for corporations today." □



Craig Wilson, supervisor of office systems, coordinates the microcomputer training efforts of ANR Pipeline Co. in Detroit. With him is Judy Plonka, microcomputer instructor. Wilson says his courses "get people to think about how they can use a computer for day-to-day chores."

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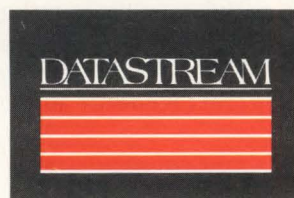
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APPLICATION

The NHL has a winning team with Memotec

The National Hockey League (NHL) has cut the cost of providing its staff with state-of-the-art data communications. With increased speed and accuracy, a computer-based X.25 packet-switched data network and Memotec communications processors coordinate the activities of 21 teams, organize an 840-game schedule, and maintain an ongoing information flow during the Stanley Cup playoffs and through the off-season.

Before installing Memotec MPAC 3X Plus, the NHL used a very tedious and expensive timesharing system to communicate between its offices in Toronto, Montreal, and New York. To add to the problem, each team kept its own statistics, which resulted in costly line, processing, and per-character charges.

"All the teams needed as much information as we could give them—especially in the area of statistics. But since many of them were not fully hooked into a computer-information network, the costs of full automation were hard to justify. We finally decided to institute the new system because even if we had been able to get everyone on-line, our old network configuration wouldn't give us much control over what we sent anyway," says Mario Carangi, the NHL's director of data processing and management information systems. In addition to league statistics, some of the NHL's on-line applications include: pension plans for each of the league's 114 employees; individualized insurance plans; general player registries;



Mario Carangi, NHL's director of MIS/dp, was "impressed by the MPAC 3X Plus' performance and efficiency."

official-scorer reports; payroll; referee and linesmen expenses; assignment and penalty analyses; and airline billing.

Because the league supplies publications and news organizations such as *Hockey Night in Canada*, the Associated Press, and *USA Today* with information from its Montreal database, it needed a communications-processing system that could easily interface with those of the mass media. According to Carangi, *Hockey Night in Canada's* requirements are so extensive that "they even spoke to us about developing a personal-computer network in every one of their broadcast facilities to obtain up-to-the-second results from our database."

After investigating several options, Carangi decided that the X.25 packet-switched data network would provide the league with a low-cost, high-performance means of entering and retrieving data. The system is also very flexible and user-friendly. The Memotec MPAC 3X Plus, which is used on X.25 networks throughout the world, was then installed in the NHL's Montreal office.

Unlike traditional point-to-point leased data lines, packet-switched networks use virtual circuits, not physical connections, between sending and receiving points.

Packet-switched networking allows the NHL to use the facilities of the Datapac network in Canada, as well as Telenet and Tymnet network resources in the U.S.A. "Before we installed our present equipment, our

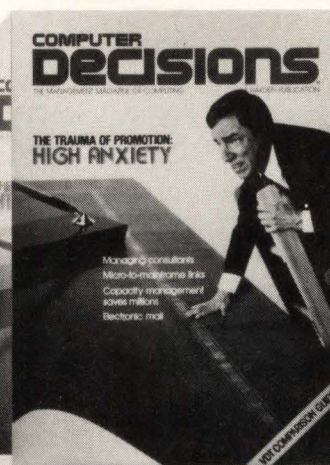
main goal was to find an effective way to communicate interactively," says Carangi. The league can now upgrade its facilities or add new locations easily, often without changing any part of its hardware and software.

The system also allows newspapers to call up NHL lines, access in-house statistics, and receive a set of results through an electronic interface. This information is automatically typeset and appears in sports sections across the continent the next day.

Another advantage of the X.25 packet-switching network is its ability to provide users with telephone-like access capabilities from any point in North America and many points overseas. These connections cost a few hundred rather than many thousands of dollars. Carangi estimates that his organization will save \$60,000 a year because of the new equipment.

"Our Memotec equipment provides us with outstanding service throughout our data-communications network," says Carangi. "I'm sure we will find many new uses for our network simply because our Memotec communications processors allow us to perform so many functions." *Circle 747*

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LETTERS

Ditto on consultants

Congratulations! "Managing consultants: Get your money's worth" [July] accurately described the major points—political issues, going over someone's head, changes in corporate structure, hidden agendas, client and consultant expectations, and staffing—which both client organizations and consultants need to be aware of. We have found that through periodic review and continuing open discussions with the proper levels of management, these issues can be effectively controlled. *Richard A. Savaiano*

Principal

Industrial Management Associates
Manhattan Beach, CA

Correct Kaypro price

In "Cost cutters" [July], it was mentioned that the Kaypro 2 computer may be purchased for \$1295 less \$300. This is a mistake. The price is \$1295, lowered from \$1595. *Linda Wright*

Public Relations
Kaypro Corporation
Solana Beach, CA

Sorry, wrong price

"Prototyping: Shortcut to applications" [June] contained an incorrect price quote for ADR/IDEAL, ADR's fourth-generation application development system. The correct price is \$50,000 to \$82,500.

Robert B. Gordon
Communications Director
Applied Data Research, Inc.
Princeton, NJ

Wang's unique twang

"Voice mail" [May] gives readers the incorrect impression that Wang Laboratories offers only small systems or systems that do not easily grow with a particular user's needs. In fact, the Wang Digital Voice Exchange begins with as few as four ports and can ex-

pand to as many as 128 ports easily and inexpensively. In addition, the DVX also simultaneously supports word-processing functions—a benefit unique to their system.

Cynthia Carriere
District Audio Specialist
Great Lakes District
Wang Laboratories, Inc.
Bloomfield Hills, MI

A friend in need

I am a very busy, one-man EDP department servicing over 20 users. Dibel-83 will improve my productivity significantly but I can't justify rewriting the more than 1,000 unstructured Dibel programs already in use.

I need a utility program to take my unstructured Dibel code and automatically produce structured Dibel-83 code. Is such a program available? Is anyone working on such a program?

I'm anxiously awaiting any information from you or your readers.

Dale Perozzo
Lafromboise Newspapers Inc.
Centralia, WA

Miffed DEC user

I read "Enhanced word processors: Looking more like micros," [July] with interest, and then with dismay at finding that Mr. [Rick] Cook made no reference to Digital Equipment Corp.'s DECmate II, either as a word processor which can function as a computer, a "selected word-processing vendor," or a word processor fully capable of communicating with other systems—mainframes, minis, or micros.

As a basic word-processing system, there is no better all-around device than the DECmate II. Slightly faster ones perhaps; more memory perhaps; "window" enhancements, yes; but more versatile, more user-friendly, better-supported, no.

The DECmate will interface by direct wire (or modem) with any system having serial ASCII output (or standard printer port). The package lets you match baud rates all the way up to 19,200 in any protocol or normal data-

bit configuration. We have, over the years, communicated with HP 3000, Radio Shack Model 4, typesetters—even a Sony Typecorder for offline key-boarding.

Equip the DECmate II with the CP/M add-on, and you have capabilities to program in COBOL or MBASIC, or run any of several dozen packages, including MULTIPLAN spreadsheet, relational database and accounting systems.

Wang and Lanier and IBM and Syn-trex are fine products, but if you wish to inform your readers properly, don't sell DEC short.

Peter W. Bennett
Manager of Technical
Communications
Fairbanks Weighing Division
St. Johnsbury, VT

Rick Cook's Reply: Mr. Bennett is correct, I did not mention the DECmate II in my article, nor the three dozen or so other brands of word processors that include the features he likes so well.

The purpose of the article was to discuss the ways that word processors can be used to do jobs normally associated with personal computers, not to compare word processors.

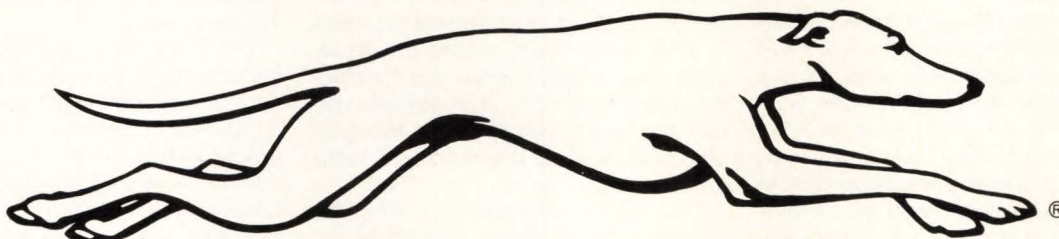
Sorry, wrong number

In "Presto! Mainframe computing gets personal" [June], you mention Logi-craft, Inc., a manufacturer of Card-ware—packages that allow DEC mini-computers to run PC-DOS, CP/M-86 or CP/M-80 applications. Logi-craft appreciates the publicity; however, Logi-craft's phone number was incorrect. For readers who want full information about Cardware, Logi-craft can be reached at (603) 888-4448.

Betty J. Pietrzyk
Direct Sales Manager
Logi-craft
Nashua, NH

Address letters to the editor to Computer Decisions, 10 Mulholland Dr., Hasbrouck Heights, NJ 07604.

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BOOKS

Further Up the Organization: How to stop management from stifling people and strangling productivity, by Robert Townsend. Alfred A. Knopf, 254 pages. \$15.95.

At first glance, one might not consider *Further Up the Organization* a serious managerial tool. But a closer look at Townsend's collection of scathingly irreverent observations, an A-Z guide to the corporate world, reveals a serious self-help book, targeted squarely at American mismanagement.

Actually, the 254-page book is a sequel to *Up The Organization*, written in 1970 by the same man who took a then-unknown Avis Rent-A-Car Corporation and transformed it into the world's most famous runner-up. Townsend's bare-bones approach to management, which was so revolutionary and vibrant 14 years ago, still rings true.

The book has 134 headings covering such topics as office romance (not a good idea), a new use for the office

suggestion box (make a birdhouse out of it), and "premature ejaculation" (marshal your support before starting a project). At times displaying cruel insight, Townsend rips away at the pomp and circumstance surrounding the corporate world.

Rather than a flow-chart exercise, however, Townsend intends his book to be a bubbling bromide for corporate indigestion to be taken liberally by chief executive officers and junior trainees alike. The author himself encourages flipping through the pages rather than reading cover-to-cover. And if you don't laugh or feel the need to kick your boss, throw the book away, he advises. Therein lies the chief strength of this book. It challenges you to think, gives you food for thought, and even makes the medicine taste good.

The author also gives us what he considers to be clean, simple truths. People, he maintains, are the most important consideration. When allowed to do what comes naturally, employees will work hard and well, resulting in

higher productivity and profits. A poorly managed corporation, however, uses only 20 percent of its employee capacity, leading to worker frustration, resentment, boredom, and, ultimately, psychological or physical breakdowns, he asserts.

Townsend also points out the value of direct contact and quick action. Go straight to the top if you want results—and do it right away before it becomes merely a good intention. In addition, all decisions should be made as far down as possible on the organizational ladder and as quickly as possible, without incurring waste.

Will this book guide you through an important merger? Probably not. But it might help you recall how things are supposed to work in the corporate jungle. After 14 years, Townsend's common-sense dictums and principles have a good shelf life. However, while this new volume packs 30 additional headings on current topics, it doesn't significantly add to the information offered in *Up The Organization*.

—John A. Mura



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CIRCLE 4

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SOFTWARE

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Tymshare, 20705 Valley Green Dr., Cupertino, CA 95014.
(408) 446-6000.

CIRCLE 275

Online library

Release 3.3 of the ADR/Vollie online program-development system for DOS/VS/VSE allows users to allocate additional online libraries. Permanent license price begins at \$14,700. Separate cpus can access the same online library. Other features include expanded editor and access by several levels of authorized users.

Applied Data Research Inc., Rte. 206 & Orchard Rd., CN-8, Princeton, NJ 08540.

(201) 874-9000.

CIRCLE 276

Unix-based APL interpreter

APL*plus/UNIX System is an enhanced APL interpreter and application-development system for 16-bit and 32-bit supermicros and minis running Unix. Price: \$1,495 to \$3,495, depending on computer model. Features include a shared-file system, nested arrays system, full-screen editing, and the ability to communicate with other computers.

STSC Inc., 2115 E. Jefferson St., Rockville, MD 20852.

(301) 984-5000.

CIRCLE 277

Language for PC

Nomad2, a fourth-generation language/database manager, now has a version for the IBM PC XT/370 as well as mainframes. The first five copies cost \$10,000, and each additional copy is \$1,000; evaluation copy is \$5,000. The micro can be linked to a Nomad2-equipped mainframe or can be used independently. Features include interactive procedural and nonprocedural language, financial

modeling, statistical analysis, and multilayered security.

D&B Computing Services, 187 Danbury Rd., Wilton, CT 06897.

(203) 762-2511.

CIRCLE 278

VM data manager

VMCenter offers complete control of system and operations resources for IBM VM data centers. The permanent license fee is \$27,500. It manages areas such as disk space, tape processing, system security, accounting and auditing, workload, and access to resources.

VM Software Inc., P.O. Box 985, Vienna, VA 22180.

(703) 821-6886.

CIRCLE 279

PC conversion

A conversion service migrates programs from the IBM System/34 or #S/36 to the IBM PC. Code is translated to the IBM PC/XT for use with California Software's Baby/34. The service provides the labor and tools to help potential Baby/34 users through the conversion process. It costs about \$5,000. Charges run about 20 percent of the original development cost and depend on the number and complexity of the programs to be converted.

Arkansas Systems, 8901 Kanis Rd., Little Rock, AR 72205.

(501) 227-8471.

CIRCLE 280

Project budgets

Capital Project Management System, for large-scale mainframes, monitors the progress of large-expenditure programs (such as construction projects) to ensure that funds are being spent properly. Price starts at \$15,000. It operates in both online and batch mode. It allows combinations, can combine expenditures to make one asset, prevents overcommitments and overexpenditures, keeps track of all allocated sums on a multi-phase project, and performs capitalization of interest.

Data Design Associates, 1279 Oakmead Pkwy., Sunnyvale, CA 94086.

(408) 730-0100.

CIRCLE 281

Development tool for Cullinet software

The Data Based Development System provides Cullinet software users with

tools and techniques for software development for each phase of a project, from business system planning to physical database design and program development. Priced at \$28,000, it features cataloging and cross-referencing, automated recordkeeping, and other utilities.

ETA, 7 Wells Ave., Newton, MA 02159.
(617) 527-8200.

CIRCLE 282

VM accounting

Version 1.0 of CA-JARS/CMS, the Virtual Machine Accounting and Chargeback System, supports IBM or compatible mainframes under VM. Price: \$10,000 for a 3-year lease. It can be used for reporting on VM machine usage and CMSBatch usage; project accounting; costing; and performance management.

Computer Associates, 125 Jericho Tpk., Jericho, NY 11753.

(516) 333-6700.

CIRCLE 283

VM/CMS scroll

With VMBrowse, users can browse and scroll VM/CMS reports in full screen mode on IBM 327X or compatible terminals. Permanent license: \$2,450. While data is scrolled horizontally or vertically by function keys, headings and descriptive columns are frozen on the screen. A function key also controls printing of the report. VMBrowse can be called directly from CMS or invoked automatically as part of a user-programmed production software system. It can also be used in conjunction with the IBM PC.

Southwater Corp., 30 Mowry St., P.O. Box 5314, Mount Carmel, CT 06518.

(203) 288-0283.

CIRCLE 285

Data analysis

Data-Mapper, for IBM and compatibles under OS, is a productivity tool for data analysis, data modeling, and logical database design. License fee: \$7,500. It can analyze data in Cobol Source code libraries; verify the accuracy and thoroughness of existing data models; reduce risks in data modeling; help change application-oriented files to subject-oriented databases; and facilitate the building of a logical/physical database design.

Data Administration Inc., 649 Strander Blvd., Seattle, WA 98188.

(206) 575-3608.

CIRCLE 286

Unix packages

CS/Xtend application development aids and productivity tools are designed for systems running under Bell Labs' Unix operating system. Prices, ranging from \$675 to \$66,150, depend on the configuration and number of users supported. The line includes a multi-user shared database executive pack; a terminal management executive pack; an interactive application builder for end users; and a system for managing databases distributed across multiple computers.

Cincom Systems Inc., 2300 Montana Ave., Cincinnati, OH 45211.
(513) 662-2300. **CIRCLE 287**

VAX query system

DEC VAX users can easily select, sort, and format data from any application package with Mentis, an information system and report writer with interactive dialogue and extensive online help. Users can create command files so responses to a session may be saved for later use. Price ranges from \$4,000 to \$7,000, depending on options. Other features include save-selected records function, format control, security, conditional calculations, and data dictionary.

Park Software Inc., P.O. Box 202, Northgate Station, Seattle, WA 98125.
(206) 284-4025. **CIRCLE 288**

Straight talk on VAX-II

With the Themis data manager, DEC VAX II 2 series users can enter questions and commands and receive answers in plain English. Users can add to or modify the system's basic vocabulary of more than 900 words, so as to build a personal vocabulary different from that of other users on the same system. Priced at \$24,500, Themis also understands sentence fragments, slang, and questions with typos and misspellings.

Frey Associates Inc., Chestnut Hill Rd., Amherst, NH 03031.
(603) 472-2800. **CIRCLE 289**

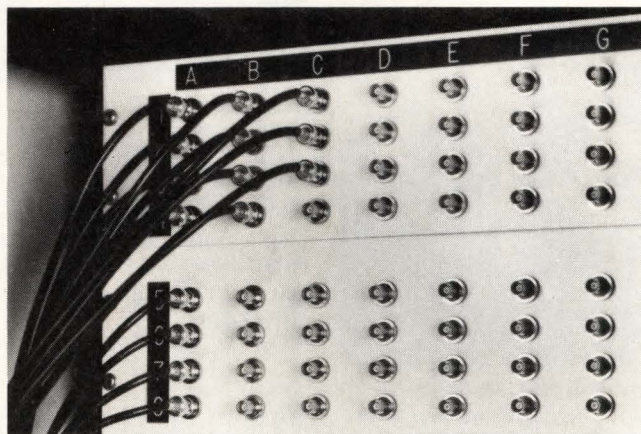
Application design

Application Design and Development (ADD) allows users to create applications to display screens, inquire into

files, generate reports, and perform online maintenance to files for the IBM S34 and S36. Price: about \$3,200. The data dictionary documentation system, a set of programs that maintain application data field and file information, is interfaced with the job stream

builder, which creates source code, object code, OCL statements, SORT statements, and documentation.

Westmoreland Systems Inc., 228 Park Ave.N., P.O. Box 2726, Winter Park, FL 32790.
(305) 645-0040. **CIRCLE 290**



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CIRCLE 142

PERIPHERALS

OCR data entry

The Formsreader OCR-based data-entry system electronically reads, validates, and edits typed, numeric hand-printed, or hand-marked information from preprinted forms and transmits the data to a mainframe or minicomputer, 3741-compatible floppy disk, or 9-track magnetic tape. Price: \$39,400. It can be tailored by the user to accommodate any number of



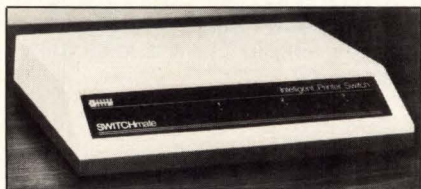
forms. The system consists of an Alphaword III+ Pagereader, micro with crt, dual floppy-disk drives, keyboard, printer, interface to host or peripheral, and software. Alphaword III+ installations can be upgraded for \$9,900.

Compuscan, Two Bridges Rd., Fairfield, NJ 07006.
(201) 575-0500.

CIRCLE 201

DEC printer sharing

The Gold Key Switchmate is an intelligent switch that enables up to three Decmates to share an LQPO2 printer. Price: from \$449. Each system holds



the data and then automatically prints when the printer is available. It operates up to 250 feet from the systems. **Gold Key Electronics**, P.O. Box 186, Goffstown, NH 03045.

(603) 625-8518.

CIRCLE 202

PC expansion

A Personal Computer Expander Kit transforms the IBM PC and compatibles into versatile data-collection tools. Price: \$2,500. It consists of a terminal communication card with RS-



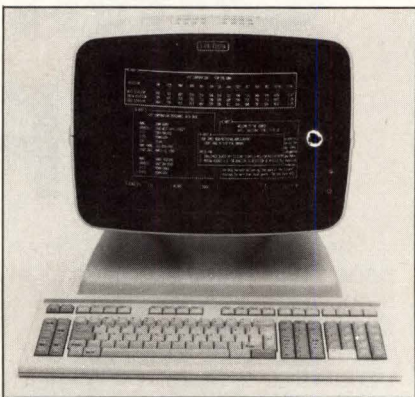
422 and RS-232 ports and a timer; a software driver; a demonstration program; and a data-collection terminal including a 3-of-9 barcode wand, alphanumeric keyboard, 16-character display, and optical badge reader.

NCR-IMO, Technology Marketing Div., 1700 South Patterson, Dayton, OH 45479.
(513) 445-7443.

CIRCLE 203

Windowed display

A 3270-type display, Model 1221 Open Window, allows users to view four windows at a time, each representing an interactive session on an IBM or non-



IBM host. It has a keystroke record-playback feature and a choice of two keyboards. Three models range from \$2,066 to \$2,866. The company also has three IBM-compatible printers. Model 1316 portable printer can be used as a dedicated station printer for several Lee Data display stations. Price: \$553. Model 1317 dot-matrix printer prints 160 cps and costs \$795. Model 1380 line printer prints at up to 300 lpm and has an intelligent processor. Price is \$12,015, plus \$2,000 for optional graphics.

Lee Data Corp., 7075 Flying Cloud Dr., Minneapolis, MN 55344.
(612) 828-0300.

CIRCLE 204

Enhanced terminal

An enhanced Fame-2 terminal has a 14-inch green- or amber-phosphor screen and displays 132 columns of data. Price: \$795. Fame-2 also has 20 user-programmable function keys, and nonvolatile memory of 1,000 characters, split screen, and two ports.

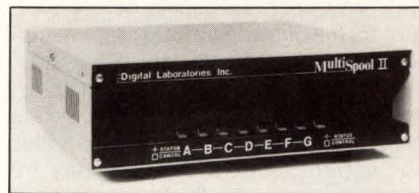
Falco Data Products Inc., 1286 Lawrence Station Rd., Sunnyvale, CA 94089.

(408) 745-7123.

CIRCLE 205

Printer sharing

Multispool Printer Sharing Systems will direct output from any combination of up to 17 computers to up to five serial and parallel printers. Four models, with two serial ports and up to 18



serial and parallel ports, range from \$595 to \$4,895. They are compatible with virtually all popular computers and printers, are transparent to users, and require no special software. Different synchronization protocols and data rates can be set on each port; serial/parallel conversion is automatic.

Digital Laboratories Inc., 600 Pleasant St., Watertown, MA 02172.

(617) 924-1680.

CIRCLE 206

Televideo graphics

Three graphics boards from Televideo—914GR, 924GR, and 970GR—allow models 914, 924, and 970 terminals to run Tektronix scientific and engineering-graphics software, such as Plot 10. Price: \$795. They also allow users to write specific programs using the Tektronix or Televideo mode. The boards provide 32 Kbytes of display RAM. The 970-GR with the 970 terminal is DEC compatible. Price is \$625 for the 970GR and \$525 for the other two. Also available is the televideo 925e terminal, an ergonomic version of the 925. It has a tilt and swivel screen, buffered printer port, 16 shiftable function keys, and optional graphics board.

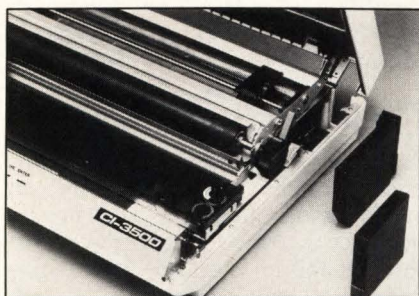
Televideo Systems Inc., 1170 Morse Ave., Sunnyvale, CA 94086.

(408) 745-7760.

CIRCLE 207

Printers and graphics terminal

The CI-3500/Model 10 desk-top dot-matrix printer is compatible with the DEC LA100. A removable interface cartridge allows a user to change the online system's compatibility. It also has removable font and character-set



cartridges. Price: \$1,995. The CIT-414a monochrome graphics terminal combines Tektronix 4010/4014 emulation and major DEC editors. It has a detachable keyboard, nonreflecting screen, and standard printer port for

LA100, C. Itoh 8510, and Epson MX-80. It features variable line types, vector/point/incremental plotting, and four character sizes. Price: \$1,495. The CIT-467 color graphics terminal, with DEC alphanumeric software commands and Tektronix 4010/4014 emulation, is \$2,995.

CIE Terminals, 2505 McCabe Way, Irvine, CA 92714.
(714) 660-1421.

CIRCLE 208

Dual-host controller

The Model 411 dual-host controller enables terminal users to interconnect with two remote IBM or compatible mainframes and up to 16 asynchronous hosts. A number of terminal users can simultaneously interconnect with different hosts and switch from one system to another through simple keyboard commands. Price: \$17,435; it can also be leased.

Lee Data Corp., 7075 Flying Cloud Dr., Minneapolis, MN 55344.
(612) 828-0300.

CIRCLE 209

Smart terminal

The Smart Link 150 video display terminal is compatible with the Televideo 950. Price: \$895. It has a 12-inch non-glare screen, low-profile keyboard, 11 user-programmable function keys, and four pages of memory. It also features full editing, 15 independent baud rates to 19.2 bps, and business graphics. A Wordstar wp package is an option. **Link Technologies Inc.**, 1887 O'Toole Ave., San Jose, CA 95131.
(408) 943-0142.

CIRCLE 210

Ten-pen plotter

The FP 5301 B/A3-size 10-pen digital plotter can be used for CAD, engineering, and business graphics. Price is about \$3,000. It features a self-capping pen, any of three standard interfaces, and 40 programmable function commands.

Western Graphtec Inc., 12 Chrysler St., Irvine, CA 92714.
(714) 770-6010.

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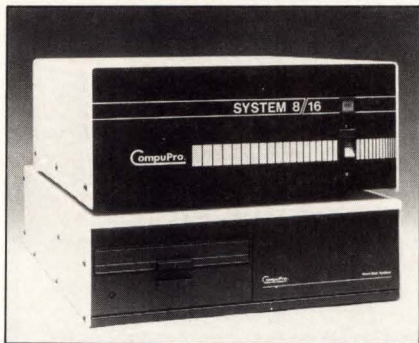
PC speech input

The Oto-I speech-recognition system enables users of the IBM PC and compatible micros to convert MS-DOS software to accept speech-input menu commands and data entry. Price: \$795. It has a 128-word vocabulary expandable to 512 words and better than 98 percent word-recognition accuracy. It also offers syntax subgroups.

Microphonics Technology Corp., P.O. Box 7411, Federal Way, WA 98003.
(206) 838-5208. **CIRCLE 219**

Multi-user systems

The System 816/G and 816/Gg 32-bit systems can be configured with 20-, 40-, or 80-Mbytes of hard-disk storage, or with a 2.4-Mbyte dual 8-inch floppy subsystem. Eight models range from \$12,495 to \$23,995. A network board for Datapoint Arcnet and S-100-compatible systems supports four System 816 nodes with a passive hub;



255 nodes can be connected for four miles with an active hub. Price: \$395. **CompuPro**, 3506 Breakwater Court, Hayward, CA 94545.
(415) 786-0909. **CIRCLE 220**

Apple/IBMlink

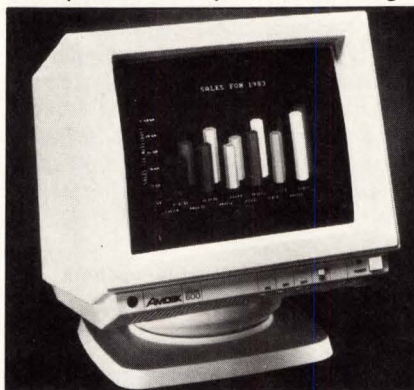
Appleline is an attachment unit that enables Apple personal computers to use existing coaxial cables and 3270 cluster controllers to connect to an IBM or compatible network. Price: \$1,295. It requires one of three software packages, depending on the personal computer being used. Lisaterminal, enabling the Lisa to emulate DEC's VT100, VT52, and TTY terminals, is \$295. Macterminal, offering the same DEC emulation, is \$99. Access 3270, which emulates IBM 3278 terminals,

costs \$150. For systems without a 3270 cluster controller and 3278 terminals, the Apple Cluster Controller can connect Apples to IBM or compatible networks. Price: \$4,500 for three-port model, \$7,000 for seven ports.

Apple Computer Inc., 20525 Mariani Ave., Cupertino, CA 95014.
(408) 996-1010. **CIRCLE 221**

Color monitor

The Amdek Color 600, an RGB video input color monitor compatible with most personal computers, offers high-



line resolution and high-contrast color for graphics. Priced at \$650, it provides 80 columns by 25 lines of text display and features a front-panel switch, which changes text color from white to green; a switchable color matrix, which provides 16 IBM or Apple colors; a built-in speaker and audio amplifier; front-mounted controls with LED display; and an optional tilt/swivel base stand.

Amdek Corp., 2201 Lively Blvd., Elk Grove Village, IL 60007.
(312) 595-6890. **CIRCLE 222**

PC file transfer

FTS File Transfer System is a utility program providing bidirectional transfer of files between the IBM PC and mainframes running TSO via the Irma Decision Support Interface. Price: \$295. Response time is not dependent on the number of users connected to the mainframe and processing is possible even when the host is down. I/O devices not supported by the mainframe can be integrated into the network through the PC.

Mackensen Distributed Systems, 3323 Pearl St., Santa Monica, CA 90405.
(213) 452-5520. **CIRCLE 223**

Apple service

Computer Checkup diagnoses problems on Apple micros, working step by step through the entire system, and providing a printed report for the user to take to a service center. It costs \$50 and is available through the Power Up! catalog.

Software Publishing Corp., 1901 Landings Dr., Mountain View, CA 94043.

(415) 962-8910. **CIRCLE 224**

Disk maintenance

A Disk Drive Analyzer automatically checks radial alignment, rotational speed, read/write ability, and clamping accuracy of a drive's read/write heads. Price is \$40 for the IBM PC or Apple version. A reusable styrene 3½-inch micro-diskette jacket holds replaceable cleaning disks. A kit with jacket, two disks, and cleaning spray is \$40. The disk is inserted, used a specified number of times, and then replaced.

Nortronics Co. Inc., 8101 Tenth Ave. N., Minneapolis, MN 55427.
(612) 540-8674. **CIRCLE 225**

Winchester drives

A series of Winchester disk drives is available for most popular microcomputers, enabling them to run applications that need much disk storage space. Fixed disks from 20 Mbytes to 84 Mbytes in capacity range from \$2,999 to \$7,999. A 5-Mbyte removable cartridge drive is \$2,399. Disks with 10 Mbytes to 57 Mbytes of fixed and 5 Mbytes of removable storage range from \$3,799 to \$7,999.

Yipkon Corp., 311 Rt. 46 W., Fairfield, NJ 07006.
(201) 575-8722. **CIRCLE 226**

System 9000link

Link-PC is a program that converts IBM Personal Computers or compatibles into interactive, online terminals connected to the IBM System 9000. The PC user can then take advantage of the multi-user business software for the System 9000. Link-PC cost \$295. It requires a diskette drive, 256 Kbytes of memory, and an asynch-communications board.

Linkdata, 2005 Route 22, Union, NJ 07083.
(201) 964-6090. **CIRCLE 227**

PC graphics card

Monographplus is a high-resolution board for the IBM PC and PC XT monochrome-display terminal. The \$595 price includes Astclock, Superdrive, and Superspool software. It also has parallel printer port and clock/calendar.

AST Research Inc., 2121 Alton Ave., Irvine, CA 92715.
(714) 863-1333.

CIRCLE 228

Power control

Power Director organizes a group of expansion outlets, control switches, and line-conditioning circuitry for personal computers in a low-profile cabinet. It



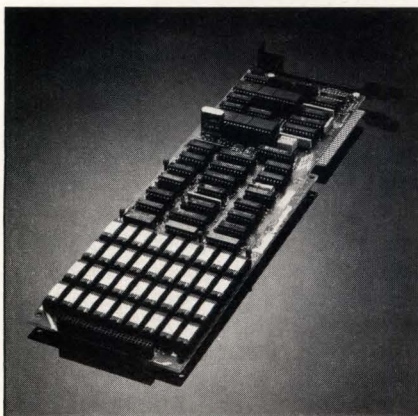
controls and protects power. A four-outlet model that stacks with disk drives, modems, or small monitors is \$99. A five-outlet model that fits under a crt is \$139. A six-outlet model that fits on an IBM PC and includes a clock and disk-storage bin is \$199.

Computer Accessories Corp., 7696 Formula Place, San Diego, CA 92121.
(619) 695-3773.

CIRCLE 229

PC expansion card

Super Rio adds two serial ports, a parallel port, a game port, a clock/calendar, up to 768K RAM, software print



spooling, and electronic disk utilities to the IBM PC and slot-compatible systems. Price for 64K to 256K RAM is \$419 to \$689. An additional Piggyback board adds 64K to 512K RAM for \$249 to \$879.

STB Systems Inc., 601 N. Glenville Ave., Richardson, TX 75081.
(214) 234-8750.

CIRCLE 230

Voice output

Protalker can make S-100 or IBM PC and compatibles talk. Price: under \$350 for the IBM PC. Its natural-sounding reproductions of any speaker's voice and intonation in any language, as well as music and sound effects, can be used for training, sales aids, or any other application requiring voice output. Stored messages can be accessed randomly for playback.

Speech Ltd., 3790 El Camino Real, Palo Alto, CA 94306.
(415) 941-2490.

CIRCLE 231

Thinking program

Maxthink, an advice system with more than 60 modules, helps users expand their insights into existing information, find new ideas, anticipate conse-



quences, analyze the reasoning of others, and transform ideas into action. Price: \$249. It also includes a programmable word processor, an advanced editor, and a language for creating advice systems.

Maxthink Inc., 230 Crocker Ave., Piedmont, CA 94610.
(415) 428-0104.

CIRCLE 232

Disk subsystem

The Interphase RDS 375 75-Mbyte subsystem, which has an 8-inch SMD disk drive and a 25-Mbyte removable disk cartridge, is useful for large IBM PC networks or large databases. Price: \$9,495. The subsystem, enclosed in a

tabletop with storage for three spare cartridges, comes with fan, power supply, SMD controller, cables, and MS-DOS 2.0 or QNX software.

Interphase Corp., 2925 Merrell Rd., Dallas, TX 75229.
(214) 350-9000.

CIRCLE 233

Statistical analysis

Trajectories, an analytical research tool that runs on CP/M, MS-DOS, or PC-DOS, has more than 40 programs. Priced at \$395, it includes program algorithms for each routine that are keyed by number in the appendix, and a two-way interface to a mainframe.

DBI Software Products, One Energy Place, 5805 E. Pickard Rd., Mt. Pleasant, MI 48858.
(517) 772-5055.

CIRCLE 234

Terminal emulation for Macintosh

The Datatalker/MAC front-end data-communications processor gives the Apple Macintosh remote 3270 emulation capabilities. Priced at \$1,095, it supports all 3270 function keys, features transfer rates up to 9600 baud and half- or full-duplex communications, and has a synchronous RS-231C interface.

Winterhalter Inc., 3853 Research Park Dr., P.O. Box 2180, Ann Arbor, MI 48106.
(313) 662-2002.

CIRCLE 235

Micro link

The Move-It Intercomputer Communication System links different brands of micros running different operating systems with different disk formats. Price: \$125 for 8-bit and \$150 for 16-bit machines. It runs on PC-DOS, CP/M-86, and CP/M; setup information is available for over 100 micros. Not only can users move files error-free from one computer to another with only one command, they can also connect to the Source and other utilities.

Woolf Software Systems Inc., 6754 Eton Ave., Canoga Park, CA 91303.
(213) 703-8112.

CIRCLE 236

Color business graphics: A 14-inch color operator station, Model 4045, from NEC (Boxborough, MA) offers eight colors and a pixel-addressable graphics-expansion option. CIRCLE 237

COST CUTTERS

PC financial pack

Analysis System for the IBM PC and PC XT has been lowered from \$495 to \$395. This structured system contains logic, calculations, and accounting procedures to perform comprehensive analyses of any business. It offers 16 predefined reports, consolidation and "what-if" capabilities, and full-screen menus.

Weiss Associates Inc., 127 Michael Dr., Red Bank, NJ 07701.
(201) 530-9260. **CIRCLE 241**

Color graphics

A family of bubble memory-based color-graphics terminals has been reduced, and formerly optional features are now included as standard. The IDT 2200 terminals are now under \$9,000, representing a reduction of over 25 percent.

Industrial Data Terminals Corp., 173 Heatherdown Dr., Westerville, OH 43081.
(614) 882-3282. **CIRCLE 242**

NAS mainframes

National Advanced Systems has reduced the price of its AS/9060, which is comparable in performance to the IBM 3081X, and the AS/9080, which exceeds the performance of the IBM 3081GX. The AS/9060 was \$3.03 million and is now \$2.7 million; the AS/9080, which was \$4.9 million, is now \$4.5 million. In addition, memory has been expanded for all mainframes in the AS/90X0 series except the AS/9080 models.

National Advanced Systems, 800 E. Middlefield Rd., Mountain View, CA 94040.
(415) 962-6000. **CIRCLE 243**

PC network

PCnet allows up to 256 IBM PC users on a local-area network with more than 16 servers. It also supports compatible, high-speed hard-disk systems and sharing of printers. The price has been reduced from \$695 to \$495. PCnet advanced-productivity software Version 2.4 offers four utility programs: hard-disk configurator with read/write capabilities; disk caching for retrieving data directly from RAM; PCnettalk program for sending messages between PCs on the network; and RAM disk

enabling four electronic disks to be shared by a remote PC.

Orchid Technology, 47790 Westinghouse Dr., Fremont, CA 94539.
(415) 490-8586. **CIRCLE 244**

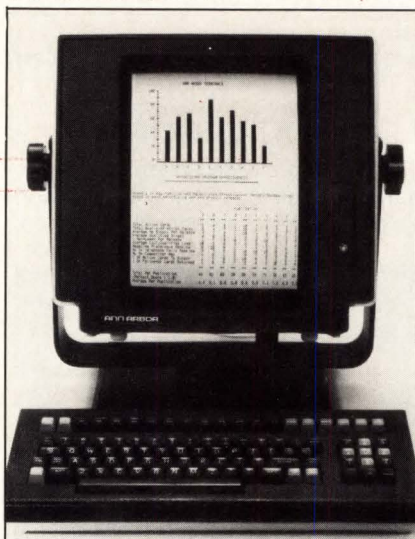
Portable printer

A full-featured portable printer, the Sprinter, has been cut from \$795 to \$695. It has full-dot, addressable-graphics capability, friction and tractor feed, travel cover, and impact-resistant casework for travel.

Micro Peripherals Inc., 4426 S. Century Dr., Salt Lake City, UT 84107.
(801) 263-3081. **CIRCLE 245**

DEC option

Genie+plus and Genie terminals offer a free DEC-mode option. Prices start at \$1,195. The option, which formerly cost



\$100, allows standard VT100 and VT52 software to be used on these ANSI-standard terminals.

Ann Arbor Terminals Inc., 6175 Jackson Rd., Ann Arbor, MI 48103.
(313) 663-8000. **CIRCLE 246**

Multi-user micros

Prices have been reduced on Horizon and Advantage micro systems, which are now available with bundled software. For example, 15- and 30-Mbyte Horizons are \$5,400 and \$6,400, respectively—reduced \$600. Two-user 15- and 30-Mbyte 16-bit systems are \$6,700 and \$7,700, down \$500. Single-user systems are bundled with CP/M, and two-user systems with TurboDOS.

The Advantage, with high-resolution graphics, has similar reductions and is bundled with Graphics CP/M valued at \$150. A fixed bundle of three accounting packages for the Horizon or Advantage is now \$800; purchased separately, they would cost over \$1,800. A four-package CP/M bundle saves users \$600.

North Star Computers Inc., 14440 Catalina St., San Leandro, CA 94577.
(415) 357-8500. **CIRCLE 247**

Display terminals

The Freedom 200 video-display terminal has been reduced from \$745 to \$695. It has 106 keys, including 47 programmable ones; double-high and double-wide characters; Greek, math, and business characters; multiple display pages; and smooth scrolling. The terminal emulates the Televideo 950 and Lear Siegler ADM 31.

Liberty Electronics, 625 Third St., San Francisco, CA 94107.
(415) 543-7000. **CIRCLE 248**

E-size plotter cut

The four-pen CPS-19 plotter, for high-volume, technical applications, is now \$9,995, a reduction of 28 percent. It can access dozens of CAD packages designed for micros. The plotter produces graphics up to 34 inches wide in continuous lengths of up to 150 feet.

Houston Instrument, P.O. Box 15720, Austin, TX 78761.
(512) 835-0900. **CIRCLE 249**

Portable computer

NEC's PC-8200 portable, battery-operated computer, formerly selling at \$799, is now \$599. For \$799 you can get a 24-K RAM PC-8200 with 300-baud modem. It comes with 14 programs, including a text editor, telecommunications package, Microsoft Basic, text formatter, and memory calculator.

NEC Home Electronics Inc., 700 Nicholas Blvd., Elk Grove Village, IL 60007.
(312) 228-5900. **CIRCLE 250**

Vax monitor program: Vaxwatch permits users to inspect or modify any terminal session under VMS. It can also observe the terminal from which it originated. It's from Advanced Systems Concepts of Hoboken, NJ.

CIRCLE 251

Color laser printer

The color laser-xerography printing system has been reduced from \$57,000 to \$46,950. It consists of the Xerox 6500 Color Graphics Printer and the Lasergraphics Rasterizing Micro Computer. It accepts high-level graphic commands and prints three copies a minute at 100 dots-per-inch resolution. A million colors can be reproduced through halftoning. The system is compatible with almost any color graphics-applications software.

Lasergraphics, 17671 Cowan Ave., Irvine, CA 92714.
(714) 660-9497. **CIRCLE 252**

Reduced modems

Seven models of the Micro4000 Data Modems have been reduced by up to 33 percent. For example, the 4,800-bps Model 4048/V.27+, which was \$2,595, is now \$1,750; the 9,600-bps Model 4096/V.29+ was \$3,095 and is now \$2,450. There is also a \$150 reduction for some products incorporating

9,600-bps modems, such as data concentrators and protocol converters.

Micom Systems Inc., 20151 Nordhoff St., Chatsworth, CA 91311.
(213) 998-8844. **CIRCLE 253**

Sheet feeder

The Lettermate III sheet feeder, which was \$1,895, is now \$1,495, including bracket, firmware, and installation kit. It delivers paper from either of two removable trays, handles envelopes, collates the finished work, and has a "Paper Out" detector.

BDT Products Inc., 17152 Armstrong Ave., Irvine, CA 92714.
(714) 660-1386. **CIRCLE 254**

Unbundled systems

Sage Models II and IV, multi-user super-microcomputers, have been reduced because a portion of the software has been unbundled and is now being offered as options. Typical reductions are from \$600 to \$800 per system. The Sage II has 256 to 512 Kbytes of

RAM and one or two 640-Kbyte floppy disks. Prices start at \$3,200. The Sage IV, with 256 Kbytes to 1 Mbyte of RAM, 12 to 40 Mbytes of Winchester disk storage, and 640 Kbytes of floppy-disk storage, starts at \$7,300.

Sage Computer, 4905 Energy Way, Reno, NV 89502.
(702) 322-6868. **CIRCLE 255**

New Executive features: Executrieve, for the IBM S/34 and S/36, enables nontechnical users to design screens, retrieve and analyze data, and create reports. Improved features include split-link access to secondary files, help screens, and improved multiple-record-type file handling. It's from On-line Software of Fort Lee, NJ.

CIRCLE 256

S/36 library analysis: User Library Analysis from Arkansas Systems (Little Rock) provides directory analysis of all libraries on disk for a System/36. It also saves user libraries to diskettes in magazines and performs several other functions.

CIRCLE 257

COMPUTER DECISIONS READS MANAGEMENT

We know what the decision makers want from a user magazine and we give it to them every month

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RESEARCH REPORT

COLOR PRINTERS

An in-depth research report that assesses the market for color printers and related consumables. Ten-year projections are given for major end-user markets: business, scientific/engineering, home/education, etc. Also reviews such major products as ink jet, thermal transfer, photographic, dot matrix, and laser printers and pen plotters. Includes:

- MARKET SIZE
 - MARKET SHARES
 - MARKET FORECASTS
 - SUPPLIER PROFILES
 - TECHNOLOGICAL REVIEW & DEVELOPMENTS
 - END-USER MARKETS
- 190 pages; 37 exhibits; published April 1984; price \$1,650.00.

For free descriptive literature and a detailed table of contents, contact:

INTERNATIONAL RESOURCE DEVELOPMENT INC.

6 Prowitt Street
Norwalk, CT 06855 U.S.A.
(203) 866-7800
WU Telex 64-3452

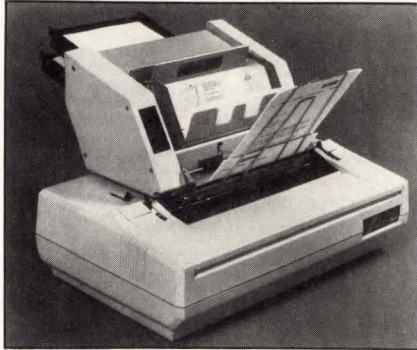
CIRCLE 129



OFFICE EQUIPMENT

Sheet feeders address envelopes

The Z-300 Intelligent Paper Processor has a software capability called Name and Address Capture. Price is \$2,500 to \$2,700. The Z-300 feeds and ejects



the printed letter, memorizes the inside address, inserts the envelope and prints the address on it, then collates the envelope and letter for the writer's signature. No retyping or reformatting is required by the operator.

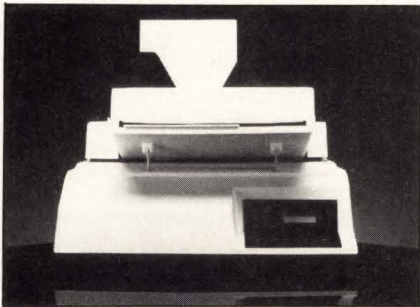
Ziyad Inc., 100 Ford Rd., Denville, NJ 07834.

(201) 627-7600.

CIRCLE 296

CEO adds powers

CEO Decision Base, a decision-support package that can be integrated with Data General's CEO Comprehensive Electronic Office, consists of a personal database, spreadsheet, report writer, and charting tool. Initial license costs \$8,500 for AOS/VS and \$6,000 for AOS; subsequent licenses cost \$6,000 and \$3,500 respectively. Right-to-use license for AOS/Workstation



costs \$500. The Dasher D470C color alphanumeric-display terminal allows users to define 2,016 additional characters; draw charts; and manipulate color features from the keyboard. Price: \$2,995. Model 4535, a 132-column dot-matrix near letter-quality printer that supports graphics, has va-

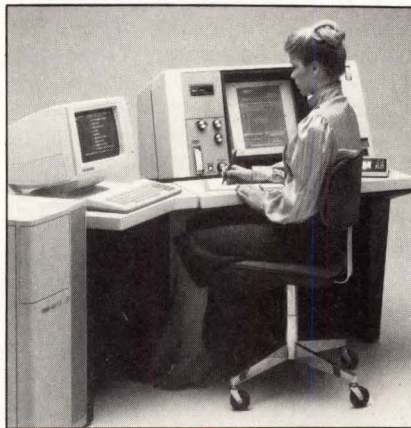
rious functions and speeds. Price: \$3,995 for tractor feed; \$1,500 for auto sheet-feed option.

Data General, 4400 Computer Dr., Westboro, MA 01581.
(617) 366-8911.

CIRCLE 297

Kodak systems

The KAR-4400 and KAR-2200 turnkey information systems, which each consist of cpu, printer, disk storage, micro-image terminals, terminals, and software, manage document images on microfilm as well as corresponding computer information. Price: starts at \$76,000 for KAR-4400, for mid- to high-volume job streams; substantially lower for KAR-2200, for 500 to 3,000 documents per day. The Reliant intelligent microfilmer 2000 processes



more than 700 documents per minute while encoding images with retrieval information. Price: about \$19,000, depending on options. The IMT-250 terminal reads and interprets the Reliant codes and locates specific images in seconds. Priced at \$15,500, it also accepts directions from a computer.

Eastman Kodak Co., 343 State St., Rochester, NY 14650.

(716) 724-4664.

CIRCLE 298

Paper handling

A line of electronic cut-sheet feeders and bidirectional tractors are available for Diablo daisywheel printers. Model F32 dual-tray sheet feeder for the Diablo 630 printer operates under host control. Price: \$1,600. Model F33, a variation that handles envelopes, costs \$1,860. Model F21 single-tray sheet feeder for Diablo 620 and Series 36 printers costs \$795. The T20 and T30 tractors offer continuous forward and

reverse feeding. Price: \$175 for the T20 for 620 and Series 36 printers; \$250 for the T30 for 630 printers. The FLO single-bin mechanical feeder and collator, designed for 620, 630, and 630ECS printers, costs \$495.

Diablo Systems Inc., 901 Page Ave., P.O. Box 5030, Fremont, CA 94537.

(415) 498-7000.

CIRCLE 299

Secretarial systems

The Personal Typing System for secretaries operates as an electronic typewriter with display and limited memory for editing, or as a communicating word processor. Priced at \$3,995, it includes keyboard, crt, dual disk drive, letter-quality printer, built-in modem with auto-answer and auto-dial, and word-processing, spelling, and communications software. Iris allows an electronic typewriter to act as a Telex terminal, to be linked for electronic mail and to have access to databases. Price: \$995.

Samanda Office Communications Ltd., 141 Don Park Rd., Markham, Ontario, Canada L3R 1C2.

(416) 474-1870.

CIRCLE 300

Unix OA

AT&T Advanced Information Systems is distributing the Handle line of office-automation products for its 3B5 and 3B2-300 Unix machines. Handle Writer, which consists of word processing, list management, and spelling correction, costs \$1,500 for the 3B2 and \$2,800 for the 3B5. Handle Calc/Graph, which includes virtual spreadsheet and business graphics, costs \$1,100 for the 3B2 and \$1,900 for the 3B5. Handle Integrated, the complete line, costs \$2,500 for the 3B2 and \$4,500 for the 3B5.

AT&T Advanced Information Systems, 100 Southgate Pkwy., Morristown, NJ 07960.

(201) 898-8326.

CIRCLE 301

Literature on computer fraud: Two books from Pilot Books (103 Cooper St., Babylon, NY 11702) show how to counteract attempts to interfere with or misuse computer systems. Price: \$5 each. "Assessing Data Processing Safeguards" covers disaster-contingency planning. "Detecting and Preventing Misuse of Computer Systems" describes 83 detection safeguards.

CIRCLE 302

Publishing system

The Concept 100 hardware/software system for the IBM PC and PC XT integrates letter-quality texts and graphics for drafts or camera-ready copy. Priced at \$2,195, including graphics subsystem, mouse, disk-based software, and documentation, Concept 100 accepts files from Wang word processors and the IBM Displaywriter, is compatible with Lotus 1-2-3 as well as Tektronix Plot-10, and handles CAD files from the CADAM format. Graphics can be downloaded from a mainframe or created locally. The system features several type fonts, pan and zoom, cross-hatching and shading, and color. **Concept Technologies Inc.**, P.O. Box 5277, Portland, OR 97208. (503) 684-3314. **CIRCLE 303**

Quality printer

The 5055 letter-quality 55-cps bidirectional daisywheel printer with 2-K buffer has adjustable character spacing, handles paper up to 16 inches wide, and operates at 50dB noise level. Compatible with most personal computers and word processors, it is priced at \$1,995, including ribbon-cassette cartridge, parallel-interface cable, and paper guide. The double daisywheel ac-



commodates 125 characters. A wide variety of typefaces is available. **Amdek Corp.**, 2201 Lively Blvd., Elk Grove Village, IL 60007. (312) 595-6890. **CIRCLE 304**

Windowing system

NCR Officeware, a hardware/software office application, has extensive windowing capabilities for 14 workstations. It features seven integrated modules: script, plan, forms, graph, terminal, desk, and network. A typical eight-user system, with a Unix-like operating system, 1 Mbyte of memory, 1-Mbyte flexible diskette, 46-Mbyte hard disk, two printers, console crt, software, and eight workstations,



costs \$58,870. **NCR Corp.**, Dayton, OH 45479. (513) 445-2075. **CIRCLE 305**

Daisywheel printer

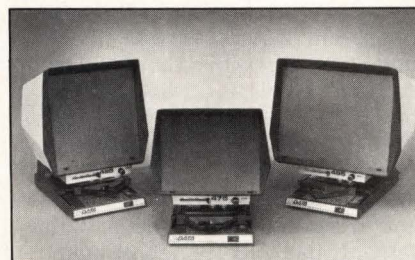
The Amdek 5040 letter-quality bidirectional daisywheel prints at 40 cps and handles paper 16 inches wide. Priced at \$1,695 including cassette-type ribbon, it has 2-K buffer, parallel and serial interfaces, and adjustable character spacing.



Amdek Corp., 2201 Lively Blvd., Elk Grove Village, IL 60007. (312) 595-6890. **CIRCLE 306**

Microfiche readers

The 400 Series of microfiche readers can be transported easily. Magnification ranges from 18x to 48x. Price: \$199 for Model 475 with 8 1/2-by-11-inch screen; \$239 for Model 495 with 11-by-14-inch screen; \$219 for Model 425, the universal COM/Source reader, with 11-by-11-inch screen.



Endata Inc., 21 N. Main St., Coopersburg, PA 18036. (215) 282-4500. **CIRCLE 307**

System software

Q-One word-processing software, one of several packages for the Series 6000 systems, features four simultaneous-editing window displays, 90,000-word spelling check, and automatic formatting. Price: \$600 to \$1,620, depending on system and number of users. Other packages for the 6000 include Supercomp 20 spreadsheet, Datamanager, and Oracle relational dbms. The 4000 and 5000 series have several advanced software packages. Electronic mail, based on a shared resource network, costs \$1,000 per license fee per system. An integrated spreadsheet for planning, forecasting, and analysis costs \$1,500 for a permanent one-time license.

Four-Phase Systems, 10700 N. DeAnza Blvd., Cupertino, CA 95014. (408) 255-0900. **CIRCLE 308**

Unix software

Alis, a Unix-based office software system with personal-computer applications and communications capabilities, uses computer intelligence for formatting assistance. Price: \$1,350 per user for bit-mapped workstation; \$900 per terminal-based user. It features universal graphics editing, integrated spreadsheet and database, electronic mail, multi-window user interface, and management-aid capability.

Applix Inc., 302 Turnpike Rd., Southboro, MA 01772. (617) 481-4721. **CIRCLE 309**

Spelling checker: Megaspell (from Megahaus of San Diego) spots misspelled words in Megawriter word-processing documents. It has a 40,000-word dictionary. **CIRCLE 310**

Electronic mail protection: Phasor Code Encryption System is software that provides security for users of GTE (Vienna, VA) Telenet's Telemail electronic-mail service. **CIRCLE 311**

VSAM space manager for XA: The VSAM Space Manager control utility offers full support for the MVS/SA operating system. The product is from Softworks Inc. of Clinton, MD. **CIRCLE 313**

SYSTEMS

Supermicro

Gen-V is a multi-user multi-tasking data-entry system offering both centralized and distributed processing. This 32-bit high-volume system has software for integrated data entry, file



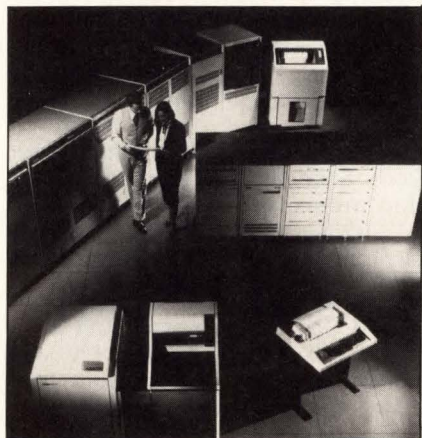
management, report writing, and multiple communications protocols. It features remote terminal capability and a specialized keyboard. It supports 10 to 120 Mbytes of Winchester-disk storage and up to 24 terminals. A configuration with 512 Kbytes of memory and 10 terminals is under \$35,000.

Inforex Inc., 186 Middlesex Tpk., Burlington, MA 01803.
(617) 272-6470.

CIRCLE 212

High-end DEC's

Decsystem-1095 and -2065 are higher-capacity versions of the Decsystem-10 and -20. Features include 36-bit cpu, cache/pager unit, 9-Mbyte memory, 176-Mbyte disk drive, hard-copy console terminal, and asynchronous front end. Prices begin at \$395,000 for the -1095 and \$335,000 for the -2065. Three software packages are available for these systems: Datatrieve-20 data management, priced at \$10,000; Version 6.1 of DBMS-20 Codasyl-oriented



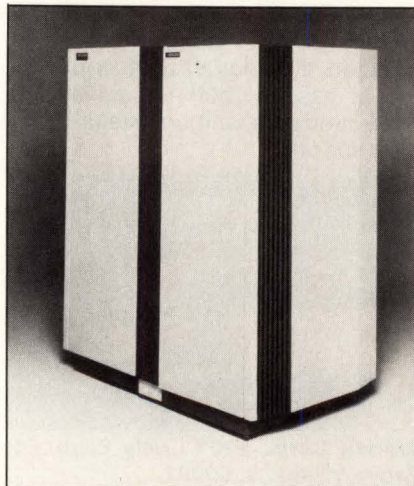
software, costing \$34,500; and Version 4 of Traffic-20, a collection of general-purpose routines priced at \$6,900.

Digital Equipment Corp., Maynard, MA 01754.
(617) 897-5111.

CIRCLE 213

Real-time 32-bit

The Classic 32/85 32-bit super-mini-computer supports real-time applications. Basic configuration with 2 Mbytes of memory is \$148,500. Additional memory is \$12,000 for a 2-Mbyte board. A load-sharing configuration with two processors and I/O controllers and 6 Mbytes of memory is \$295,000. The 32/85 has up to 64 Mbytes of multiported physical memory and addresses up to 1 Gbyte of virtual memory. It also offers 64 Kbytes of cache memory, a Memory



Management Unit, context file containing 128 banks of general-purpose registers, arithmetic and logic unit, dual-bus I/O controller, and floppy-disk drive for loading and diagnostics.

Modcomp, P.O. Box 6099, 1650 W. McNab Rd., Fort Lauderdale, FL 33310.

(305) 974-1380.

CIRCLE 214

Multi-user mini

The Syfaplus distributed data-processing system, the size of a two-foot cube, can connect up to 24 workstations—either as a stand-alone or in the Syfanet local-area network. Price: \$19,000 to \$29,000. As a stand-alone, the Syfaplus serves as a resource processor managing communications among micros, peripherals, and mainframe. It has 256 Kbytes of memory,

32-Mbyte Winchester-disk drive expandable to 100 Mbytes, 10-Mbyte streamer-tape cartridge, and eight to 24 ports.

Computer Automation Inc., 1800 Jay Ell Dr., Richardson, TX 75081.
(214) 783-0993.

CIRCLE 215

Integrated database

The DBC/1012, an integrated hardware/software database computer, handles up to a trillion-byte databases. A basic system with six micros, 2.5 MIPS, 1.9 Gbytes of data storage, relational software, and utilities costs \$480,000. Add-on components are about \$60,000 per MIP and \$37 per Mbyte of add-on disks. The DBC/102 features multiple parallel micro-computer modules with dedicated disk storage, all communicating with each other via an intelligent network.

Teradata Corp., 12945 Jefferson Blvd., Los Angeles, CA 90066.
(213) 827-8777.

CIRCLE 216

CAD/CAM family

The ICEM (Integrated Computer-Aided Engineering and Manufacturing) system has added several hardware, software, and service products. An Ergonomic Workstation features high-resolution, noninterlaced color display, 3-D display file, and up to 2,000 Kbytes of RAM. Price starts at about \$30,000. Prices for the application packages vary with the model. For the Cyber 825, the Patran-G finite-element-modeling software is \$2,000 per month. A graphics technique for the design and analysis of hydraulic systems is \$20,000. A package for creating an electrical schematic is \$22,500; Tekroute, which places the PC-board components and routes the interconnections, is \$57,000. A Facilities Planning Package is approximately \$8,500. A consulting and training service costs from \$9,000 to \$34,000, depending on the modules chosen.

Control Data Corp., 8100 34th Ave. S., Minneapolis, MN 55440.

(612) 853-5695.

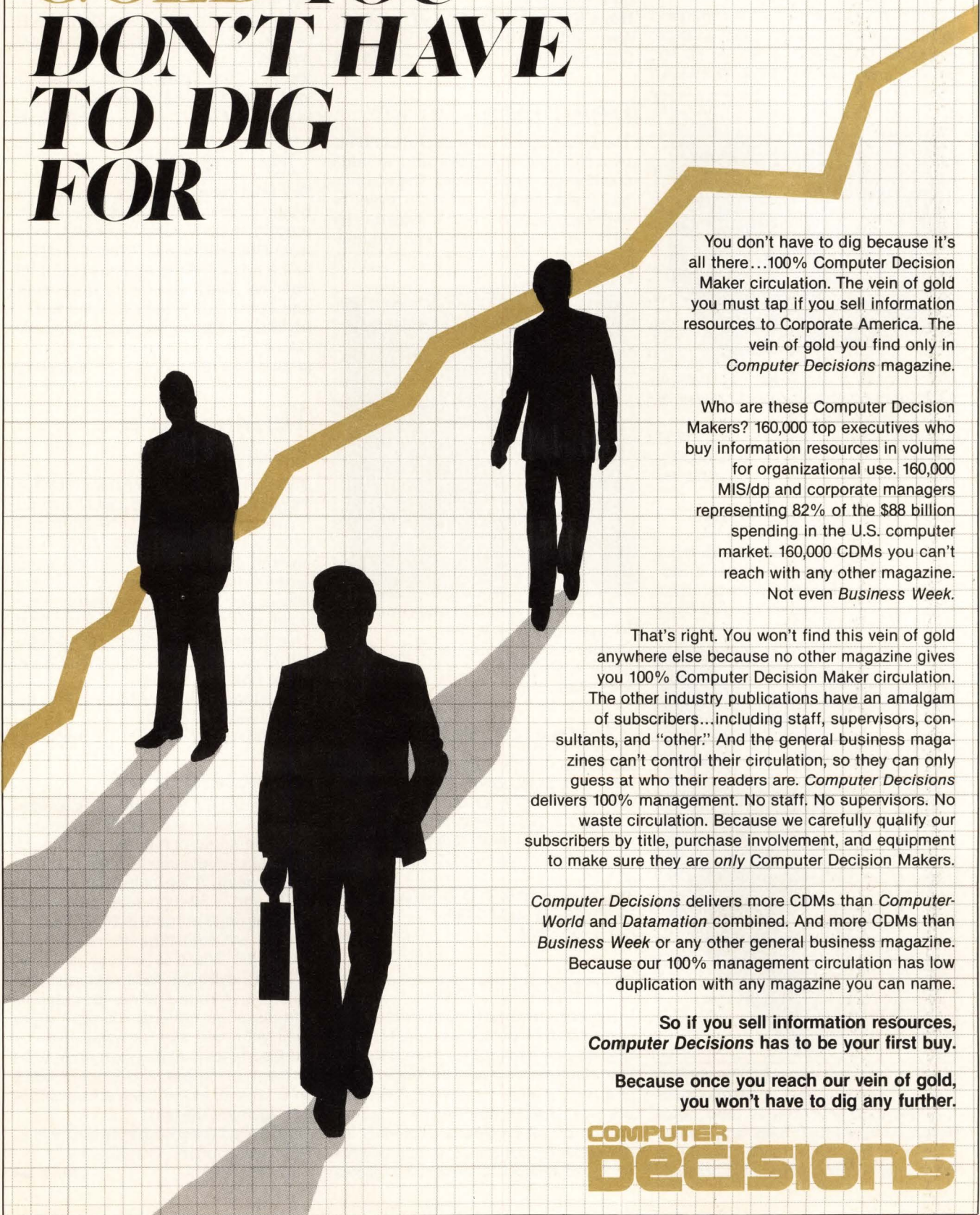
CIRCLE 217

Tech software for Gould: The IMSL (Houston) Library is now available for Gould Concept/32 systems. It contains 540 Fortran subroutines for mathematical and statistical applications.

CIRCLE 218

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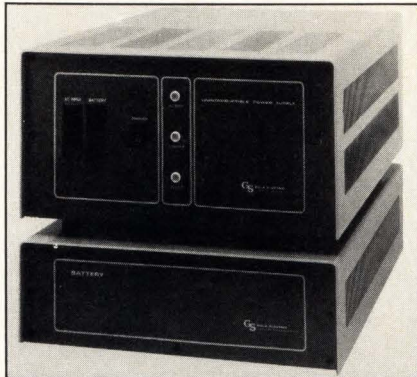
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ACCESSORIES

Compact UPS

A plug-in, online 1.0 kVA uninterruptible power system and voltage regulator is available in 60 or 50 Hz models, and costs \$2,955. A 12-minute



battery pack costs \$540. Two battery packs with combined reserve power of 27 minutes cost \$1,080.

General Signal, Sola Electric, 1717 Busse Rd., Elk Grove Village, IL 60007. (312) 439-2800. **CIRCLE 258**

Power for micros

The Supernova power conditioner/uninterruptible power system is designed for microcomputers, PBX systems, word processors, and other



small equipment. When AC line voltage drops or power is lost, a switch transfers the load to batteries, and automatically transfers it back again when proper power is restored. Priced at \$890, this 800VA system also protects

the load from line noise or spikes when on the AC line.

Nova Electric Mfg. Co., 263 Hillside Ave., Nutley, NJ 07110. (201) 661-3434. **CIRCLE 259**

Head cleaning kit

The Dysan Head Cleaning Kit contains two cleaning diskettes and enough solution for 40 cleanings. The solution has been metered to avoid over- or underapplication. The kit, available for 5 $\frac{1}{4}$ - and 8-inch single- and double-



sided drives, costs \$32 and comes in a free plastic diskette file.

Dysan, 5201 Patrick Henry Dr., Santa Clara, CA 95050. (408) 988-3472. **CIRCLE 260**

Cleans connectors

Gold Mist Jr. is an aerosol that cleans and lubricates connectors that interface computers, printers, crts, modems, and other devices, so as to prevent corrosion and reduce frictional wear. A box of four 4-ounce cans costs \$21.50.

The Texwipe Co., P.O. Box 308, Upper Saddle River, NJ 07458. (201) 327-9100. **CIRCLE 261**

Protocol links

Interpress Printing Architecture is comprised of protocols and formats that let office machines from different manufacturers work with each other and with a wide variety of electronic printers. The set, which includes a document format as well as protocols for networking, communications, directory, and security, costs \$250. It allows

users to create documents in any layout with line graphics and halftones, in any number of fonts. In addition, consulting and certification services are available.

Xerox Office Systems Div., 3450 Hillview Ave., Palo Alto, CA 94304. (415) 494-4767. **CIRCLE 262**

Disk labeling

Disktabs serve both as a means of labeling floppy disks and as a handle for placing them in and removing them from files and drives. When the disk is in the drive, the tab extends out of the opening. They cost \$2 for a set of 10 and come in five colors for sorting.

LDW Co., 38211 Logan Dr., Fremont, CA 94536. (415) 651-4109. **CIRCLE 263**

Temperature monitor

Smart Ambient Temperature Monitor/Power Controller alerts users if computer-room temperature rises above a safe level. It costs \$995. After a set amount of time and continued temperature rise, a programmed command allows for an orderly software shutdown and also powers down the host. This device is compatible with all popular minis. It requires an asynchronous serial port.

Intra Computer Inc., 101 W. 31st St., New York, NY 10001. (212) 947-5533. **CIRCLE 264**

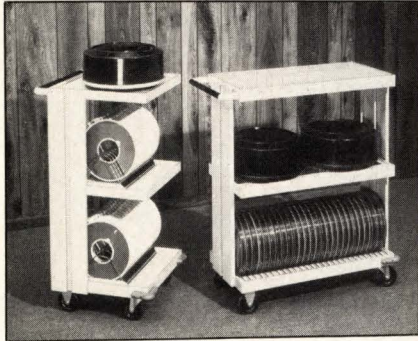
Micro cabinet

The Ergospace PC Cabinet is a comfortable mobile workstation that protects personal-computer equipment. Cabinets are 60 $\frac{3}{4}$ -inches high and 26 $\frac{3}{4}$ -inches deep. A 24-inch-wide model is \$810, and a 30-inch-wide cabinet for wide-carriage printers is \$855. Vertical shelves are adjustable in half-inch increments. There is an eye-level crt shelf, a keyboard shelf that rolls out below it, storage shelves for manuals and disks, an optional roll-out printer shelf with feed slot, optional fold-out work surfaces that can expand or slide forward to create a U-shaped work area, as well as two fans and a cable-management system.

Engineered Data Products Inc., 470 E. 76th Ave., Denver, CO 80229. (303) 289-4676. **CIRCLE 265**

Media transporter

Tape trucks, which move tapes, disk packs, forms, and other computer-related media from location to location, are available in two versions. The slim-line has three shelves, 18½ inches



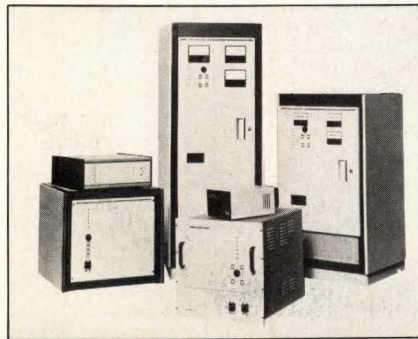
square. The large-capacity version has three tiers, each with a wire rack that holds up to 26 hanging reels. Prices range from \$290 to \$325. Both versions come with lockable casters and oak-woodgrain top.

Wilson Jones, 6150 Touhy Ave., Chicago, IL 60648.
(312) 774-7700.

CIRCLE 312

Power systems

Uninterruptible power systems, ranging from 8-minute 90VA to 12-minute 35kVA, provide continuous conditioned, regulated power in case of a



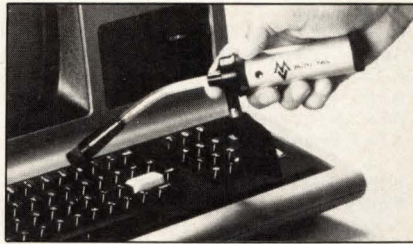
line disturbance or power failure. Price: \$395 to \$41,400. Options include static switch, RS-232 interface, additional batteries, and rack mount.

General Power Systems, 1400 N. Baxter St., Anaheim, CA 92806.
(714) 956-9321.

CIRCLE 267

Hand-held vacuum

Mini-Vac, a small, lightweight cleaning system, can be used for delicate cleaning jobs involving computers, typewriters, and appliances. Priced at \$30,



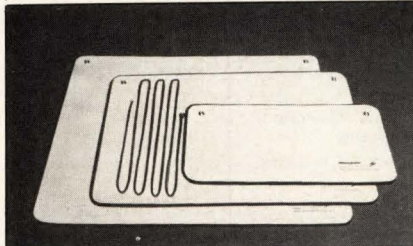
it runs on a 9-volt battery and comes with an easy-to-empty bag, two fine brush nozzles, and two directional wands for corners. An optional AC adaptor is \$10.

Baystar Co., 110 Painters Mill Rd., Owings Mills, MD 21117.
(301) 363-4304.

CIRCLE 268

Computer supplies

The Personal Computer Starter Kit consists of basics for organizing, operating, and maintaining a personal computer. Priced at \$80, it includes com-



puter forms, Calcpad worksheets, a variety of cleaning and anti-static products, and a carrying case. A Media Center organizes tapes, cassettes, disks, printouts, ring binders, and more in one cabinet. It has both stationary and pullout shelves, racks, and hanging rails, and comes in three sizes ranging in price from \$478 to \$686. Static Dissipative Desk Mats, when placed under electronic equipment, drain off static electricity. They can be used for personal computers, word processors, dp equipment, typewriters, printers, and other devices. Three sizes range in cost from \$40 to \$60.

Wilson Jones Co., 6150 Touhy Ave., Chicago, IL 60648.
(312) 774-7700.

CIRCLE 269

Monitoring modem

The DM-C15 Modem Cartridge plugs into the Dranetz Series 626 Remote Monitor Unit (RMU), letting it analyze power-line disturbances and report results over phone lines. Price: \$350. Selected printouts returned by the RMU

include the last 64 disturbances detected and a detailed measurement of the 10 worst-case events for given parameters. Models are available for single-phase AC monitoring, three-phase AC monitoring, and three-phase AC plus DC channel.

Dranetz Technologies Inc., 1000 New Durham Rd., Edison, NJ 08818.
(201) 287-3680.

CIRCLE 270

Printer enclosure

A Sound Enclosure Printer Table reduces noise and vibration and also provides a work surface. Accommodating printers up to 31 by 20 by 12 inches as well as housing power strip and cabling, it costs \$953; internal lighting, casters, and power strip are optional. When access to the printer is needed, the tempered glass top can be opened with gas-spring assistance. The front door can be opened for paper loading.

Computer Cabinet Corp., 1290 Anvilwood Court - 9, Sunnyvale, CA 94089.
(408) 743-9120.

CIRCLE 271

No-glare screen

A nylon-mesh Power Screen fits over the crt and eliminates glare, increases contrast, and prevents static-electricity buildup, which causes dust accumulation. At \$50, it attaches by Velcro



buttons to the crt frame, and comes in a hundred sizes to blend with any terminal styling.

Screen Data Corp., 240 Cedar Knolls Rd., Cedar Knolls, NJ 07927.
(201) 285-1212.

CIRCLE 272

Portable PC tester

Montest-PC tests personal-computer black-and-white and color monitors. Battery-operated and pocket-sized, it features tests of all three colors individually and checks video intensity. Price: \$129.

Network Technologies Inc., P.O. Box 203, Chagrin Falls, OH 44022.
(216) 543-1646.

CIRCLE 273

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CIRCLE 131

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If mailing label is not available print your old Company name and address in this box

Please allow
6 weeks for
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take effect

2. Print your NEW business address here

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COMPANY _____

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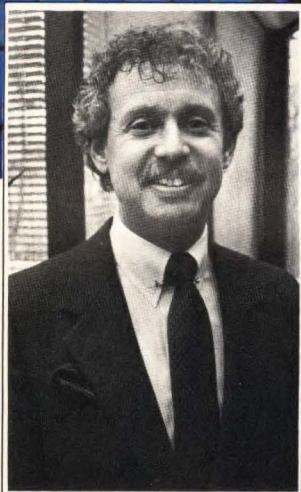
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CD 10

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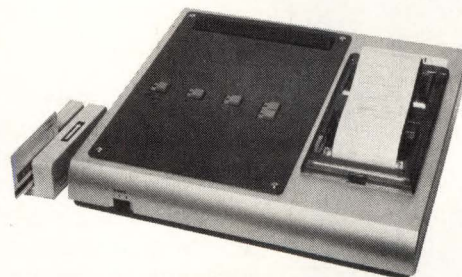
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by Mary Miles, New England Editor

YOUR CAREER

Rx for troubled employees: the EAP

Look, Pat, you've been a good employee for a long time. But in the last few months you've lost a lot of time, and your work is below par. It's clear something is wrong. The company has a special program to help people with problems. You don't have to go. However, you should know that if your performance doesn't improve, I'll have no choice but to start an adverse action."

Maybe you've delivered—or received—a variation of that difficult statement. But one thing is certain, the program referred to is an employee assistance program (EAP). The EAP addresses the needs of employees whose work performance is adversely affected by personal problems. EAPs are staffed by professional counselors who are trained to counsel employees in trouble and to refer them, when necessary, to outside agencies or programs for help.

According to a recent report from Congress, 12 percent of the workforce has access to an EAP—and that figure is growing.

"Counseling employee problems is not a job that can simply be assigned to someone in personnel," says Dale A. Masi, president of Masi Research Consultants, Inc. (Washington, DC), who has trained EAP professionals and successfully set up programs in more than 50 corporations. Masi, author of *Designing Employee Assistance Programs* (Amacom, \$34.95), goes on: "Any one of many problems can sap an employee's productivity—alcohol or drug abuse; emotional, legal, marital, or financial difficulties; or a troubled family member, for example. The EAP professional's job is to meet with an employee to talk over the problem. It may be that short-term counseling will be ap-

propriate and effective. If not, referral may be made to, say, a treatment/rehabilitation facility, marriage counselor, drug rehabilitation program, or psychiatrist."

Although many organizations have informal help services, such as hot lines or personnel "counselors," these alone cannot be as thorough or effective as the EAP. The loosely defined policies probably lack the direction and cohesiveness of a formal program staffed by trained counselors, and there's decreased capability of networking with relevant outside sources.

"Counseling troubled employees is not a job that can simply be assigned to someone in personnel." *Masi, consultant*

Most importantly, informal employee-help resources don't attract the employees who need assistance.

"A company may sincerely believe that individuals with problems are going to seek help within the company when it's needed," says Masi, "but this just doesn't happen. If you really have a problem, you're not likely to go to the personnel department for help in dealing with it."

Most managers are aware that employee problems can seriously affect the health of the business. Troubled employees are costing U.S. industry over \$50 billion a year, according to Masi. "We know that difficulties such as addiction and mental health problems occur in up to one-fifth of any employee population, causing a loss of 25 percent in productivity. That's at least 25 percent, measureable in ab-

senteeism and accidents. These figures apply across the board, regardless of the type of business.

"More and more organizations are waking up to the impact of employee problems. General Motors, for example, found that its average troubled employee was missing 100 days a year before it instituted an EAP. And, speaking of another company that has implemented the program, Masi says: "United Airlines figures it saves 16 times the dollar amount of its investment in an EAP."

These programs need not be limited to large organizations, asserts Masi. While they're more likely to have a formalized EAP in place (her rule of thumb is "if you have 3,500 or more employees, you should have at least one full-time professional heading up an EAP effort"), smaller companies can initiate effective plans too. They can arrange for a part-time professional or call upon a specialized consultancy that can set up and maintain a professional program that will inspire employee confidence and participation.

Still another alternative is the increasingly popular consortium arrangement: a group of companies, each paying into a fund according to its number of employees and contracting for the EAP professionals, whom they share.

Why does an EAP, as opposed to company help-services, stimulate trust and the willingness to accept assistance on the part of troubled employees? Because the EAP has several advantages going for it:

- **Accessibility.** The professional EAP staff is available; its time is not taken up by other employee concerns. Also, most staffers will meet privately—in clients' offices or at an outside

location—to maintain confidentiality and provide immediate attention.

- **Safety.** The EAP provides a secure psychological environment for troubled employees. As a result, they may gain a healthy sense of control over their lives, promoting personal involvement with, and responsibility for, solving their problems.

- **Credibility.** Confidence in the EAP staff's abilities, assurance that their rights will be respected, and that there are attainable solutions to their problems, help employees to get back on a productive track again.

The EAP has specific policies to educate the employee population about its existence, purpose, and availability. But the ingenuity of the concept, according to Dale Masi, rests on the manager's success in discerning employees with problems. In regular training sessions, managers learn that when the usual managerial techniques to improve productivity have failed with an employee, there is likely to be a personal problem that must be dealt with on a professional level.

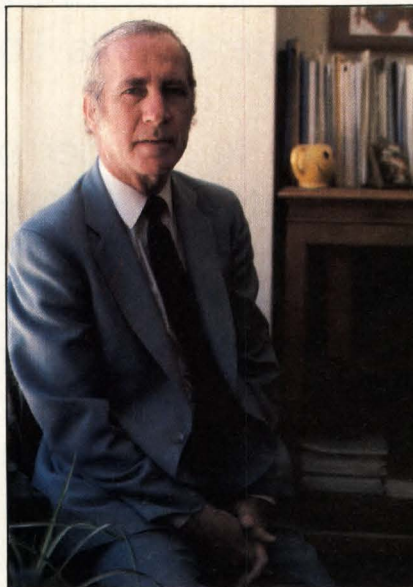
"We teach managers how to recognize when personal problems may exist, and to induce the employee to seek help," says Masi. That may include convincing the troubled person to make use of available help systems because his or her job is on the line.

How do troubled employees respond? According to Masi, "Most employees will come around. It has been found that the average alcoholic, for example, will give up his or her family five years before giving up the job." However, because of the human tendency to deny problems, even debilitating ones, an employee may actively resist assistance.

Ray Lenahan, employee counselor at New York Life Insurance Co., is concerned with personal problems that diminish job performance. In his

capacity, he does a lot of individual counseling, as well as arranging for outside assistance when it's called for. While a growing number of employees come to him for help on their own, many must be urged to seek it. One of the most difficult tasks of the EAP, he says, involves training the managers to handle this delicate assessment in an effective yet humane way.

Effective EAP training of managers also deals with "reverse denial": Many in management positions seem to avoid confronting the problems of those around them. Lenahan remembers a man who held a demanding position. He began to disappear for hours at a time, reappeared uncoordinated and disoriented, and his work visibly suffered. It was apparent to virtually everyone that he had a serious alcohol problem, yet no one—subordinates, peers, or superiors—



Ray Lenahan, employee counselor at New York Life Insurance Co., trains managers to ease troubled employees into accepting help through awareness laced with discretion, empathy and humanitarian concern.

reached out until it was far too late.

And, at the other end of the spectrum, it's not uncommon for managers to deny that personal problems are undermining *their* effectiveness. In fact, this behavior is more likely at the management level than at lower levels, claims Dale Masi. "People in positions of responsibility may be much more defensive, and practice more denial than you'd expect," she says.

Recognizing problems is only half the battle. For instance, what if an employee who needs help to get back on the road to good performance says: "I don't need help. I can handle it. It's none of the company's business what's going on in my personal life!"

When an employee refuses to admit to, or seek help for, a problem, says Lenahan, the manager must recognize that it's within his or her rights to do so. "But you have to make it very plain that it's then up to the troubled worker to perform. Ethically and legally, the employee must be presented, perhaps again and again over a period of time, with a responsible choice: to improve performance or risk losing the job.

"Firing a troubled employee is the last action we want to take," Lenahan concludes. "What we're interested in is holding on to employees. In spite of what may be a serious problem—an illness or addiction—if an employee is valued, it's both to the employee's and the company's advantage to restore that employee to good performance. It's no secret that each employee represents a tremendous investment. But the ultimate purpose of an EAP is humanitarian."

The employee assistance program offers many other benefits besides. It can:

- Reduce absenteeism and accidents;
- Cut the expense and disruption of high turnover;

YOUR CAREER

- Boost employee performance and morale;
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(For more information on the problems associated with firing employees, see "The end of firing at will," in this issue.)

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