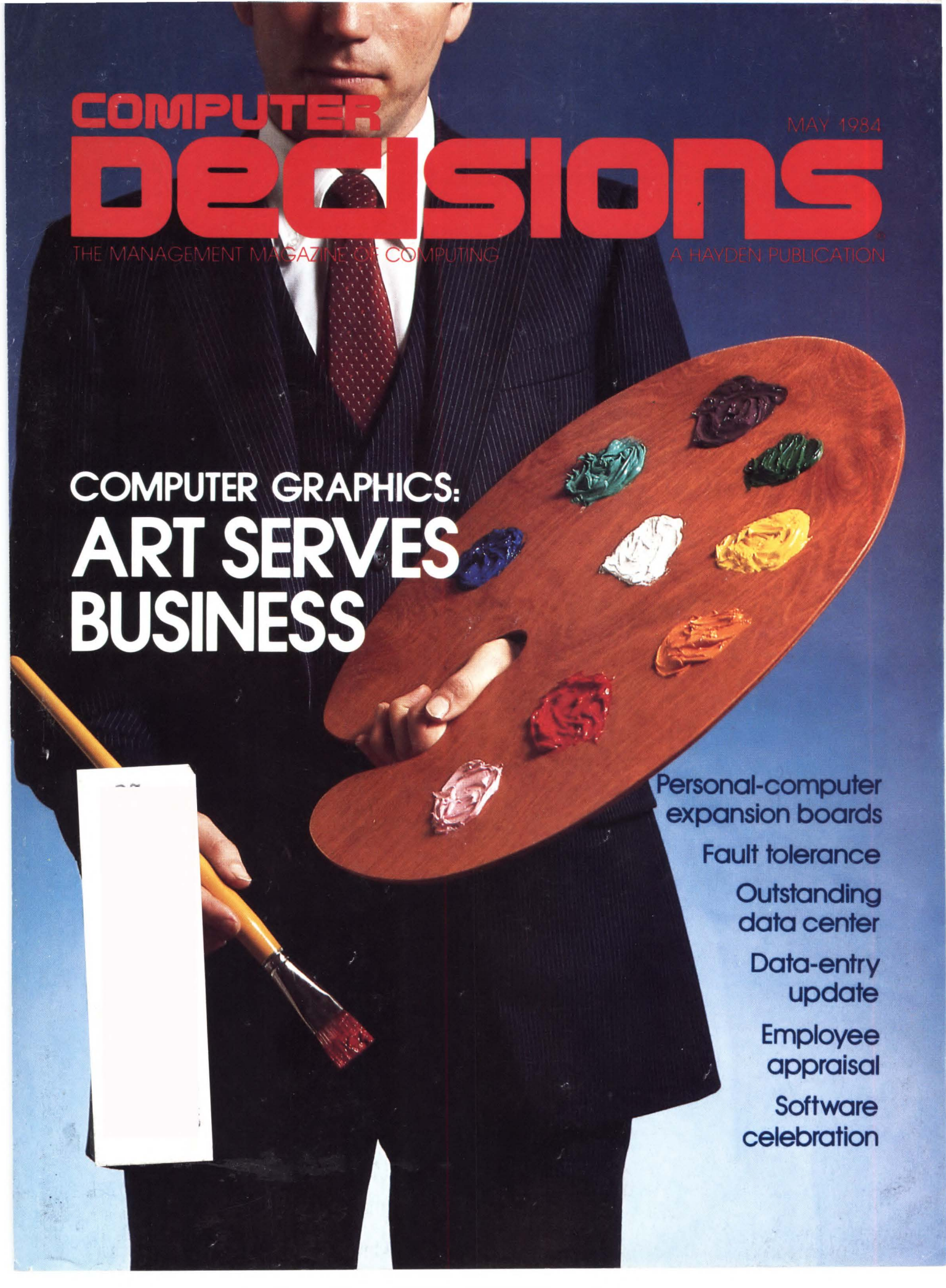

COMPUTER
DECISIONS
MAY 1984
THE MANAGEMENT MAGAZINE OF COMPUTING
A HAYDEN PUBLICATION
COMPUTER GRAPHICS:
ART SERVES BUSINESS
Personal-computer expansion boards
Fault tolerance
Outstanding data center
Data-entry update
Employee appraisal
Software celebration

The most successful first year in the history of American business.

It's true. COMPAQ® Computer Corporation had greater first-year sales than any new company in American business history.

We sold $111 million worth of our personal computers, the COMPAQ Portable and the COMPAQ PLUS™.

How did we do it?

We followed two principles.

Principle One: Offer people personal computers that work better. We gave them the COMPAQ Portable. This rugged, full-function system is truly IBM®-compatible. So it runs without modification all the most important, most useful software; literally hundreds of programs.

We followed with the COMPAQ PLUS, a high-performance version with an integrated ten-megabyte disk drive.

Besides being portable, both offer more capabilities than most other personal computers. They display high-resolution text *and* graphics on the same built-in screen. Expansion slots take IBM-compatible boards. There's even a kit to convert the COMPAQ Portable to the COMPAQ PLUS.

The sales figures say we did pretty well on Principle One.

Principle Two: Make it easy for people to get what they need. More than one thousand of the country's best computer dealers are now Authorized COMPAQ Computer Dealers. We back those dealers with training, service, and support to make life simpler for our users. That's one reason 98 percent said in a recent survey that they would recommend COMPAQ to a friend.

We were honored to have a history-making first year. But it's only history now. How should a company follow up the all-time best beginning?

Principle Three: Stick with Principle One and Principle Two.

For the location of your nearest Authorized Dealer, call 1-800-231-0900.

COMPAQ®

It simply works better.

Shared DASD users, don't leave your data integrity to chance.

Protect it with Super-MSI™

the integrity protection package designed exclusively for multiple-CPU environments.

Easy to install. Easy to maintain. Super-MSI requires no modifications to your operating system and can be implemented in an active system in as little as ten minutes—assuring complete data integrity from the moment it is installed.

Super-MSI guarantees data integrity.

No complicated job scheduling. No elaborate control schemes. No software changes. Super-MSI spans inter-system activity to give "unified system" integrity to your entire multi-system complex.

Super-MSI preserves integrity under MVS, MVS-SE, MVS-SP, SVS, MVT, VS1 and MFT systems.

Super-MSI prevents data destruction.

Inadvertent modification, simultaneous access ... Super-MSI stops the damaging data abuses that multiply in a multi-systems environment. Prevents the errors that can so easily occur—and too often go undetected—when users operate in a multi-systems complex.

Super-MSI eliminates hardware RESERVEs.

Super-MSI completely protects your data integrity and frees your systems of RESERVEs and RESERVE lock-outs. Super-MSI converts selective RESERVEs to logical controls that securely protect your data without inhibiting system throughput.

Super-MSI does more.

As part of the CGA family of single-image software for multiple-CPU sites, Super-MSI works together with MSM®, our Multiple Systems Manager which manages tape and disk storage devices and GCD®, our Global Console Director which consolidates consoles, cutting costs and streamlining operations. The result is a unified single system image that is transparent, flexible and powerful. Use them together or in any combination, CGA's multiple systems software is a must for large users.

More than 1,000 CGA single-image software packages are in use around the world, preserving data integrity and helping multiple-CPU sites hum like they're supposed to. Call today. Set up a free trial of Super-MSI, GCD or MSM.

Speak software. Talk to CGA.

800-237-2057

cga

CGA Software Products Group
960 Holmdel Road
Holmdel, NJ 07733

CIRCLE 1

COMPUTER DECISIONS®

THE MANAGEMENT MAGAZINE OF COMPUTING

MAY 1984

Volume 16 Number 6

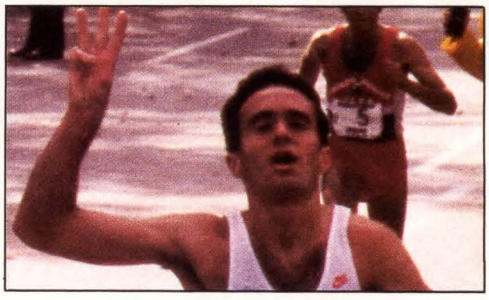
Copies Printed: 170,939

Features

110

126

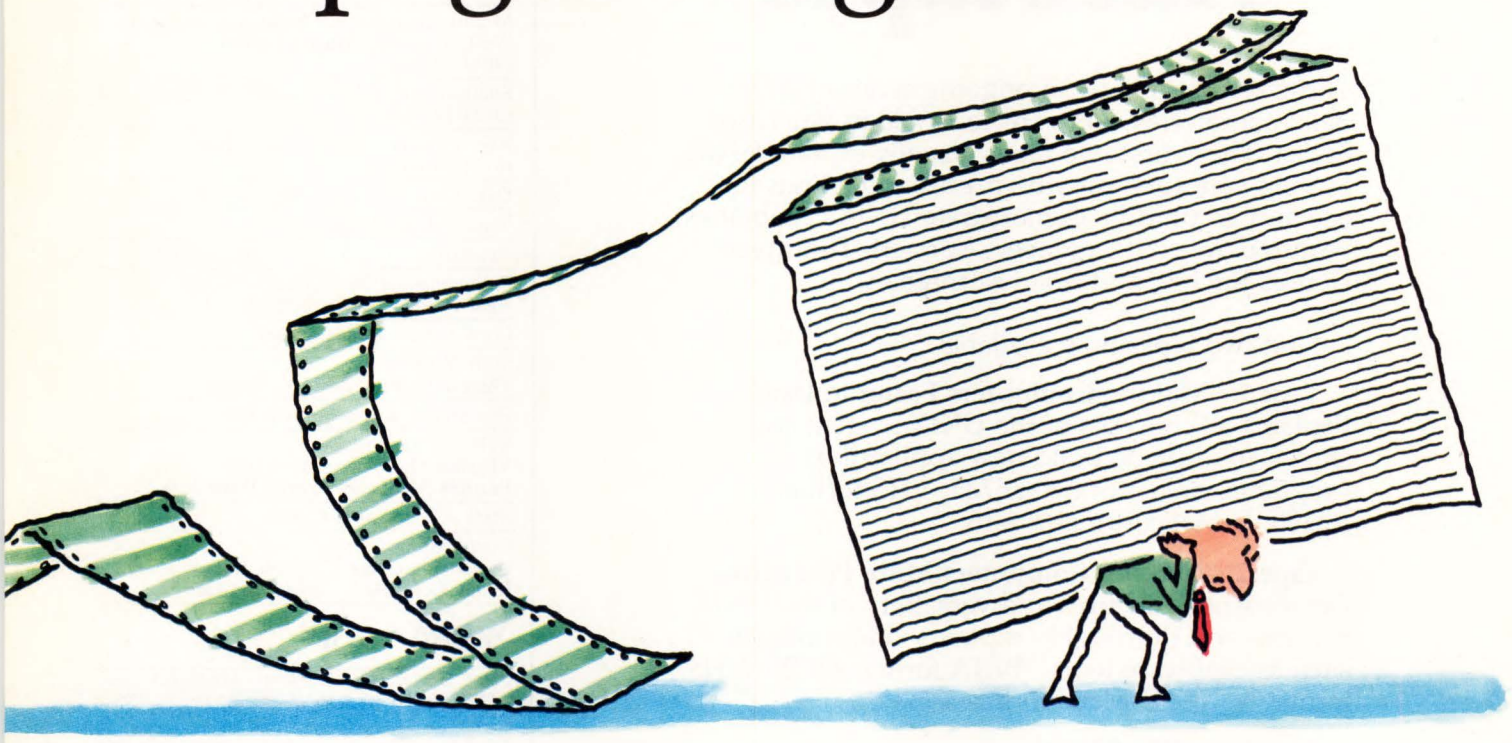
156



Columns / Departments

COVER PHOTO: Edward Hardin

Why do 10 page reports always have to be 100 pages long?



The problem is control. The solution? Value Computing's new Data Center Distribution System (DCDS). DCDS is online software that automates your control of report routing and distribution, streamlines an otherwise labor-intensive and wasteful process, and lets you give report users exactly the information they want, precisely when they need it.

The cost-effectiveness of DCDS gives your datacenter a quick pay-back. The saving in paper alone is tremendous. That's because the customizing parameters in the DCDS database break each report into individualized versions for recipients. If certain users want only pages 7–18, they receive exactly what they specify—no more, no less, and on time.

It's automatic, online, in real time, with no hooks to the operating system and only one JCL change per job.

And DCDS is "datacenter friendly." Implementing it causes no disruptions and requires no extensive retraining of personnel. Plus, distribution information is in the data base; it won't get lost and can be changed via simple, online screens.

What's in it for large user organizations? More efficient report distribution . . . reduced paper cost . . . better use of human and computer resources . . . less confusion and waste . . . happier end users. With DCDS, report printing and distribution is no longer dominated by CPU and JCL considerations. The focus is on the report recipient, where it belongs.

DCDS is flexible and integrates with all other Value Computing software—Data Center Management System, Comput-A-Charge, Valu-Lib, and SMF Express—for complete datacenter control.

Call for the details on our new Data Center Distribution System.

VALUE COMPUTING

THE OPTIMUM SOFTWARE FOR DATA CENTER MANAGEMENT

Value Computing, Inc., 498 N. Kings Highway, Cherry Hill, NJ 08034 (800) 257-8242. In New Jersey (609) 482-2500

CIRCLE 2

COMPUTER DECISIONS

Headquarters Office
10 Mulholland Dr., Hasbrouck Hts., NJ 07604, (201) 393-6000

Publisher/Vice President: **Don Huber**

Editor: **Mel Mandell**

Managing Editor: **Donne Florence**

Senior Editor: **David Whieldon**

Software Editor: **David J. Kull**

Art Director: **Bonnie Meyer**

Midwestern Editor: **Jan Snyders**

Microsystems Editor: **Susan Foster Bryant**
Western Editor: **Martin Lasden**
(408) 736-6667

Southwestern Editor: **Jennifer E. Beaver**
(213) 548-7877

New England Editor: **Mary Miles**
(617) 746-4441

Data-Comm Editor: **John Seaman**

News Editor: **Joseph Braue**

Associate Art Director: **Lynn M. Holl**

Production Editors: **Claudia Nalven**
John Rymer Susan Trembly

Copy Editor: **Donna Jackel**

Staff Writers:
Theresa Conlon, David R. Roman

Researcher: **Karen S. Schwartz**

Editorial Support Staff:
Virginia M. Johnson, Supervisor
Patricia McShane, Joanne Wendelken

Staff Artist: **Laura Conca**

Contributing Editors:
Gideon I. Gartner Joseph Hillhouse
Randy Goldfield Ilene McGrath

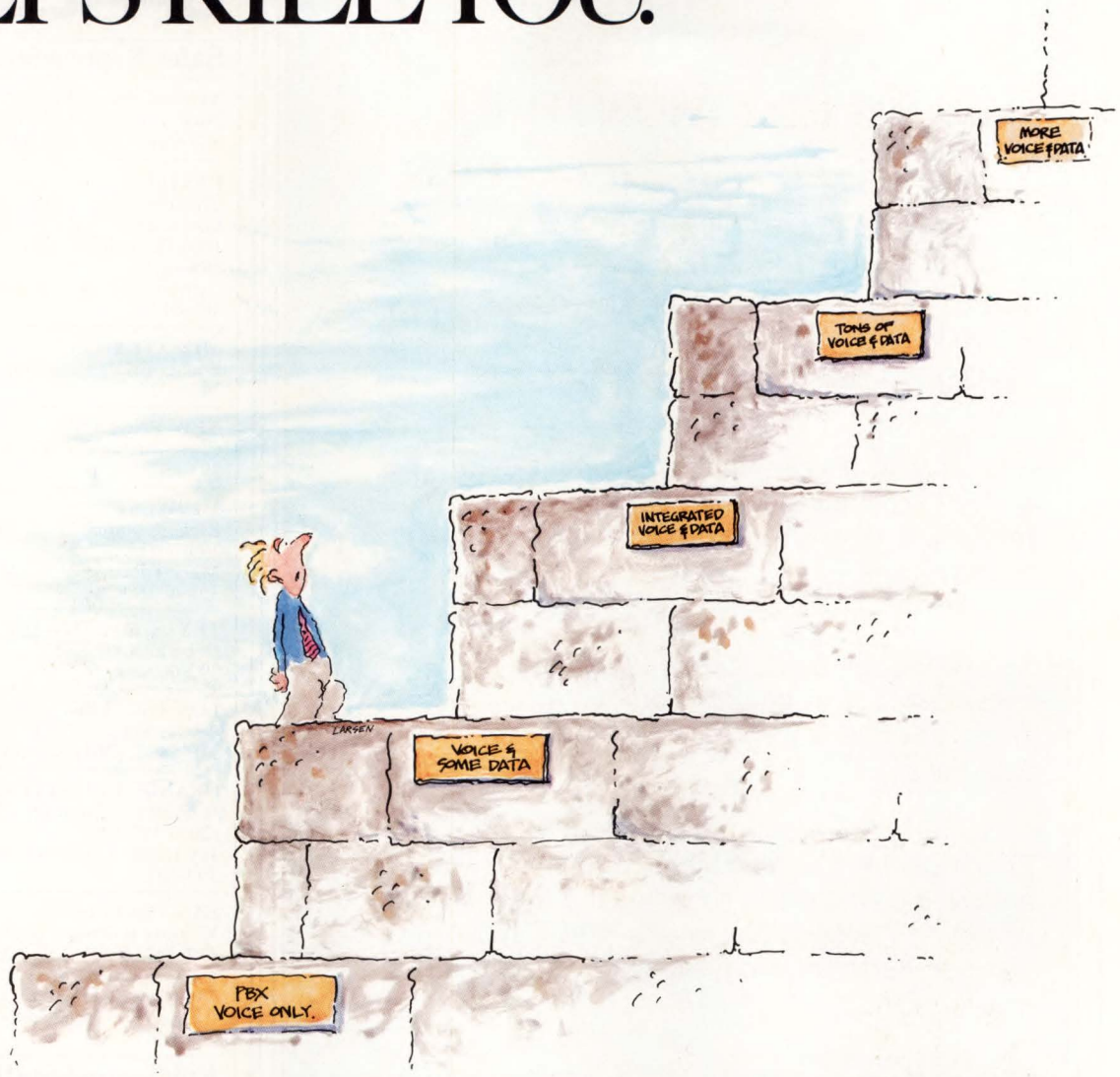
VBPA ABP

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.

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.

Back issues of COMPUTER DECISIONS are available on microfilm, microfiche, 16mm or 35mm roll film. They can be ordered from Xerox University Microfilms, 300 N. Zeeb Rd., Ann Arbor, MI 48106. For immediate information, call (313) 761-4700.

DON'T LET THE STEPS KILL YOU.



Take The Ramp. ROLM has perfected a breakthrough communications controller: The CBX II.

It's the centerpiece for a spectacular new ROLM® business telephone system — the fastest, most advanced way to manage voice and data in the world.

Instead of the typical stops, starts, steps and plateaus of expansion, CBX II lets you grow smoothly, easily and very, very cost-effectively.

You can move up The Ramp from sixteen phones to more than ten thousand phones, terminals and personal computers. You can store and forward messages. You can monitor costs. You can have the least expensive long distance routes automatically, instantly. You can even network networks, from Dow Jones to the IBM Infonet. And we're plugged into IBM and HP and DEC and Data General and the other movers and shakers to guarantee that we can take their new products and new systems in stride.

The CBX II is just the latest reason why ROLM is the choice of more than two-thirds of the *Fortune 500* companies, why more than fourteen thousand ROLM systems are up and running today.

When it's all said and done, the best thing about The Ramp is that it ends that recurring nightmare that you may be buying a business communications system that can't grow, can't change or has a big, gee whiz capability missing.

Make your life a lot simpler. Just skip the steps and take The Ramp. **ROLM**

4900 Old Ironsides Drive, M/S 626, Santa Clara, CA 95050 • 800-538-8154. (In Alaska, California and Hawaii, call 408-986-3025.)

CIRCLE 3

ADVERTISING OFFICES

Sales Representatives

National Sales Manager
Nick Bubany, 10 Mulholland Drive
Hasbrouck Hts., NJ 07604, (201) 393-6012

EASTERN
Christine Uhre, (201) 393-6007
Lori Lippin, (201) 393-6021, (212) 369-6601
Joan DeSaulniers, (201) 393-6025, (203) 869-1530
Cynthia Peyton, (201) 393-6024, (914) 368-0148

MID-ATLANTIC
Bonnie Breslauer, (703) 379-0346, (201) 393-6025

NEW ENGLAND
Chris Dobbrow, (617) 358-4146, (201) 393-6021

MIDWEST
Richard Julius, (312) 337-0588, (201) 393-6021
Mark Hickey, (312) 446-6893, (201) 393-6025

TEXAS/SOUTHWEST
Deborah Goldsmith, (214) 239-3467, (201) 393-6024

LOS ANGELES/NORTHWEST
Denise Sinnott, (213) 641-6544-45-47, (818) 289-5425, (201) 393-6024

ORANGE COUNTY/SOUTHWEST
Kathleen Kosanovich, (213) 641-6544-45-47, (201) 393-6007,
Jay Leech, (213) 641-6544-45-47, (201) 393-6021

SAN FRANCISCO
Virginia Pohlman, (408) 736-6667, (415) 332-3075, (201) 393-6025
Heidi Spencer, (408) 736-6667, (415) 789-5119, (201) 393-6024
Cherie LaFrance, (408) 736-6667, (201) 393-6007

Publication Staff

Promotion Director
Rayna Gillman

Production Manager
Craig Balick

Assistant Production Manager
Richard Macnamara

Promotion Copywriter
Claire Nemes

Production Assistant
Fran Nelson

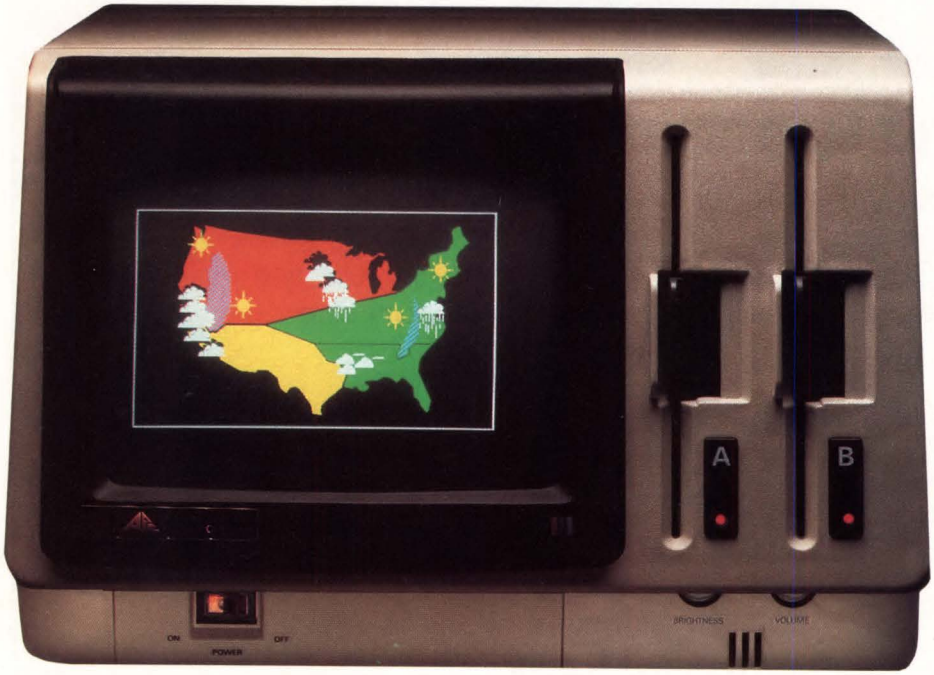
Circulation Director
Barbara Freundlich

Fulfillment Manager
Cindy Stump

Research Manager
Irene Chervin

COMPUTER DECISIONS

HAVE YOU BEEN BLIND COMPUTER WITH THE



NEC's Advanced Personal Computer offers the sharpest color graphics of any personal computer.

NEC's Advanced Personal Computer offers the widest range of quality graphics.

One reason the APC is better is that it lets you do more kinds of graphics than any other personal computer.

In fact, it gives you the kind of graphics you'd expect only from a much more expensive computer.

With the APC, you can produce color transparencies, color slides, or output to a variety of printers and plotters.

You can even do Computer Aided Design (CAD).

Our screen is graphically better.

Seeing is believing. And one look at our color screen will prove it's the best.

But it's no accident. It starts with the NEC 7220 graphics processor, the most advanced graphic chip available.

Then, unlike other PC's, the

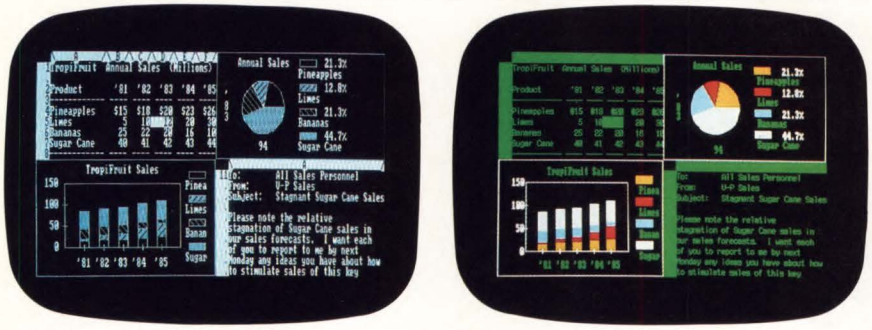
Graphics are being used more and more by businesses every day. They give companies a clearer picture of their place in the market. They make for more effective presentations. And with slides and color transparencies, they can let a room full of people see the same thing at once. Although most people see the value of graphics, very few are aware of the personal computer that lets them create the best color graphics.

It's the Advanced Personal Computer from NEC.

This slide was produced from the screen using Videograph™ software, an inexpensive Screen Shooter™, and Polachrome™ 35mm film, in less than 5 minutes. For less than $1.00!

Context MBA is a trademark of Context Management Systems, Inc. Graphwriter is a trademark of Graphic Communications, Inc. Graphplan is a trademark of Chang Labs, Inc.

TO THE PERSONAL BEST COLOR GRAPHICS?



Context MBA™ runs in high resolution color on the APC. But it can only run in one color on the color monitor of the leading brand.

APC graphics option has its own dedicated memory, so there's never a tradeoff between color and resolution.

Software will make you a big-time producer.

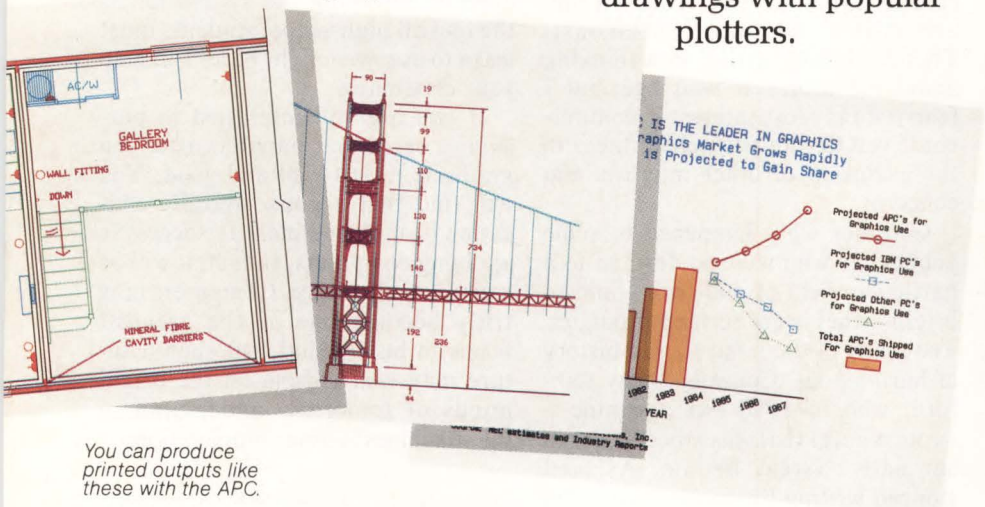
Better hardware alone isn't enough. You also need better software. And NEC provides that, too.

Take Graphplan™ for example. Graphplan can take spreadsheet format data and produce customized business graphics on paper. Instantly.

Graphwriter™ will let you produce professional color graphics in over 20 different formats. Then turn them into transparencies or hard copies using the most popular pen plotters.

Videograph™ makes creating free-form color images for slide presentations easy and inexpensive.

Autocad™ lets architects, engineers and designers create sophisticated graphics and designs, then produce precise drawings with popular plotters.



You can produce printed outputs like these with the APC.

This software combined with the APC hardware will give you the best graphics you can get on any personal computer.

For the complete picture, call NEC.

For product literature on any of NEC's APC graphics capabilities, call 1-800-343-4419.

Designers can use Autocad™ to make the design process faster and easier.

In Massachusetts, call 1-617-264-8635.

And find out why more and more graphics users with vision are saying "NEC and me."

NEC AND ME

NEC Information Systems, Inc.
1414 Mass. Ave.
Boxborough, MA
01719

Screen Shooter is a trademark of NPC. Polachrome is a trademark of Polaroid. Videograph is a trademark of Xiphias. Autocad is a trademark of Auto Desk, Inc.

INSIGHT

Slow down, Paul!

The following letter, which had been written on a computer and printed on a dot-matrix machine, recently arrived at the offices of *Computer Decisions:*

I am writing for information on the job of Systems Analyst. I am interested because I like computers and logical thinking. I am 13 years old and in the eighth grade.

Thank you for the information. Please respond rapidly; I will be anxiously waiting.

Paul Streaker
Westminster, MD

Illustration by Dan Culhane

I am not going to answer Paul's request for information directly because I don't believe it would be in his best interest if I did. However, I do have some advice for him: Slow down!

Setting the job of systems analyst as a goal is fine, but I hope you don't become too single-minded in your pursuit of it. I strongly urge you to complete a well-rounded high-school and college education. There's so much more to computers than the technical analysis of systems. In the application and management of computers, the toughest challenges are *human*, not technical. Computers are used by *people* doing jobs that more often than not were defined before the computer age. To be productive, computer applications must be more closely matched to the jobs employees do and to organizational goals. Making these matches is a difficult task that some observers believe demands a new generation of managers.

Because you are so strongly motivated to learn about computers, Paul, I suspect that you plan to major in computer science when you enter college in four or five years—if you are still a computer enthusiast. There's nothing wrong with thinking about the future at your age, but I fear you may lose interest in computers if you devote yourself to them to the exclusion of other interests and concerns.

Consider what happened to some youngsters who were so devoted to a particular field of endeavor—and so bright—they were termed prodigies. Too many of them have a sad history of burning out. Consider Daisy Ashford, who in 1890—at age nine—wrote a novel that was a best-seller in her native Great Britain. Ashford stopped writing for publication when she entered her teens. William James Sidis, a mathematical prodigy at the turn of the century, dropped out of life after graduating from Harvard at the age of 15. Of course, other prodigies have gone on to become super achievers.

Instead of setting a specific job title as your goal, I suggest that you try to learn as much as you can about many fields. Make becoming a well-rounded individual your goal. Instead of computer science, you might study liberal arts. This is not to say you should give up your interest in computers. In fact, I wouldn't be surprised if in future years you are able to earn pocket money, or even a substantial portion of your college tuition, by teaching fellow students how to use computers. Today, the personal computer is replacing the typewriter as the tool all high-school students must learn to use; you might be able to help your classmates.

If you are still interested in pursuing a career in computers after you graduate, that's well and good. You will find that a not-so-specific education is no impediment to success in applying computers. In fact, it will be a distinct advantage. Computers may truly become one of the greatest boons to humankind, but such a future may well depend on the bright minds of tomorrow understanding the machines' human implications.

Mel Mandell

Only Texas Instruments packs more portable terminal into less space.

Here's a brief case for the Texas Instruments *Silent 700*™ Model 707 Portable Data Terminal. It's the latest and lightest in a long line of standard-setting *Silent 700*™ terminals. And it's the most versatile full-function portable anyone can pack into a briefcase.

By carrying TI's Model 745 one step further, we made the best even better. The 707's standard internal modem connects to any telephone network while the optional acoustic coupler and battery pack make it fully portable. The spreadsheet size 132-column printer is now standard. And TI's solid state plug-in cartridges can add functions for your current use and later expansion.

For the standard-setting terminal that packs more product into less space, get the TI Model 707. At only six pounds, it packs more full-size functions than any other portable . . . all at a surprisingly low price. For more information contact: Texas Instruments Incorporated, P. O. Box 402430, Dept. DTB-163OC, Dallas, Texas 75240. Telephone 1-800-527-3500.

TEXAS INSTRUMENTS

Creating useful products and services for you.

2763-39MIS

news & comment

Chargeback claims info-center role

Almost one-third of the information centers queried in a recent survey charge users for their services. In the sampling of 169 information centers, primarily in Fortune 1,000 corporations, 32 percent have chargeback policies, 7 percent are planning to implement them, and 61 percent do not charge users for the resources they use.

The survey was conducted last winter by Crwth Computer Coursewares, Santa Monica, CA, a computer-based-training outfit. About half of the respondents are information-center managers. The remainder are data-processing trainers, product/educational consultants, systems analysts, and others who work closely with information centers.

Introduced during the late '70s, information centers were designed to train and educate end users so they could use corporate information resources to improve decision-making and raise productivity. From their inception, a debate has raged over the merits of charging users for use of equipment and services provided by information centers. For instance, among respondents in the Crwth survey, several centers with chargeback policies claim users have a better awareness of the cost of computer time if they are charged for it. Centers that do not have chargeback systems claim users are more creative in their use of information centers if their department doesn't have to pay.

Among the information centers surveyed by Crwth, there was no standard chargeback system. Some information centers charge users only for machine time and provide free consultation services. Other centers charge a flat rate or include labor as part of a data-processing charge.

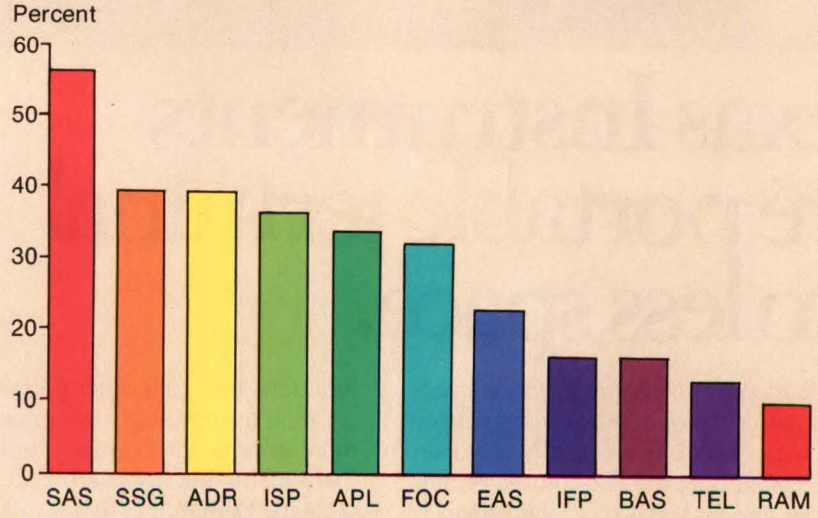
Chargeback systems are not viewed as a major obstacle to increased use of information centers by the respondents. The biggest barrier to growth is a lack of data-processing trainers, the study indicates. Only 12 percent of the respondents believe their information centers were implemented with enough data-processing trainers and educational/product consultants. As might be expected, Crwth, a vendor of computer-based training, concludes that the shortage of trainers may be remedied only by introducing state-of-the-art training technology into information centers.

Among the respondents, 55 percent use computer-based training. Virtually all the information centers using computer-based training believe it makes training more available and individualized. Almost 90 percent of the respondents report that computer-based training decreases scheduling problems and about 80 percent say it improves their ability to reach remote users.

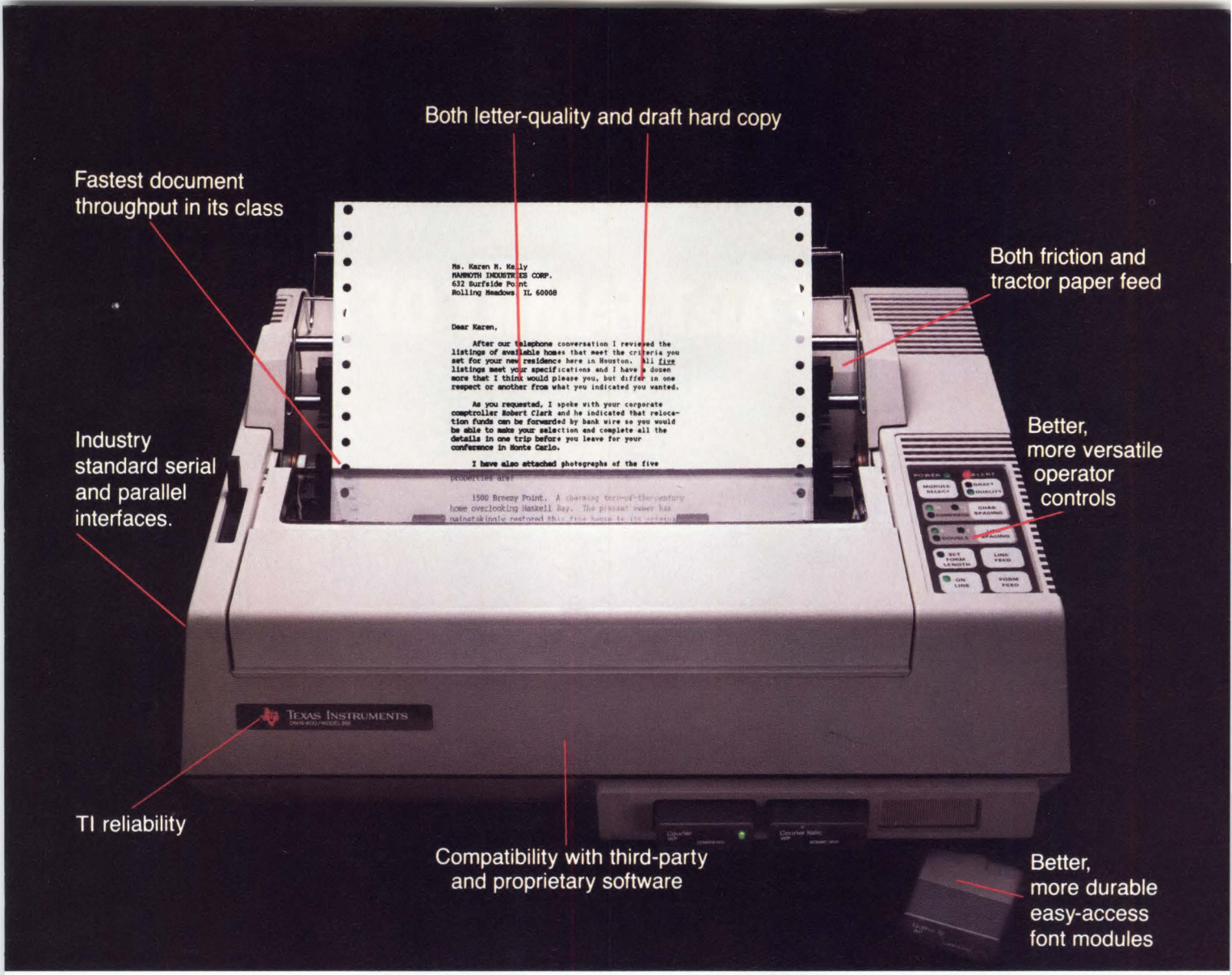
Most (58 percent) of the information centers set up in the past year have between one and three full-time staff members. Of the centers more than a year old, about 40 percent have between one and three full-timers, but 30 percent have more than six full-time staffers.

The other major barriers to information-center growth cited by respondents are lack of user awareness (80 percent), dp resistance (71 percent), and reluctance on the part of management toward developing the facilities (63 percent). *(Continued)*

Favorite information-center software



Key: SAS—Statistical Analysis Software; SSG—SASGraph; ADR—A Departmental Reporting System; ISP—Interactive System Productivity Facility; APL—A Programming Language; FOC—Focus; EAS—Easytrieve; IFP—Interactive Financial Planning System; BAS—Basic; TEL—Tell-a-graf; RAM—Ramis.



Introducing the TI 855 microprinter. No other printer says better so many ways.

Feature for feature, no other microprinter can match the versatility, compatibility, reliability and productivity of the OMNI 800* Model 855 microprinter. Here's why.

Two Printers In One. With the TI 855 you get the speed of dot matrix draft copy. Plus the precise clarity of the most advanced matrix technology for letter-quality print. It's two printers in one — at one low price.

A Great Family Name. Texas Instruments is known for providing the world with the industry standard for printers — the TI 810. TI builds the same reliability into every 800 series microprinter. Both the 855 and the data processing Model 850 are part of the expanding TI line of high-performance, low-cost microprinters.

Hardware Compatible. The TI 855 microprinter is compatible with all major PC hardware. And it provides both serial RS232C subset and "Centronics-type" parallel as standard interfaces.

Software Compatible. The TI 855 uses industry standard escape sequences for compatibility with virtually all third-party software. And for those with proprietary software needs, a model is available with ANSI standard escape sequences.

Tough Font Modules For Quick Character Change. Three font modules can be inserted into the front of the printer at one time, and are accessed individually. Each contains both draft- and letter-quality character sets. They're easier to use, more reliable and more durable than traditional metal or plastic daisy wheels.

More Productivity Than Any Other Microprinter. The 855 offers both friction and tractor paper feed, to handle all types of word and data processing applications. A quick-change snap-in cartridge ribbon. Raster and mosaic graphics. And intelligent printing which maximizes document throughput — regardless of format.

Get the printer that makes for better information systems. For more information visit your nearest TI authorized dealer or write Texas Instruments Incorporated, P.O. Box 402430, Dept. DPF-0830C, Dallas, TX 75240. Or call toll-free: 1-800-527-3500.

TEXAS INSTRUMENTS

Creating useful products and services for you.

THE AT&T FAMILY OF DATAPHONE

You need to move more data than ever before. And it has to move fast.

AT&T Information Systems can help. We have a full line of modems and advanced diagnostic systems—all designed to keep your data coming loud and clear.

A full line of fast-talking modems.

Whether you need to transmit data over private or switched lines, AT&T Information Systems has a modem to make waves.

We offer a full line of asynchronous and synchronous modems—suitable for either multi-point or point-to-point connections—that get data moving at speeds ranging from 300 to 9600 bps.

We keep an eye out for trouble.

You need more efficient, reliable network management. Our DATAPHONE*II Service meets that need.

It combines synchronous analog data transmission at speeds ranging from 2400 to 9600 bps with a network diagnostic system on four levels.

As your system grows, you can upgrade by adding new equipment to monitor and control the data sets you already have.

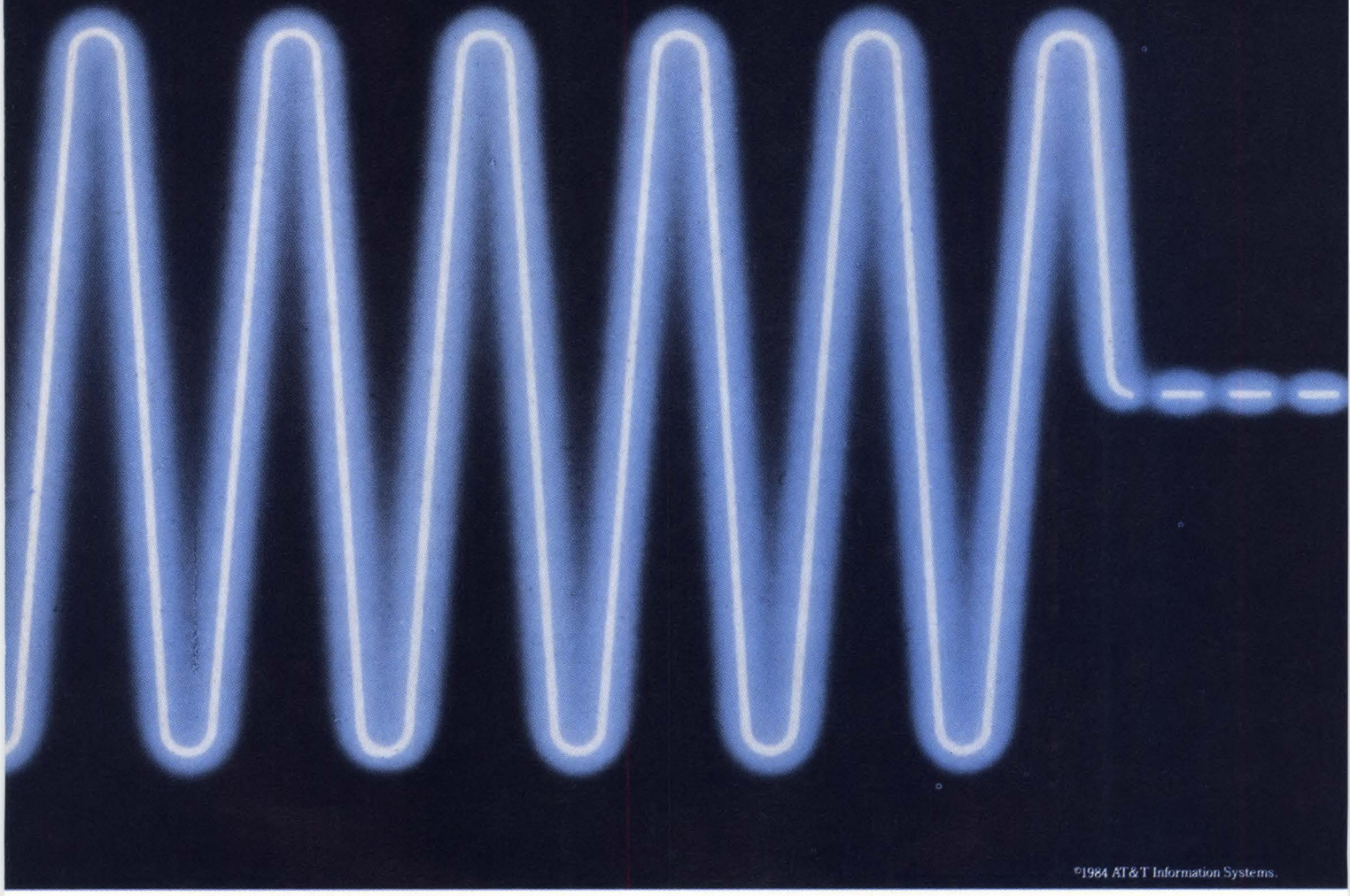
On all levels of our service, diagnostics are separated from your host computer. You save costly processing time. System malfunctions are detected automatically, isolated and repaired without disabling your entire network.

Level I utilizes stand-alone data sets with enhanced operational and built-in diagnostic features. It monitors the signal on a low end frequency band to guarantee the integrity of your data.

Level II offers more advanced diagnostics for small- to medium-sized networks. A Diagnostic Controller is added to centralize network control and testing. Up to 256 control modems can be monitored through this single desk-top console.

Level III incorporates the Diagnostic

MODEMS. WE MAKE WAVES.



Controller, and adds a Network Controller and CRT for expanded diagnostics and control. Adding a printer provides hard-copy reports of faults and test results.

DATAPHONE II Service Level IV is our newest offering, with eight times the capacity of Level III. Its design and functionality are ideally suited to the largest, most complex networks.

A System Controller manages eight systems, each with four-tier addressing and real-time monitoring. A color CRT provides graphic display of reports. Trends can be analyzed quickly, adjustments made and future problems avoided.

A unique benefit available with DATAPHONE II Service is remote 24-hour monitoring at one of our nearby AT&T Data Maintenance and Operations Control Centers.

We bring you outstanding credentials.

AT&T led the communications revolution over 100 years ago. Our products set the industry standards for performance and reliability.

Today, we're applying our resources to provide a growing line of data transmission products. Products developed through the research of AT&T Bell Laboratories, and supported by the largest, most experienced sales and service force in the industry.

Our DATAPHONE products incorporate Information Systems Architecture, the design principle that integrates our products so they perform as one system. As you grow, the flexibility of Information Systems Architecture allows for easy system expansion.

To learn how our family of DATAPHONE Modems can increase your profits and productivity, call 1-800-247-1212, Ext. 328.

WHEN YOU'VE GOT TO BE RIGHT.

AT&T
Information Systems

(Continued from page 12)

Who uses information centers? The Crwth study indicates that one-fourth of the users are clerical and administrative personnel seeking training in the basics of information processing. Business analysts seeking decision-support aids such as forecasting, modeling, and statistical analysis comprise 36 percent of the users in the respondent information centers. Fifteen percent of the users are supervisory personnel seeking to generate reports, electronic spreadsheets, and graphs. Dp professionals also use the information centers to develop applications software in a fraction of the time and cost of using Cobol and Fortran, according to the survey.

Higher productivity is the best benefit of information centers to users, according to 72 percent of the respondents. Improved use of information resources, higher computer literacy, appreciation of computer systems, and higher dp productivity are also cited by respondents.

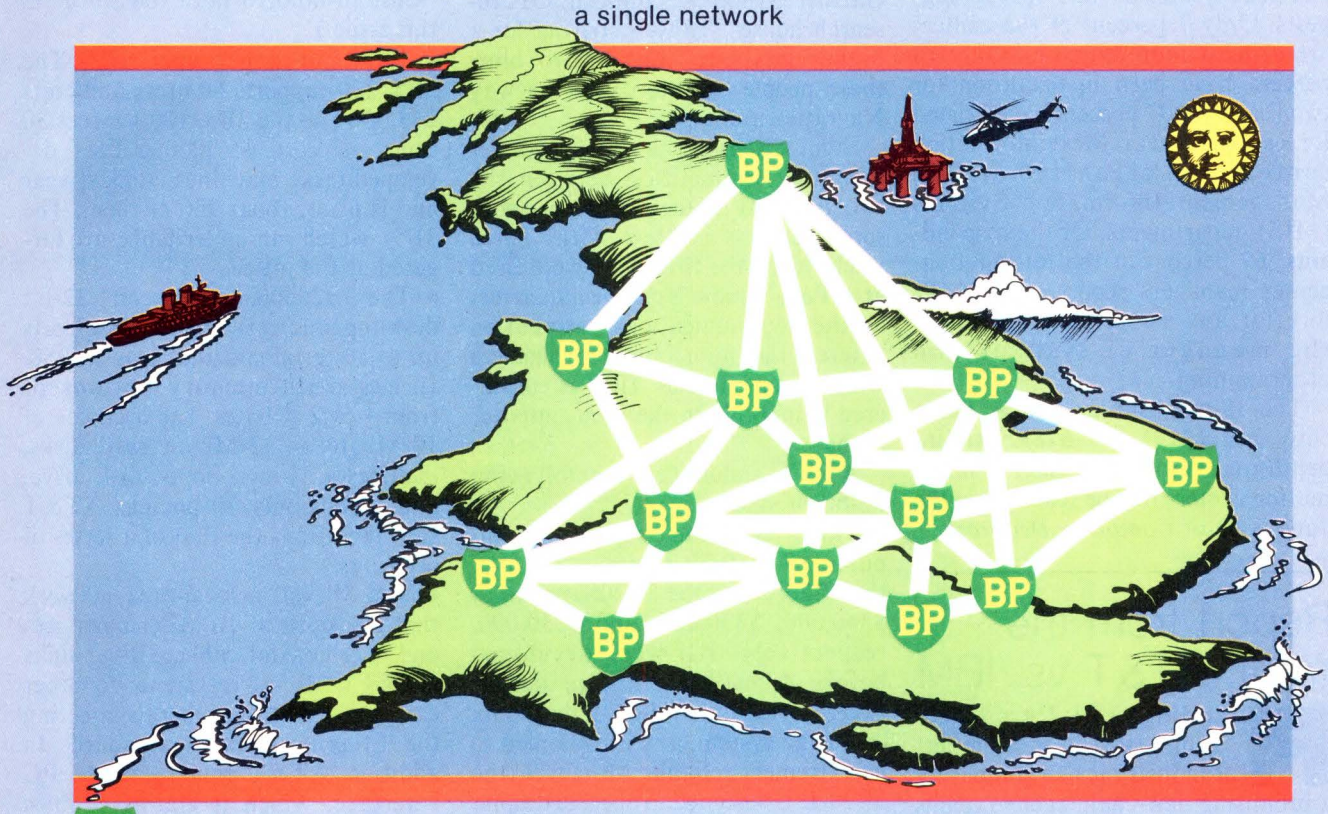
Of those polled, 67 percent believe the information center has reduced a backlog of dp projects. Information centers are also credited with cutting the "invisible" backlog, or the ideas for projects that are never submitted to the dp department because users are discouraged by the likelihood of prohibitive delays. However, only 15 percent of the respondents consider backlog reduction a major benefit.

The survey also examines the software packages used by information centers. On the personal-computer side, 54 percent of the information centers support Lotus 1-2-3, an electronic spreadsheet from Lotus Development Corp., Cambridge, MA. On the mainframe side, almost 60 percent of the respondents support Statistical Analysis Software, a report-generating package from SAS Institute, Cary, NC. Other widely used packages include SAS Institute's SASGraph; IBM's A Departmental Reporting System (ADRS), Interactive System Productivity Facility (ISPF), and A Programming Language (APL); Focus from Information Builders Inc., New York; Easytrieve from Pansophic Systems Inc., Oak Brook, IL; Interactive Financial Planning System (IFPS) from Execucom Systems Corp., Austin, TX; Tell-a-graph from Integrated Software Systems Corp., San Diego; Ramis from Mathematica Products Group, Princeton, NJ; and Basic, the popular programming language.(See chart.)(Continued on page 18)

Compatibility

for private networks

Integrating dissimilar
communication devices into
a single network



BP BRITISH PETROLEUM

wanted a simple, cost-effective way to access their IBM, Digital, and Univac computers with any terminal.

TYMNET technology integrated all of BP's computers and terminals into a private data network that simplifies terminal-to-host communications.

Now, from one terminal, a British Petroleum user can access any computer in their private data network.

The reason?
Network compatibility.

TYMNET technology supports **X.25, async, 3270 Bisync, SDLC, RJE/HASP, X.PC,** and many nonstandard protocols.

Major corporations, like BP, are benefiting from TYMNET's advanced communications technology. Put a TYMNET private network to work for you. Call or write for more information.

TYMNET, Inc.
2710 Orchard Parkway
San Jose, CA 95134
(408) 946-4900

Private and Public Data Networks

TYMNET®
A Tymshare Company

CIRCLE 9

(Continued from page 16)

Information centers have been rapidly increasing in number in the last four years, as this survey suggests. Only 7 percent of the centers are at least four years old. Only 18 percent have been in operation for two years and 37 percent have existed for less than a year. Most information centers are organized within Management Information Systems (MIS) departments. Of the respondents, 63 percent of the information-center managers report to the MIS director and 26 percent are under the manager of systems and programming.

The 35-page survey is free. For a copy call (213) 391-6788. An in-depth roundtable discussion of information centers will be featured in the June issue of *Computer Decisions*.

Report from the front: AT&T vs. IBM

Assessing AT&T's chances against IBM in the computer industry is like comparing a promising new challenger to tennis star Martina Navratilova. "AT&T might be interested in *becoming* competitive in the computer business, but IBM is already competitive," says Dave Stein, co-founder of the Gartner Group, a Stamford, CT, research house. "IBM is striving for a higher goal—to continue to blow these people off the court the way Navratilova does."

Stein discussed the prospects for mounting competition between the two giants at a recent Gartner-sponsored seminar in New York. Three weeks later, the first shots were fired at AT&T's New York headquarters as the communications corporation entered the minicomputer business with six new models. IBM is considered vulnerable in the minicomputer arena.

AT&T announced the following 32-bit products:

- Three "high-end" super-minicomputers. The fault-tolerant 3B20-D, the 3B20A, and the 3B20S, priced at $340,000, $330,000, and $230,000, respectively. All were developed before divestiture, are in use at AT&T, run under Bell Labs' Unix operating system, and are claimed to be extremely reliable. Moreover, the 3B20-D is designed to operate despite hardware failures, repairs, and software updates. It might be especially useful for online banking and reservation systems, according to AT&T. (For more on fault tolerance, see "Custom-tailored fault tolerance" in this issue.)
- Two "mid-range" super-minis. The 3B5/200 supports 60 users and costs $73,000 and the 3B5/100 services 30 users and costs $57,000. AT&T developed these machines late last year and is using about 250 of them. The 3B5s, which run under Unix, are targeted at the office.
- The 3B2/300, a "low-end" 32-bit desk-top microsystem that supports up to 18 terminals and costs $9,950. It has main-memory options of from $\frac{1}{2}$ to 2 Mbytes, has a choice of 10-Mbyte or 32-Mbyte hard disks, includes a $5\frac{1}{4}$-inch floppy-disk drive, and weighs only 30 pounds. AT&T says the 3B2 is the first of a series of offerings.
- The 3BNet, a local-area network that transmits at 10 Mbytes per second over coaxial cable. 3BNet links AT&T's 3B microsystems to other computers and peripherals meeting the Ethernet network standard. In addition, AT&T announced the PC Interface, which it claims enables personal computers running under the MS-DOS operating system to

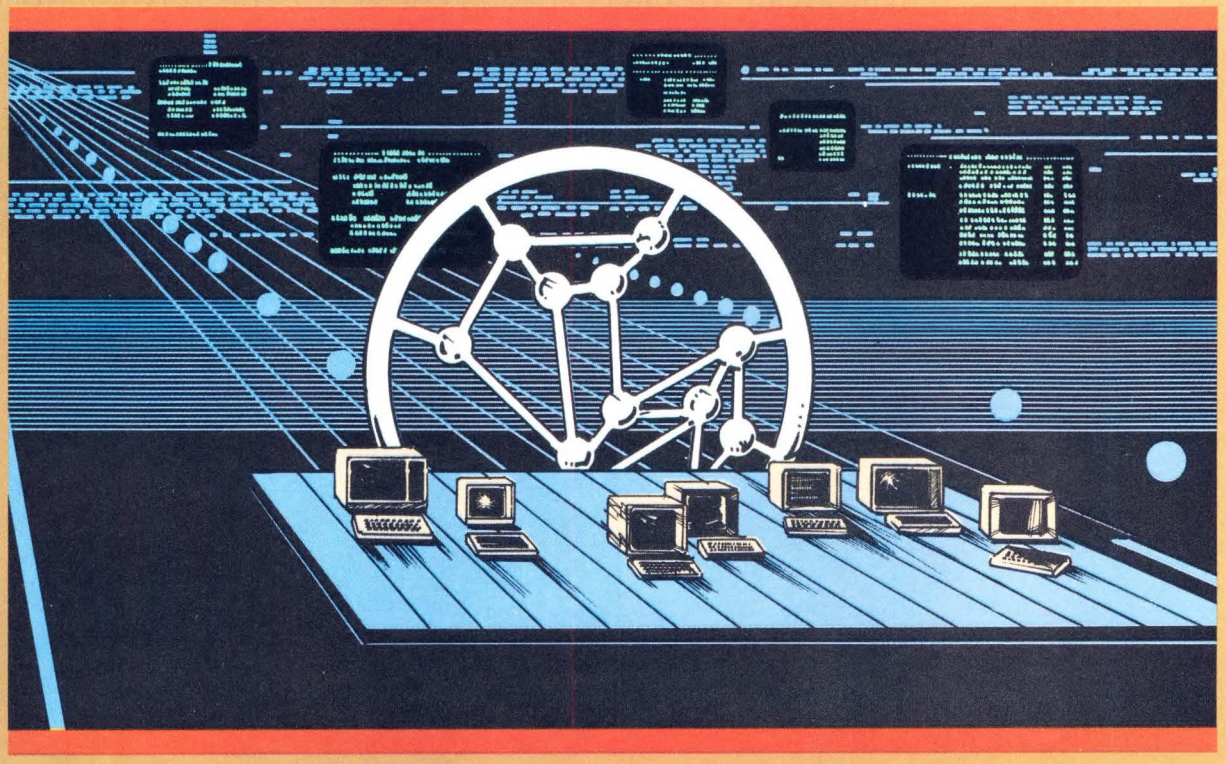
(Continued on page 22)

The tale of the tape

	AT&T	IBM
Revenues (1983)	$56.5 billion	$47 billion
Research organization	Best in business	Excellent
Product-development cycle	Slow	Accelerating
Manufacturing capabilities	Equal	Equal
Distribution channels:		
1. Direct	5,000 salespeople	12,000 salespeople
2. Indirect	926 Phone Centers	70 Product Centers
3. 3rd party	6,000 outlets	1,400 unaffiliated dealers
Responsiveness to change	Unknown	Proven
Product line	Emerging	Extensive but needs integration
Local-area network	Expected extension of System 85 PABX	Expected token-passing ring
Wide-area network	World leader	Efforts through Satellite Business Systems Inc. are struggling
Voice capabilities	Cornerstone of product line	No voice products announced in U.S.

3270 Access

Expanding 3270 access to any terminal you have



TYMNET simplifies 3270 access.

All it takes is a terminal and a local call to the TYMNET public data network.

We let you use the async terminals and personal computers you already have.

We give 3270 terminals the versatility they need to access async services and independently access 3270 applications on one or more hosts.

There's no hardware or host software to buy. And TYMNET delivers price performance other data networks can't.

What could be simpler?

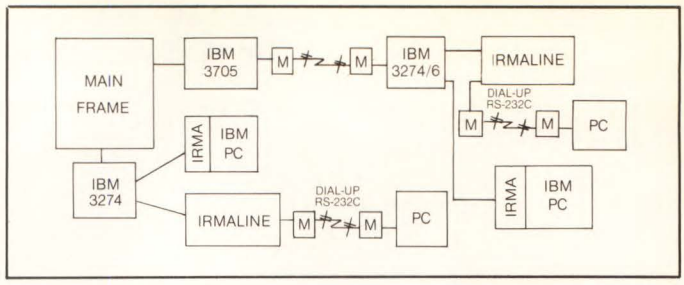
For more information, call or write for TYMNET's "3270 Access" brochure.

TYMNET, Inc.
2710 Orchard Parkway
San Jose, CA 95134
(408) 946-4900

Public and Private Data Networks

TYMNET®
A Tymshare Company

Here are two beautiful ways to get small computers on line with the mainframe quickly, easily and economically—yours from DCA, home of the industry's first coaxial cable links between small computers and IBM 3270 networks.



IRMA™ is the Decision Support Interface™ that gets IBM Personal Computers and IBM PC XTs into the 3270 mainstream via direct attachment to 3274 or 3276 controllers.

IRMA™ and IRMALINE™. The DCA family connections that help small computers think big.

IRMALINE™ does the same for remote IBM PCs, IBM PC XTs, Apple Lisas and DEC Rainbows, among others, with just a local phone call to a nearby 3270 controller.

Both can go to work literally minutes out of the box. Both provide mainframe data access, selection and storage, and data communication back to the mainframe.

Put first things first. Find out more about the DCA first family of 3270 micro/mainframe connections. For information, write DCA, 303 Technology Park, Norcross, Georgia 30092. Phone (404) 448-1400, TLX 261375 DCA ATL. Or call us toll-free (800) 241-IRMA.

dca®
Digital Communications Associates, Inc

IBM PC and IBM PC XT are trademarks of International Business Machines Corporation. Apple and Lisa are trademarks of Apple Computer, Inc. Rainbow is a trademark of Digital Equipment Corporation.

CIRCLE 11

(Continued from page 18)

communicate with the 3B2. Many personal computers could share files on the central 3B2 machine, AT&T asserts.

Unlike Apple and other vendors that disclose production figures to assure users of their products' availability, AT&T had not said, at press time, how many of the machines it is manufacturing and when they will be ready for distribution, notes Kenneth G. Bosomworth, president of International Resource Development in Norwalk, CT. Currently, most of the products will only be available to original-equipment manufacturers and value-added resellers. Only when the machines are available with software will they be able to be judged against IBM's current offerings, analysts say.

To James E. Olson, chairman of AT&T Technologies Inc., AT&T's announcements show "we're into this business in a big way and we're into this business to stay." To MIS/dp managers, however, AT&T's big splash doesn't mean too much, according to several experts. "This announcement is not something that directly affects these executives," says Thomas R. Billadeau, president of The Office System Consulting Group Inc., Cambridge, MA. "They should certainly not feel that they have to do business with another vendor because that vendor is not yet ready to sell to them."

Users at the Gartner Group seminar were not pleased about the prospect of having AT&T sales representatives appear at their doors offering yet another line of incompatible office equipment. Almost all the attendees indicated that they have IBM shops strung together with Big Blue's architecture, and their remarks suggest that AT&T might get along better by going along with IBM, at least for the time being.

Most eloquent among the users was James McGrath, director of administrative services at the Pennwalt Corp., Philadelphia. "AT&T has to find a way to fit into our environment," he said. "We're not going out of our way to fit into its scheme. It has to come up with something we can use with the equipment we have and it has got to do it at a reasonable price. If it does, a whole lot of organizations, including us, will be interested in buying AT&T products."

If, as analysts say, AT&T's entrance into minicomputers was a tentative first volley, what can users expect from the corporation's game plan?

(Continued on page 26)

MITRON'S STD 1600 Simplifies Data Transfer By Communicating Off-Line Tape-To-Tape

Mitron's STD 1600 provides an efficient method for sending and receiving data anywhere in the world. STD 1600s communicate with each other and with other companies' bisynchronous terminals and computers.

The STD 1600 solves machine compatibility problems. It transfers data reliably without mailing tapes. It can communicate off-line to relieve an overworked computer.

STD 1600s transfer data at speeds up to 56KB. Double-buffering eliminates delays caused by read/write cycle times.

The STD 1600 can be leased or purchased.

STD 1600 features:

- Easy-to-install
- Needs no software
- Data rates to 56KB
- RS-232 or V.35
- Dial-up or private line
- Multiplexers
- 800 or 1600 bpi
- 1200′ or 2400′ reel sizes
- Bisynchronous protocol
- Transparent or non-transparent
- Space compression
- Variable size records to 16K
- Labels and multiple files

STD 1600 options:

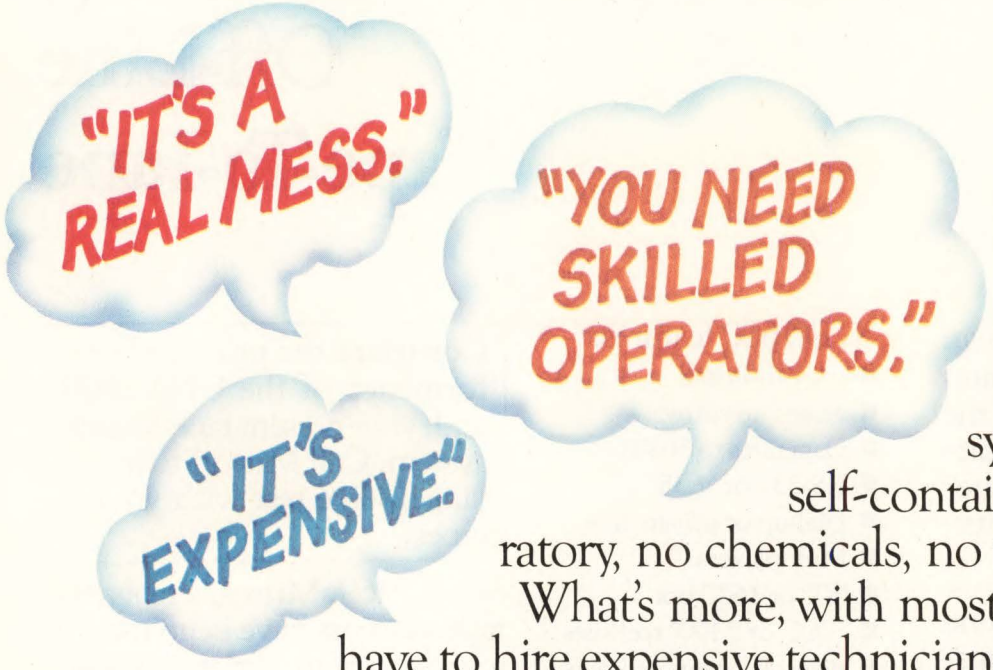
- Autodialing
- Asynchronous
- Code conversion
- Modem eliminator

Compare the price and performance of the STD 1600 with your present tape-to-tape system. Call Mitron to arrange a live test with your tapes.

Since 1969, Mitron's magnetic tape systems have been used in a wide variety of data communications applications. Let one of our Applications Engineers explain how you can connect the Mitron STD 1600 to your system or data communication network. Call 800-638-9665. (In Maryland, call 301-992-7700.)

MITRON
Systems Corporation
2000 Century Plaza, Columbia, MD 21044

Forget all the you've ever in-house CO



Today's COM from Bell & Howell is a whole different story. Our 6650 is a compact, dry system that's totally self-contained. There's no laboratory, no chemicals, no water. Nothing!

What's more, with most COM systems, you have to hire expensive technicians. And put up with frustrating operating procedures that often cause delays.

But not with the 6650. It was designed specifically for DP environments. It's as easy to operate as most line printers. So your staff can use it with minimal training. And because it operates online, it can produce your data in real time.

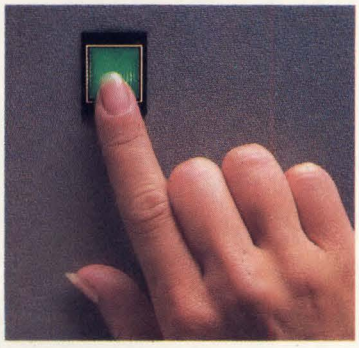
All you have to do is enter a few simple English language commands. The 6650's software will take over from there.

COM PRODUCTS

dirty stories heard about M printing.

It can handle microfiche production. Create and maintain job setups. And even produce audit trails. All at the same time.

Meanwhile, you won't have to interfere with your host computer's



1. To load the 6650, simply insert the film. There are no messy chemicals.
2. When you're ready to print, it's easy. Just press a button.
3. Your fiche will be ready in seconds—for a fraction of what it would cost to put the same data on paper.

software because the 6650 has its own minicomputer and emulates an IBM® 3211 printer.

And here's another surprise: Your end users will appreciate the sharp, clean images from the 6650's dry process.

Isn't it time you learned more about Bell & Howell's clean new approach to COM? Call our marketing manager toll-free at (800) 538-4000.
In California, call collect, (714) 660-1050.

BELL&HOWELL
COM DIVISION

CIRCLE 7

(Continued from page 22)

Users can expect a lot, asserted Stephen Cohen, vice president of the Gartner Group Industry Service, at the recent seminar. AT&T wants to be the "end-to-end information-products and -services provider," he said.

In addition to its own computers, AT&T will be offering a variety of workstations and minicomputers, some from outside sources. One source will be Convergent Technologies of Santa Clara, CA, AT&T's partner in a Jan. 3 agreement to build an exclusive line of computers. Other office products could be forthcoming from Ing. C. Olivetti of Italy, in which AT&T has a 25 percent stake. The common denominator of future products will be Unix and communications abilities, said Cohen.

"It's not going to be a flash of light and a crash of cymbals and AT&T will be there," Cohen said. "It's going to take a long time. Only after AT&T announces a second generation of products and learns about the market will it be fair to judge the giant's competitiveness."

AT&T is a likely candidate to battle IBM for many reasons. Last year, its revenues were almost $10 billion greater than those of IBM (see chart), although IBM was far more profitable. In Bell Labs, it has the best research organization in the United States, asserted Cohen. AT&T's manufacturing prowess is equal to IBM's, Cohen said. AT&T Technologies has already produced a 256-Kbyte random-access memory chip and is making the WE32000 microprocessor at the heart of the 3B5 and 3B2. (The WE32000 is the first true 32-bit microprocessor.)

AT&T also has a large distribution system and, like IBM, has a good reputation for product reliability, according to Cohen. The 3B series indicates it also has experience in manufacturing computers, if only for internal use.

But AT&T enters the contest with significant weaknesses. A former monopoly, AT&T must "recondition" itself to be a player who can stay in tough serve-and-volley games with Big Blue and other seasoned competitors, said Cohen. Bell Labs, in particular, must turn away from the slow product-development cycles promulgated under government regulation and prepare to nimbly react to changes in the marketplace.

"In this game, one player is a master at marketing products and understanding the market—that's IBM—going against an opponent that must transform itself, and that pro-

cess will be expensive," says Thomas Crotty, president of Gartner Group Advisory Services. "It will be a long time before AT&T competes successfully against IBM. I'd put it at about five years."

AT&T's opening moves indicate that the first arena of this battle will be the office. Which competitor has the edge? "Historically, IBM has dominated desktops with its typewriters," says David Stein. "AT&T says it has dominated with the telephone. But if you ask yourself which will be more important in the future—the typewriter or the telephone—IBM's beachhead with typewriters looks more significant as corporations move toward installing intelligent workstations."

Gartner analyst Ken Sobel-Feldman gives AT&T and IBM equally bad ratings for providing compatibility across lines of office products, accessibility to applications, and user interfaces. But he says IBM's big advantages are its battle-tested sales force, open architecture, and established line of workstations. AT&T's only significant lead in the office is its experience in the integration of voice and data communications. AT&T makes private automatic branch exchanges (PABXs) and IBM does not, the analyst notes. However, IBM's acquisition of more than 20 percent of Rolm Corp. (Santa Clara, CA), the communications vendor, set the stage for an assault by Big Blue in the PABX market sometime in 1985 or 1986, Sobel-Feldman says.

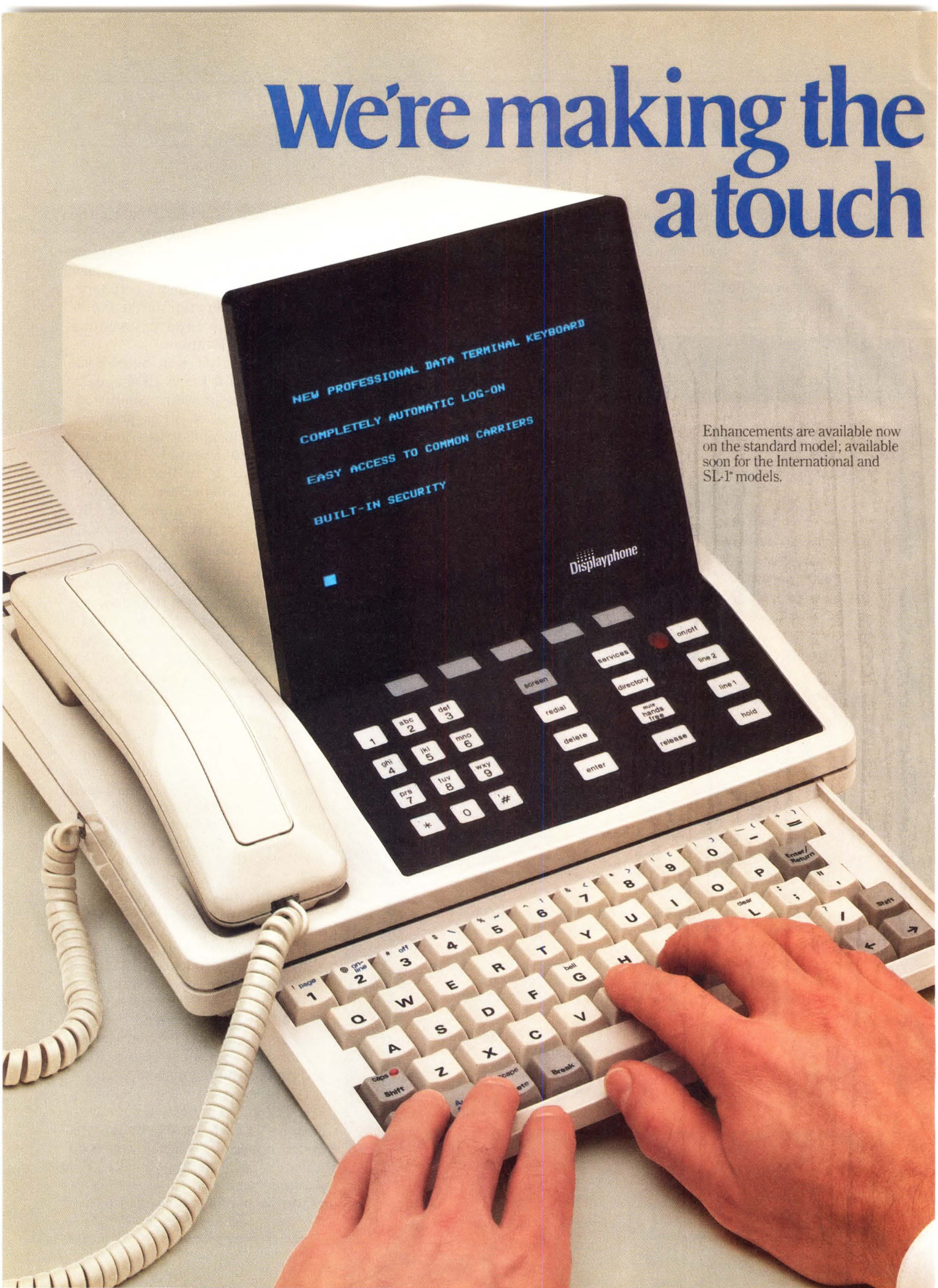
Of course, IBM is the reigning power in the computer industry, experts agree. Big Blue's mainframes dominate, and the System/34, /36, and /38 minicomputers and the 3270 terminal line are de facto industry standards. IBM's huge market share and capital base, high productivity and profitability, and astute marketing and management will keep it strong.

However, there are chinks in IBM's armor, says Stein. IBM's allegedly incoherent software is a "Tower of Babel," he asserts. IBM also has limited experience in communications, has yet to build a supercomputer, and has not been particularly successful in minicomputers.

Gartner analyst Bob Flemming says AT&T's strength in communications should not be underestimated, especially when it comes to private branch exchanges. "The PBX is often mentioned as a gateway or central communications-distribution

(Continued on page 32)

We're making the a touch



Enhancements are available now on the standard model; available soon for the International and SL-1® models.

Displayphone terminal easier to use.

Northern Telecom introduces a new keyboard and other features to simplify data retrieval and transmission.

Two years ago, Northern Telecom introduced the Displayphone* integrated voice and data terminal—the first of its kind in the world.

Since then, managers and executives from all over the country have discovered how easy it is to access data. They're tapping into internal and external data bases on many different types of computers, including IBM systems.

Today, we're continuing our leadership by making the Displayphone terminal even easier to use. It has a new keyboard with the look and feel of a standard full-scale data terminal. The log-on process is now completely automatic—press a button and the Displayphone terminal does the rest, then beeps when the call is ready. Even dialing specialized common carriers such as MCI and Sprint has been made effortless.

Those who already have Displayphone terminals can quickly and easily upgrade them to benefit from these improvements. This is a perfect example of our commitment to Continuity, a key criterion of Northern Telecom's OPEN World*—a planning framework for the development of effective information management systems.

If you don't already have a Displayphone terminal, you should get in touch. Call 800/621-6476 (In Illinois: 800/572-6724; in Canada: 800/268-9079), or send in the coupon.

*Trademark of Northern Telecom Limited

To: Northern Telecom Inc.
P.O. Box 10934, Chicago, IL 60610

I would like to know more about the Displayphone terminal.
☐ Send me more information.
☐ Have a sales representative contact me. CD-2

Name_____

Title_____

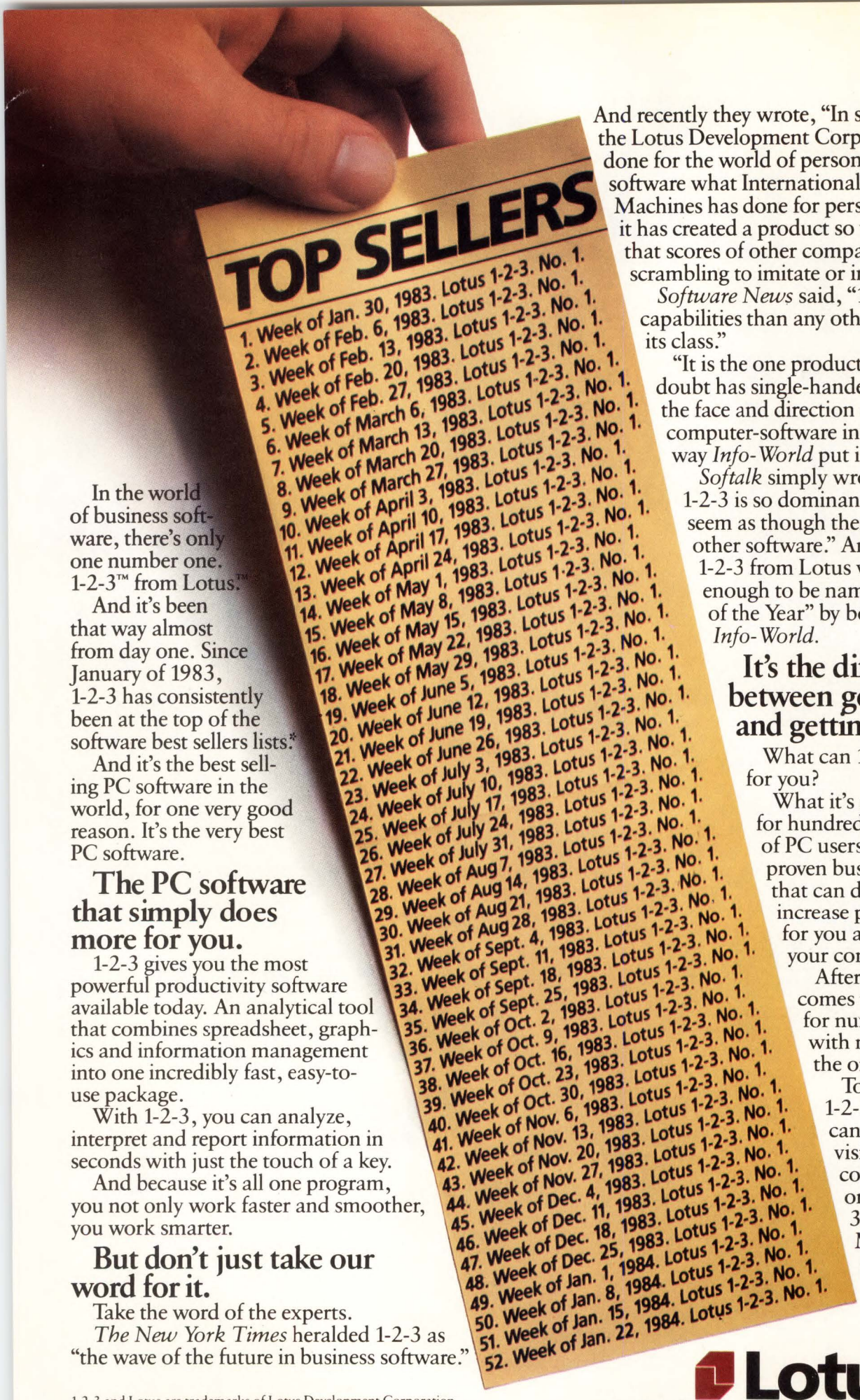
Company_____

Address_____

Phone_____

City/State/Zip_____

CIRCLE 14



In the world of business software, there's only one number one. 1-2-3™ from Lotus.™

And it's been that way almost from day one. Since January of 1983, 1-2-3 has consistently been at the top of the software best sellers lists.*

And it's the best selling PC software in the world, for one very good reason. It's the very best PC software.

The PC software that simply does more for you.

1-2-3 gives you the most powerful productivity software available today. An analytical tool that combines spreadsheet, graphics and information management into one incredibly fast, easy-to-use package.

With 1-2-3, you can analyze, interpret and report information in seconds with just the touch of a key.

And because it's all one program, you not only work faster and smoother, you work smarter.

But don't just take our word for it.

Take the word of the experts.

The New York Times heralded 1-2-3 as "the wave of the future in business software."

And recently they wrote, "In scarcely a year, the Lotus Development Corporation has done for the world of personal computer software what International Business Machines has done for personal computers: it has created a product so wildly successful that scores of other companies are scrambling to imitate or improve on it."

Software News said, "1-2-3 has more capabilities than any other program in its class."

"It is the one product that without doubt has single-handedly changed the face and direction of the personal-computer-software industry," was the way *Info-World* put it.

Softalk simply wrote, "Lotus's 1-2-3 is so dominant, it doesn't seem as though there's room for other software." And in 1983, 1-2-3 from Lotus was good enough to be named a "Product of the Year" by both *Fortune* and *Info-World*.

It's the difference between getting by and getting ahead.

What can 1-2-3 do for you?

What it's already done for hundreds of thousands of PC users. Give you a proven business software that can dramatically increase productivity for you and everyone in your company.

After all, when it comes to looking out for number one, going with number one is the only way to go.

To find out what 1-2-3 from Lotus can do for you just visit your local computer store, or call 1-800-343-5414. (In Massachusetts call 617-492-7870.)

1-2-3 and Lotus are trademarks of Lotus Development Corporation.
*Based on Softsel, Softalk Best Selling Software Lists, 1983.

Lotus
The hardest working software in the world.

1-2-3 from Lotus. Maybe the best way to look out for number one is to go with number one.

(Continued from page 27)

facility for the office of the future, both for voice and for data," Flemming says. "According to our figures, AT&T has 47 percent of the current installed base of PBXs in the United States. While others have begun to erode AT&T's position, AT&T still dominates this market."

AT&T hopes to provide a "tightly integrated" product line of PABXs and local-area networks, office-support hardware and software, wide-area communications, value-added networks, and workstations, Flemming adds. The key to this plan will be its System 85 PABX. At press time, neither AT&T nor IBM had introduced local-area networks, although both are expected to very soon. Along with future development of a local-area network, AT&T intends to offer a way to hook up mainframes, minis, micros, terminals, printers, and word processors into integrated systems.

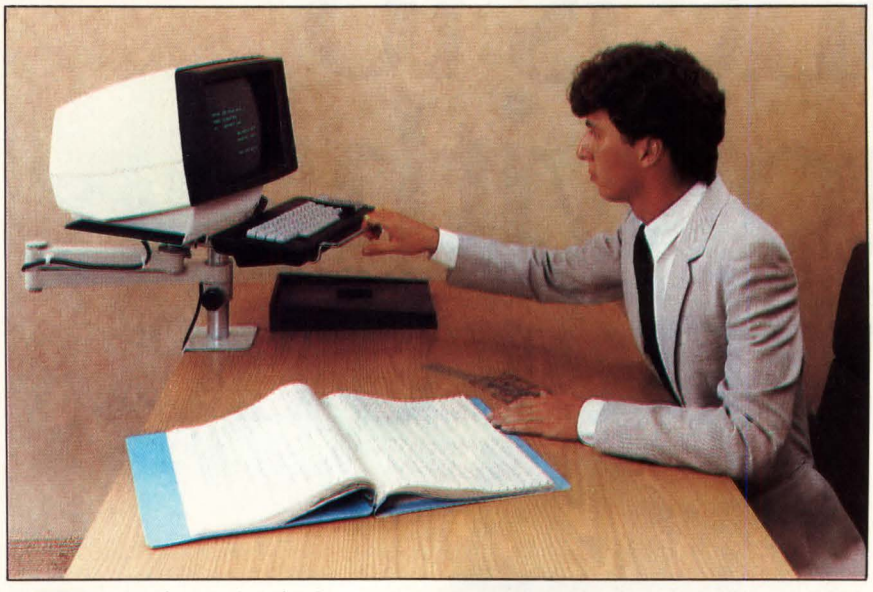
For the most part, AT&T's strategy locks users into its architecture. This will prevent AT&T products from talking with other vendors' machines. Two positive developments for users, according to Flemming, are AT&T's agreements with Wang Laboratories, Lowell, MA, and Hewlett-Packard Co., Palo Alto, CA, to provide a protocol that will allow document transfers between machines made by all three vendors. But, as of press time, AT&T had not yet opened up its Digital Communications Protocol, which is the link between its workstations and its PABX. Thus, although equipment from all three vendors may be able to exchange information at the top, or systems, level, there would be no communications between workstations, which is what users really want, says Flemming.

In addition, AT&T has not announced whether it will honor IBM's document-communications protocols, Document Content Architecture-Document Interchange Architecture (DCA-DIA). This means that AT&T and IBM office systems will not be able to revise and share documents. Wang, Hewlett-Packard, and Digital Equipment Corp., Maynard, MA, have already indicated support for the IBM protocols, which Flemming says are becoming the de facto industry standard.

For users, the contest between AT&T and IBM will eventually reduce prices and improve technology, the experts agree. But don't expect to see those benefits until AT&T gets a better grip on its product line. "Expect lots of product announcements during the next 18 months, but I don't think AT&T will break any price barriers," says Gideon Gartner, co-founder of the consultancy that bears his name. "AT&T's production will still be limited. Convergent and Olivetti are not going to create big markets. AT&T will become very aggressive the second or third time around with its proprietary products."

To Cohen, the battle boils down to how fast AT&T can change its corporate culture from a utility-like monopoly to an opportunistic competitor. "Is AT&T capable of changing?" he asks. "The jury is out. Everybody knows what the problems are, but you'd be nuts to believe the company would have made the bet it did without being willing to go the long haul to cash in on it."

Shuttle clears the desks



Executives who don't want a personal computer cluttering up their desks may find relief in the CRT Shuttle, a swing-away platform for terminal and keyboard. The steel Shuttle adjusts to various viewing angles and turns 360 degrees. It can be either clamped onto a desk or bolted to a desktop, and supports up to 120 pounds. Global Computer Supplies offers a package including the shuttle, a cpu stand, and extension cables for $285. The Shuttle is popular with high-ranking executives, says Bob Dooley, marketing manager. "Even the White House has ordered one," he says. For more information, call (516) 485-1000.

Fiberoptic LAN

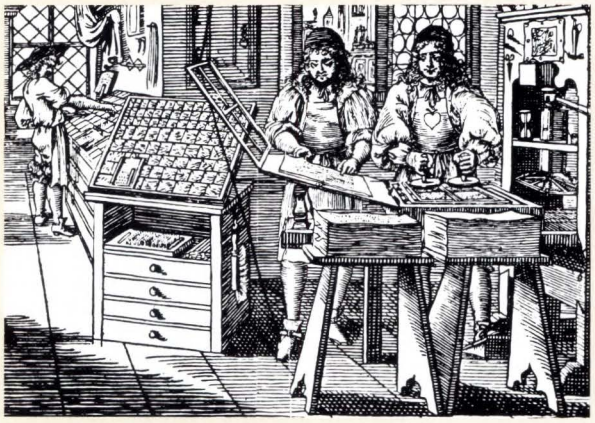
Some early local-area networks (LANs) have been plagued by high error rates, noise on the line, security problems, and short ranges. Experts say these shortcomings will be eliminated with

(Continued on page 51)

Surviving the Paper Tide

Xerox Integrates Information Management

Coping with the Information Age



Information is getting out of hand—again. More than 500 years ago, the Gutenberg press began creating a flood of paper. During the first half century after its appearance, more than 30,000 different books were published. Eventually this explosion of knowledge facilitated the Industrial Revolution, but first the information had to be organized.

The main problem then, as now, was how to make the *right* information readily available. Clearly, the previous system of locking away jumbled manuscripts in collector's chests would not do. So, along with the printing press came another marvelous invention—the public library, with books systematically arranged by subject on open shelves.

Today, the rise of computers, word processors, and electronic printing has helped to produce another flood of information. Recorded knowledge has doubled during the last 12 years. It will double again during the next ten years, and then again over the next ten. We are entering a new age, the Age of Information.

This explosion of information demands better organization, to allow individuals and enterprises to avail themselves of it. Shelves crammed with paper and racks overflowing with data tapes can no longer be counted on to provide the right information quickly to the right person. A new, more highly integrated system for managing information is required.

To be effective, such a system should be able to convey information smoothly from keystroke to finished document. Already more than 90% of documented information is captured electronically at some point. What remains is for the different pieces of office automation equipment that handle this information to be joined so they can access it in a coherent way.

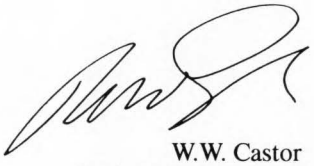
The impact that an integrated information system like this can have on office productivity is only now beginning to be appreciated. Functional integration can eliminate several unnecessary steps in document preparation and sometimes enable a job to be done in one-half to one-third the time previously required. Connecting workstations to printers, for example, can eliminate the need to retype documents, while automated composition can do away with time-consuming paper paste-ups. Inventory costs can also be low-

Features

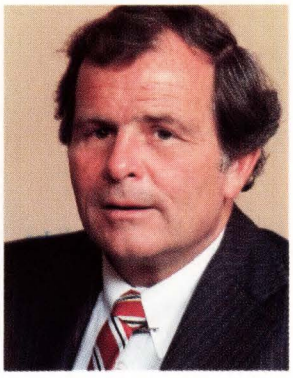
ered as printing on demand replaces wasteful print-and-store procedures.

Other benefits are less tangible but can be even more important. Integrated information management brings the whole process of creating documents under more direct control of the knowledge workers who originate them. Such a shift not only raises office efficiency but can also encourage greater personal responsibility and professional creativity.

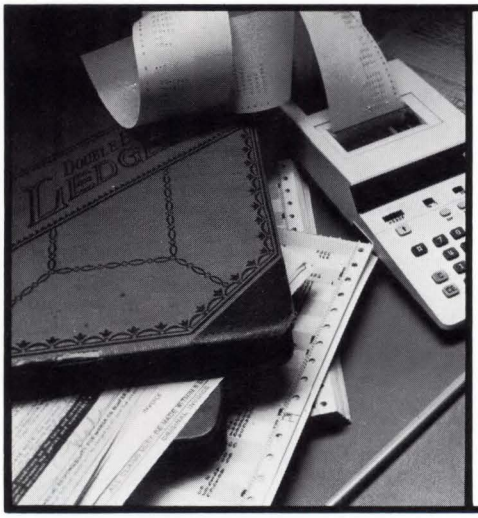
Coping with the Information Age will require office automation systems that not only produce and store information, but also help organize its flow. This means that the "office of the future" must be people-oriented, not machine-oriented. Xerox has been committed to this long-range view of office automation for many years. As a result of this pioneering effort, Xerox has now become the first company to offer a fully integrated office information system that can meet the needs of the dawning Information Age.



W.W. Castor
Senior Vice President
Xerox Systems
Marketing Division

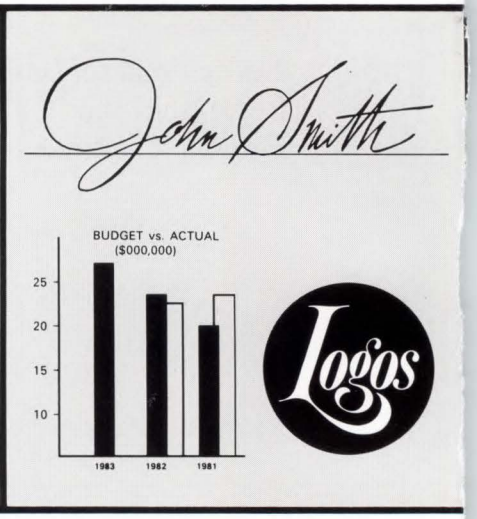


Our smallest electronic printers now act more like our biggest.



They let you compose, paginate, format, and store your pages electronically.

They let you set type in your own choice of font style and size.



They let you reproduce logos, charts, and signatures instantly.

Until now you couldn't get all these printing capabilities on a small, quiet electronic printer. Now you can with the Xerox 2700 distributed electronic printers. With new sophisticated features, they now act more like our larger, high-volume 8700 and 9700 electronic printing systems, to give you greater printing flexibility.

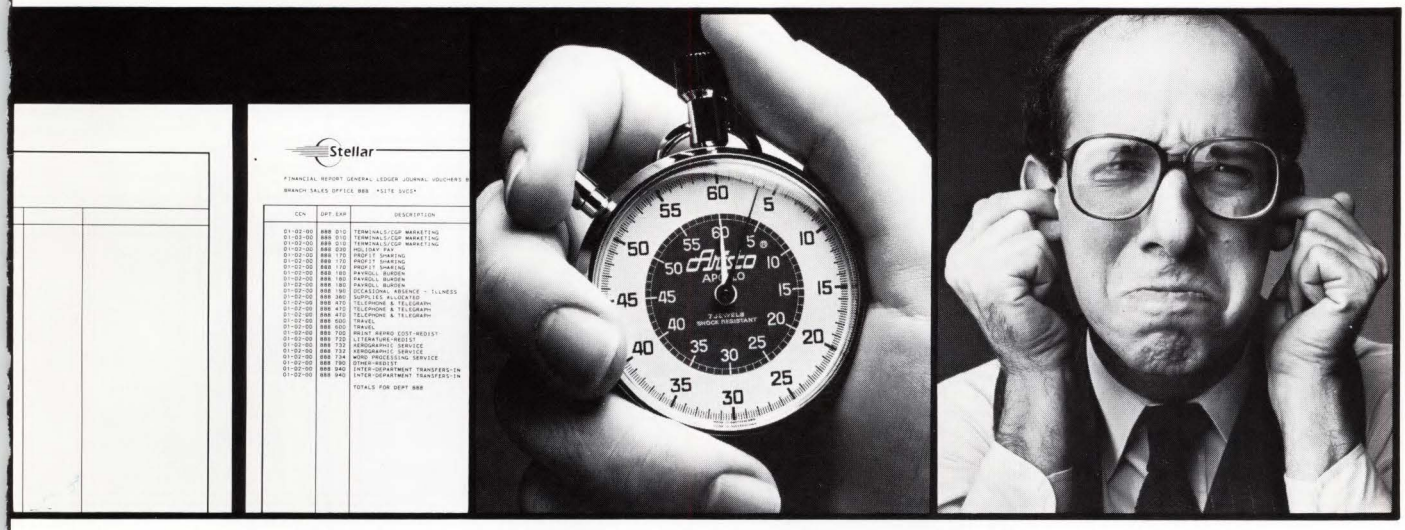
Printer of the Year

The Xerox 2700 is still the extremely quiet laser printer dubbed 1982 "Printer of the Year" by Datek Information Services. It still offers letter-quality printing on cut-sheet paper and prints on demand, to give you originals when you need them, where you need them. And its small, modular design and built-in diagnostics mean it's still simple to maintain and service.

New Features

What makes the 2700 act big? Enhanced features like increased memory and internal font storage; wider typeface selection that lets you choose from up to 15 easy-to-change fonts; and a graphics reproduction capability

XEROX



They let you merge computerized data with customized forms.

They let you produce twelve letter- or legal-size pages per minute on plain, cut-sheet paper.

They let you replace both noisy impact and line printers in a variety of data communications environments.

for logos, bar charts, or signatures.

Greater Printing Flexibility

A new interface capability lets you use the 2700 with thousands of computers now running under the IBM Systems Network Architecture (SNA). User-defined keys let you customize print commands to fit your particular needs. You can even print everything in 11 foreign languages.

Easy Installation

Place the 2700 where you need it most, as you would a copier. There are no special power or air conditioning requirements. The 2700 is attractive and office-quiet, to fit easily into any environment. With minimal training, all office and data processing personnel can operate the 2700 with ease.

To see the Xerox 2700's "big" performance, call toll-free 1 (800) 556-1234, Ext. 95, or in California, 1 (800) 441-2345, Ext. 95. Or write: Xerox Systems Marketing Division, 880 Apollo Street, P1-60, El Segundo, California 90245.

The Myth of the Paperless Society

When computerized word processing and electronic data transfer first began to have an impact in American offices, there was a brief spate of predictions that the country was moving toward a "paperless society." Why bother with paper, the advocates of this new way of doing busi-

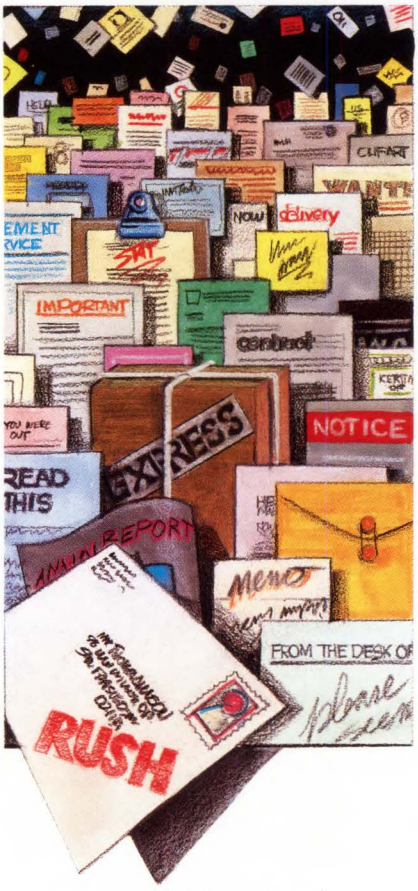
ness would ask. Soon most workers will have access to terminals, they argued, and sophisticated networks will be able to transmit data, text, and graphics at the speed of light to a preselected audience. Everybody will be *glad* to get away from paper. Won't they?

Well, the electronic office revolution is now in full swing and the main result, so far, has been an almost exponential increase in the amount of paper generated. The growing burden has silenced euphoric talk of a paperless society. Instead of replacing paper as the dominant medium of business communications, electronic information processing has somehow enhanced it.

In retrospect, the idea that new office technologies would bring a decline in paper documents was like believing that the invention of movable type would do away with books. Both developments not only made the creation of documents easier but also brought about fundamental changes in the way they were employed. Before Gutenberg, paper was used mainly for information storage; the printing press helped transform it into an information transfer medium. Now, computerization of information is emphasizing the importance of paper as a medium of action.

Already it is less expensive to store information on a magnetic disk than on paper, and optical disks will be cheaper still. This means that there will be less need to use paper for archival storage. At the same time, electronic networks like the Xerox Ethernet can carry information at a rate equivalent to transmitting all the words in a very long novel every second. Clearly, paper's use for simply transferring information—particularly raw data—will also decline.

But the role of the business document as an information management tool is bound to gain importance. What the users of new office automation equipment have rediscovered is that paper documents can command action. The unanswered business proposal that glowers from an "in" box, the well-thumbed manual that sits helpfully beside a complicated machine, the marked-up financial plan that demands to be taken home for further revisions—all share this activity-producing quality. The problem now is not how to eliminate paper, but how to increase its potential for stimulating action.



Advertisement

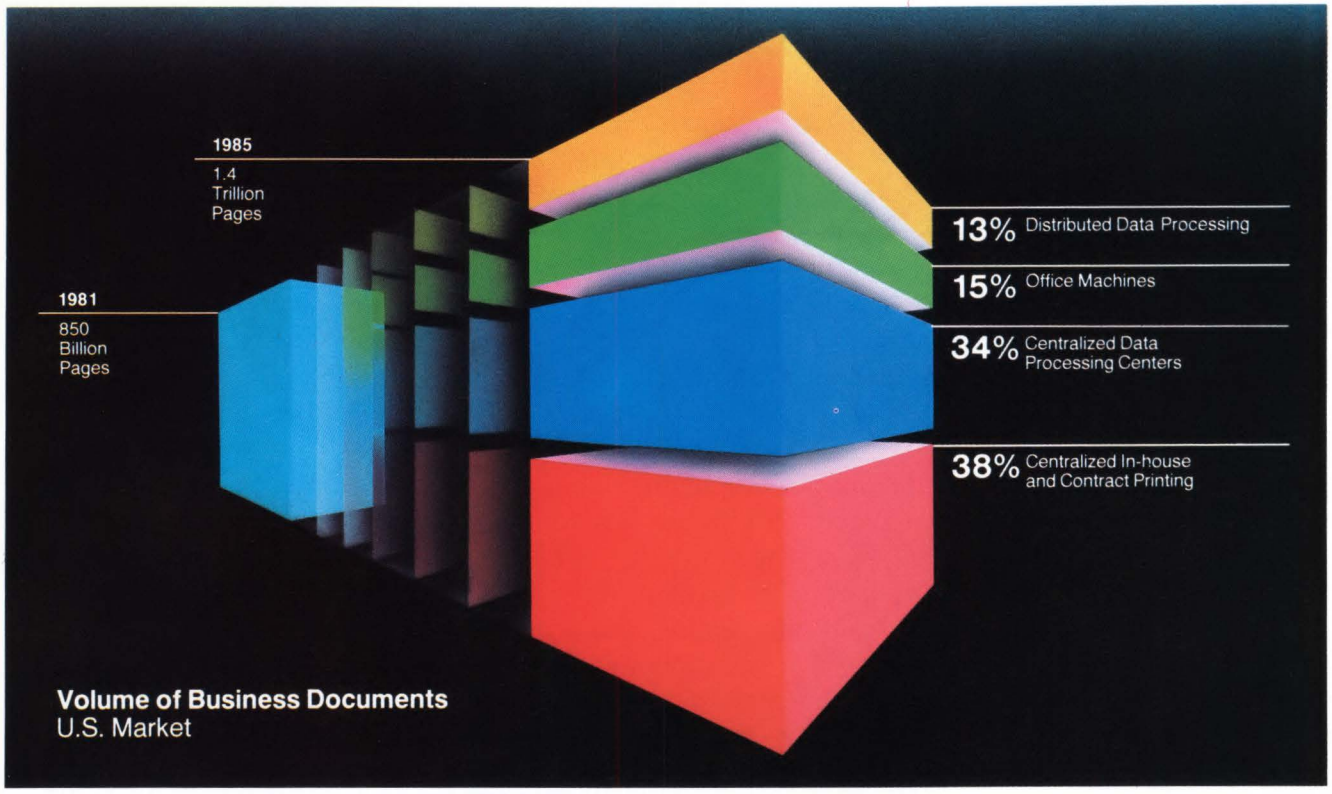
Wasted paper—Wasted time

Consider, for example, how many companies today go about producing a business document. First, a manuscript is typed and copies are circulated for approval. Here paper isn't really needed, because electronic media could keep track of each reviewer's comments and the resulting set of revisions far more precisely and neatly. If a paper copy is needed for "homework," it can always be produced individually. Using paper for such unnecessary, intermediate steps only diffuses its action potential.

Usually, graphics creation and approval follow a parallel course of revisions and approvals through the office. Copies of illustrations may be inserted as separate pages tucked into a manuscript, but the professionals most directly involved with the ideas that a document must convey now have little chance to see how text and graphics will fit together. Even when both words and illustrations are originally generated using a computer, they must often be processed separately.

Next comes the layout, the step at which text and graphics are finally merged and pasted up on a page. Too often, this page is still literally a piece of paper. Onto it are pasted other pieces of paper, bearing columns of type, logos, or illustrations. This procedure can be tedious, time-consuming, exceptionally messy, and usually requires sending materials from the department in which they originate to a special in-house graphics facility or to some outside vendor. The delays introduced are measured in days, yet this whole step can also be automated electronically and take only minutes or hours.

Finally, a paper "original" arrives at the company print shop. Although all of the information contained in the document may have originated in a computer and may



soon be printed using a highly automated machine, another needless transfer of paper still usually connects the printing process to the steps that went before. On the other hand, if computer output is being printed directly, too often the resulting product has a lackluster appearance—with few layout options and only limited fonts and graphics. In either case, the standard procedure is to print as many copies as someone, someplace, believes will eventually be needed. Usually, such bulk printing produces too many copies of a document, which must first be stored and then eliminated as waste.

Benefits of integration

By contrast, the same document could be prepared in a fraction of the time required by the procedure just described, using an integrated office information system. With such a system, text and computer-generated graphics are prepared at the same professional workstation (e.g., the Xerox 8010) by the person who has the best understanding of the subject being discussed. Both text and graphics are then made available simultaneously to reviewers through the office network (like Ethernet), which also allows other material from electronic files to be added. Additional graphic material, including half-tone photographs, can also be captured electronically, using other devices on the network (e.g., the Xerox 150 graphic input station).

Once a document has been revised and approved, the user can completely lay out each page on an 8010 screen, without having to resort to a single piece of paper. (Half-tone photographs and scanned line art are represented by "windows" on the screen.) The 8010 enables the user to merge text and graphics, to electronically "cut" and "paste" columns of type almost instantaneously, and to call upon a full complement of fonts to complete the make-up page.

But this page—the "master copy"—remains in digital form. Any number of copies can then be produced *on demand* by an electronic printer (e.g., the Xerox 9700, 8700, or 5700). Each piece of paper that emerges from the printer is thus an "original," in the sense that there is no intervening duplication step as there is in offset printing. (Indeed, if a very large number of identical documents is required, one electronically produced copy can serve as a master for a high-speed duplicator. Thus digital mastering provides an added measure of flexibility by giving the user options in choosing the least expensive printing process for each job.)

This highly automated document-creation process has several advantages. It greatly simplifies document preparation. Through demand printing, it allows an office to produce only the right number of copies needed at any given time, thus saving considerable overhead. Also, if required, the user can make each copy of a document different by simply changing the digital master. An insurance company, for example, can print policies tailor-made for each customer. The final advantage is that, by coupling a printer electronically to the rest of an office, one can bring the whole print shop operation closer to the mainstream of office activity, where it can be used more effectively.

Xerox's answer to the myth

Using the system just described can sharply reduce the time required to produce business documents. It can eliminate much wasted paper, which now causes important documents to get buried on cluttered desks. Most importantly, it integrates all the tools of document preparation so that the final product is more effective—with instantly recognized logos, easily read columns, attractively placed graphics, and highlights set apart by multiple fonts. Using an integrated information management system can thus help increase the efficiency and productivity of document creation and stimulate potential for provoking action.

Xerox Corporation was able to construct the *first* such system by focusing on the quality of finished business documents. Xerox's goal is to enable businesses to use paper more effectively and thus avoid being trapped by either the wasteful past or some mythical vision of a paperless future.

Only Xerox now offers a fully integrated information management system. The remaining articles of this series examine the elements of this unique system in more detail and show how they can be arranged to meet the needs of many different types of businesses. The first article explains Xerox's role as a leader in the *new* Information Revolution. Next, the 8010 workstation and Ethernet are described in terms of their power and flexibility in integrating information processing in the office. This is followed by an examination of the general advantages of electronic printing and then a look at some specific applications in the distributed processing environment. Finally comes a reminder about where some of today's most talked about innovations originated and some predictions about the future of office automation.

Xerox's Role in the Information Revolution

During the 1960s, the plain paper copier brought about a revolution in the office. Not since the invention of the typewriter had business procedures changed so drastically. At first, some people thought xerography would simply be a neater, more convenient alternative to carbon paper. However, within a few years, the ability to make high-quality copies in any volume, on demand, began to alter fundamentally the way documents were created, distributed and used.

Xerox Corporation played a unique role during that period—by both introducing the technological innovations required and establishing a standard of excellence for the copying industry that was soon to emerge. This experience also gave the company a unique perspective on office automation, focused toward production of a final document, rather than manipulation of the database.

Now another revolution is taking place, encompassing the flow of information at all levels of business. This time, a variety of technologies are involved and many different ways of improving office procedures are being tried. The result, too often, has been chaos: Personal computers sit isolated on professionals' desks unable to share their data; proprietary networks lock users into buying all their equipment from one vendor; and perhaps worst of all, printing operations remain separated from the document preparation and distribution cycle.

By sticking to its philosophy of concentrating on the finished business document, Xerox has again been able to emerge as a leader in the new Information Revolution. The task has required more than a decade of pioneering research, careful product development, and some painful experiences—all in an increasingly competitive environment. But as a result, a new generation of Xerox products stand out in their ability to transform raw data into useful information on paper.

The reason for this success is clear. Business depends on *action*. Documents are the *medium* for action. The surest means of improving office productivity is to create documents more efficiently and in a more useful form, and to get these documents to the people who need them. What Xerox planners realized from the beginning was that the only way to accomplish this goal would be through an office system that could provide integrated document management.

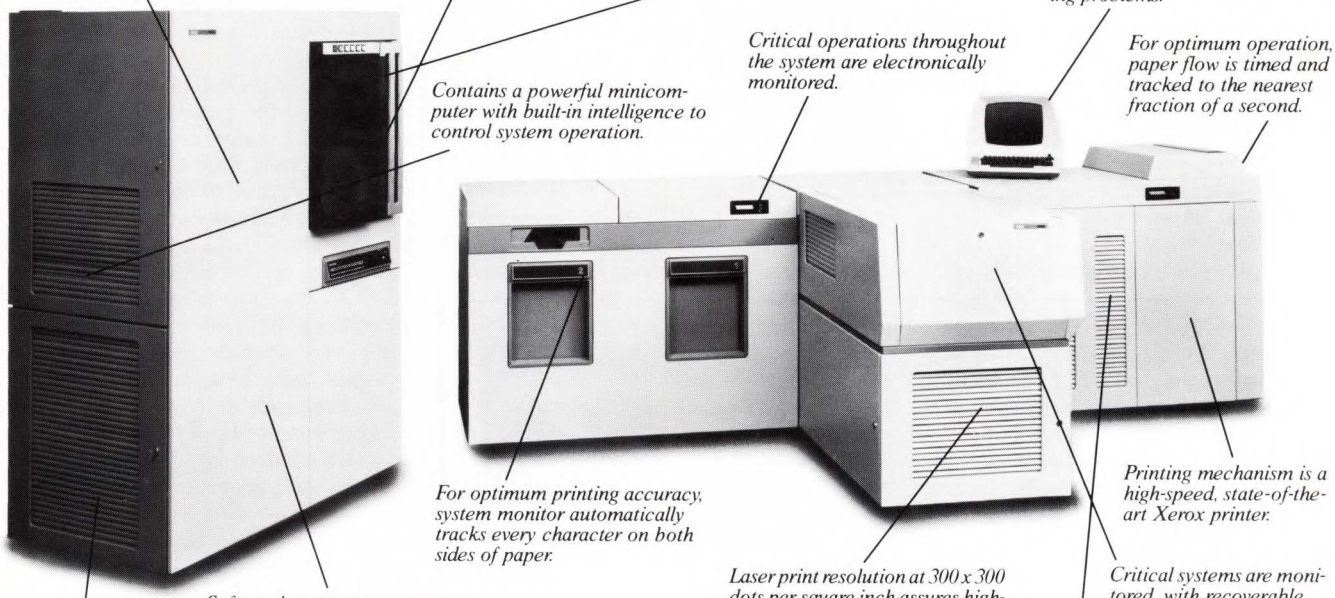
Such a system must let users create, process, file, print, and distribute information electronically. At the "front end," a professional workstation should combine computing, text editing, graphics creation, and electronic mail. Then, for final document preparation, an electronic printer is needed that can transform a "master" of digital signals into marks on paper—complete with multiple fonts and high-resolution graphics. Between the two ends must be a high-speed, "open" network that not only joins workstation and printer, but can also handle communications with a host computer, disk storage units, and other equipment from a variety of vendors.

At present, only Xerox offers such a completely integrated system. It is already beginning to play a pivotal role in the current Information Revolution. In the years ahead, I believe integrated document management will change the office as much as xerography did in the 1960s.

Robert V. Adams
President
Xerox Systems Group

XEROX

We built in 14 good reasons to offer you an uptime guarantee.



If we wanted to, we could point out a lot more. But you get the idea.

Our Xerox 9700 electronic printing system is designed to operate in your data center. Every day. 365 days a year.

Just like our 8700 electronic printing system.

Which is why we can guarantee its uptime to you for an average of 684 out of the 720 hours in each month, on a quarterly basis.

Less the time needed for regularly-scheduled servicing, of course.

If we're wrong, we'll credit you for your downtime. And we'll give you that guarantee in writing.

All we ask is that you help us take care of your system according to the provisions of the Xerox Uptime Guarantee Program.

To further assure that you get flexible, high-quality document production, we'll also train your people.

And we'll assign one of our special teams of Customer Engineers directly to your machine.

(They come with months of lab training, and a national communication and computerized parts-backup system that lets them make any needed corrections quickly and accurately.)

We'll even regularly update your software. So you'll always have the latest in system capabilities and reliability.

Unlike some Johnny-come-lately electronic printers, the Xerox 9700 doesn't come with just promises.

It comes with a written guarantee.

If you want more information, call toll-free, 1 (800) 556-1234, Ext. 95. In California, 1 (800) 441-2345, Ext. 95. Or write: Xerox Systems Marketing Division, 880 Apollo Street, P1-60, El Segundo, California 90245.

That'll get you the rest of our story.

The Xerox 9700 Electronic Printing System.

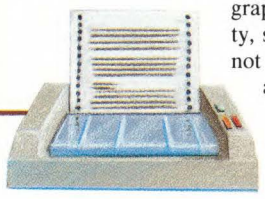
Two Keys to the Integrated Office

Two decades of having only limited access to mainframe computers caused many business professionals to leap at the chance to have personal computers on their desks. The advantages were obvious: These small computers were relatively easy to use; they could run most common business

software, like programs for spreadsheet analysis and word processing; and they avoided many of the delays and hassles involved in time-shared systems. In a word they were. . .well, personal.

Unfortunately, some of the disadvantages of using such small, standalone systems have turned out to be obvious only in retrospect. Computers in a business office have *interpersonal* as well as personal functions. Information must be shared among coworkers. Professionals need to have access to centralized databases. Finished documents should have a more polished appearance than that produced by many small printers available for personal computers.

As these limitations began to sink in, office managers started looking for ways to link various pieces of equipment together into local area networks. Too often, this step only added to the chaos. Some networks were "closed," meaning that just the devices from one manufacturer could be attached. In some "open" networks, data transmission rates ranged from only a few hundred to a few thousand characters per second, because of limitations in the personal computers themselves. And frequently, access to sophisticated electronic printers, with multiple fonts and graphics capability, simply could not be established at all.



Only a fully integrated information management system can preserve the personal computing qualities professionals enjoy, while supplying the communications capability a business needs. The most complete system now available—introduced years ahead of competitive products, with hundreds of systems installed today—comes from Xerox.

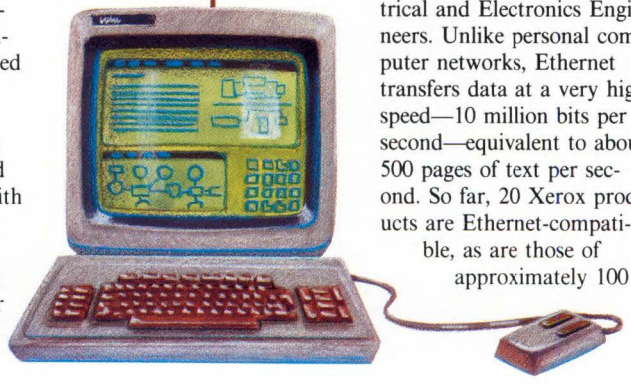
The Xerox 8000 system combines advanced computing functions with a high-speed local area network, and offers unique text editing and graphics capabilities for sophisticated document creation. It can also provide electronic mail, automated file management, and interfaces for electronic printers, external communications, or a mainframe computer.

Two key components are required for an 8000 system: an 8010 professional workstation and an Ethernet local area network. A wide variety of other devices may also be added to the system, however, including electronic printing systems, personal computers (IBM-PC, Xerox PC, etc.), word processors (like the Xerox 860), storage disks, electronic typewriters, facsimile equipment, photocomposers and so forth.

The 8010 workstation provides a business professional with all the desktop convenience, program flexibility, and user-friendliness of a personal computer, plus a host of additional features no standalone system can match. With its two-page display, fully integrated software, multiple document "windows," graphics capability, and simple "mouse" controller, the 8010 is designed for high-volume, time-critical professional jobs.

By letting one person handle text, graphics, and composition on a single, easy-to-use terminal, the 8010 can reduce the time required for document creation substantially. Yet, despite the unique power of the 8010, a user can learn basic operations of the workstation in approximately four hours.

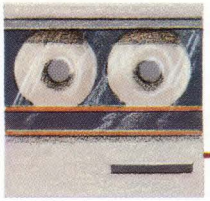
Ethernet provides the standard for a local area network that office managers have sought in order to link many pieces of equipment, which may come from different manufacturers. It has been accepted as an international standard by the European Computer Manufacturers' Association and has also been adopted as a standard for American industry by the Institute of Electrical and Electronics Engineers. Unlike personal computer networks, Ethernet transfers data at a very high speed—10 million bits per second—equivalent to about 500 pages of text per second. So far, 20 Xerox products are Ethernet-compatible, as are those of approximately 100 other companies. Most importantly, it is an *accepted* standard: More than 20,000 Ethernets are now in use.

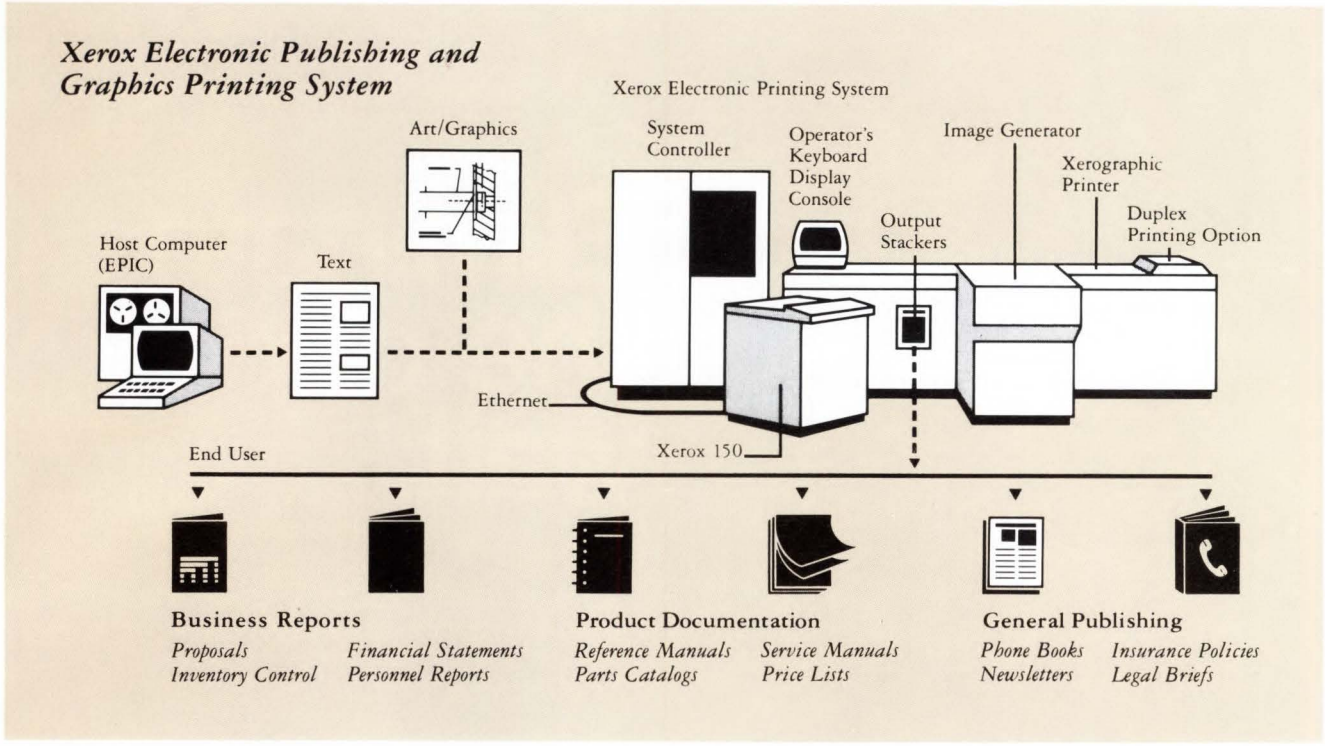


The Xerox 8000 integrated office information system is designed for routine use by business professionals and managers whose jobs fit between those of upper-level executives and clerical-secretarial functions. They include engineers, analysts, production specialists, librarians, administrators, and others directly involved in the assembly and distribution of information. These workers account for about 80 percent of white collar labor costs, and using their time more efficiently represents the best way to keep these costs in line.

The ability of the 8000 system and its earlier experimental prototypes to provide businesses with powerful new leverage on professional productivity has been demonstrated in more than 500 major installations, including the White House. One of the most dramatic of these demonstrations took place at the Boeing Co. in Seattle. For *each* Boeing 747 jumbo jet delivered, the company's professionals produce an almost equal weight of documentation—355 tons! By adopting a Xerox integrated information system, Boeing cut the cost per page for this documentation by at least 50 percent. In terms of productivity, the change was often even more dramatic: One engineer's productivity jumped from 42 pages to 210 pages of documentation a month.

Integration of office information can benefit large and small businesses alike. Approximately 500 fully integrated Xerox information management systems have been installed in customer premises around the world. One of the particular benefits of Ethernet is that it can be used for a small installation and then expanded almost indefinitely. Experience in many different kinds of companies has demonstrated that the Xerox 8000 system can greatly improve office productivity. An office manager can easily determine the potential advantage of such a system by calculating how much his or her company would save by cutting several days per month off the time each professional spends generating business documents.





Electronics Takes Printing Out of the Back Room

Most documents now originate in one of the "back rooms" of a business—more than one-third in a data processing facility and another one-third in a publishing support area. Printers based on electronic technology can make publishing more accessible to the profes-

sionals whose ideas are being disseminated. By enabling them to control more of the process, electronic printing helps take document creation out of the back room and put it into the managerial mainstream. And in certain "form-intensive" industries, like banking and insurance, more routine printing jobs can be speeded up severalfold and inventories of paper greatly reduced.

The best way to illustrate such advantages is by example:

- Every PBX now sold by a rapidly growing telecommunications equipment manufacturer must be accompanied by 800 to 1,400 pages of technical documentation. This company publishes separate manuals, which once took 3 to 6 months to complete and which then had to be translated into French, Spanish, and German. To cut the time required, the company used a Xerox 9700 printing system and Xerox Integrated Composition System software. Not only were printing costs alone reduced by millions of dollars annually, but the company found that producing documents on the new system could also save as much as a year's time in releasing a new product.
- A major insurance company once employed several young clerks to roller skate in front of 12,000 bins, collecting the individual forms needed to customize new policies. They have now replaced this process with an electronic printer from Xerox that automatically produces the layout of each form, adds the standard clauses, and then puts personal data into the appropriate blanks. Each new policy is printed in a matter of seconds, collated and ready for mailing.

What are electronic printing and publishing?

"Electronic printing systems" are distinguished by their ability to produce virtually any image directly from a digital source. This capability allows them to merge text and graphics, change fonts character by character, and print all the pages of a document in order, on demand—that is, only when actually needed. Such printers can add many of the advantages of a commercial print shop to an ordinary office, yet do so with unmatched flexibility and ease of use.

When electronic printers are combined with computerized composition systems the result is "electronic publishing," defined as the integrated production of documents on demand. Xerox offers two ways for a business to start publishing electronically. The first employs an 8000 system to produce all the necessary input, with composition done on the 8010 workstation. The second uses a host computer and Xerox Integrated Composition System (XICS) software to provide computerized text and digitized graphics.

Most electronic printers use technology derived from photocopying—which helps explain why Xerox has emerged as the undisputed leader in the field. Inside the printer, a laser controlled by the system software scans the positively charged surface of a photoconductive drum or belt. Wherever the light hits, the electrical charge dissipates. Negatively charged toner is then spread over the surface, where it adheres to the remaining positive charges for transfer to paper as a printed image.

Xerox makes a wide variety of electronic printers to meet the needs of both large and small operations. Two of these printers have fully integrated text and graphics capability, including reproduction of halftone pictures from digital signals: the 9700, which prints

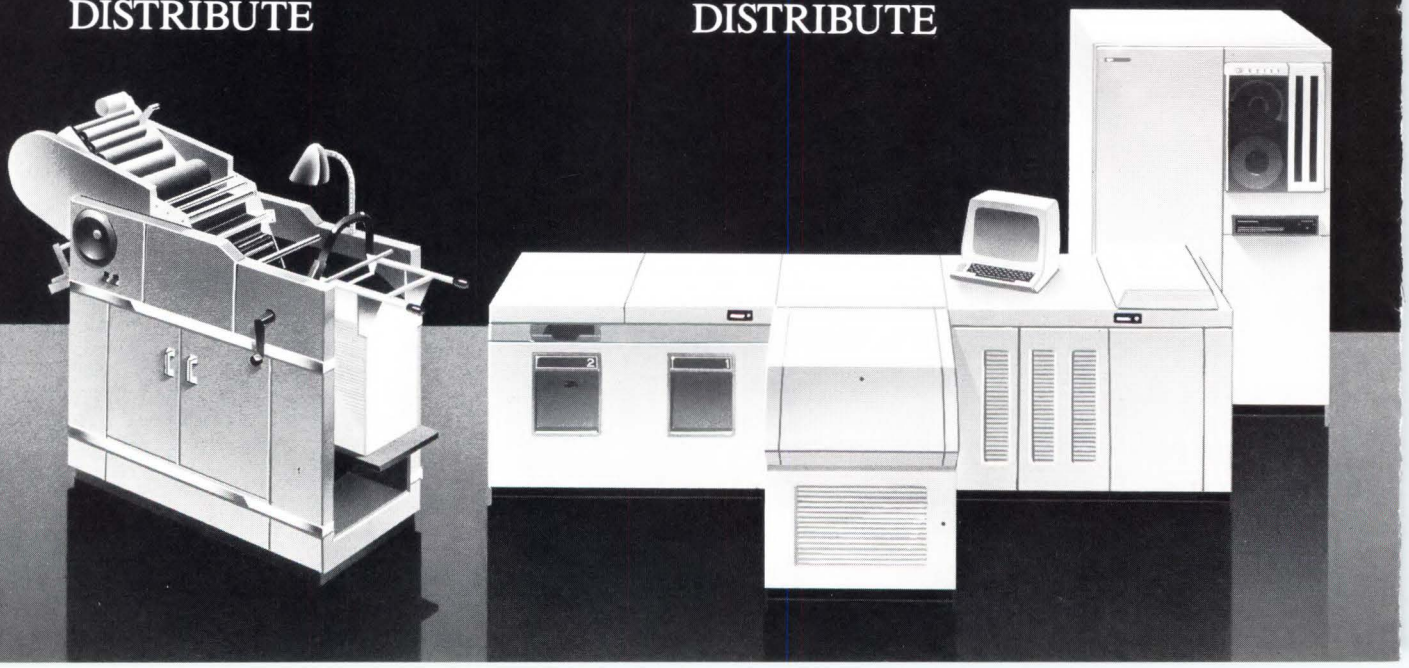
Eliminate the paper wait.

CONVENTIONAL PRINTING

DATA INPUT
COMPOSE
TYPESET
PROOF
MAKE UP PAGE
MAKE NEGATIVE
OPAQUE NEGATIVE
STRIP NEGATIVE
MAKE PLATE
PROOF
SET UP
PRINT
COLLATE
STORE
DISTRIBUTE

THE XEROX ELECTRONIC PUBLISHING SYSTEM

DATA INPUT
COMPOSE
PROOF
PRINT
DISTRIBUTE



XEROX

And accelerate your growth rate.

As you can see, it's the things you don't do with the Xerox Electronic Publishing System that make it unique.

What you don't do is take weeks or months to produce business documents by preparing them as camera-ready artwork for conventional printing.

Instead, you eliminate the paper wait by producing the actual catalogs, price lists, proposals, technical manuals—whatever kinds of business documents your company uses—on demand.

That's because our Xerox Integrated Composition System (XICS), the software of electronic publishing, lets you create cover-to-cover documents from computerized text and digitized graphics.

Which means you compose, paginate, format and store all your pages electronically.

And set type in a choice of font, style and size, as well as reproduce logos, signatures and graphics.

Then, using either our 9700 or 8700 electronic printer, you print on both sides of ordinary, cut-sheet, 8½ x 11 paper and turn out documents at up to 120 pages per minute.

All sorted, collated and stacked automatically.

So you get what you want, when you want it. And only as many sets as you need.

Of course, you also get tremendous savings in production costs, warehousing and waste reduction.

Not to mention increased flexibility to respond to customers' needs.

For example, one company, a wholesaler of books to school libraries, used our system to offer customized catalogs with a personal choice of sequence and delivery dates.

The result was. . . "increased sales of over 400 percent."

Another company, a leading manufacturer of PBX systems, uses it to produce the 800 to 1,400 pages of documentation that must accompany each system—a job that used to take three to six months to complete.

They now do it in parallel with new products. . . "saving as much as a year's time in releasing a product."

Can electronic publishing help your company accelerate its growth rate, too?

Find out by asking for our free, 16-page XICS brochure.

It'll give you complete details of how the Xerox Electronic Publishing System works and what it does.

Just call Xerox Systems Marketing Division, toll-free, at 1 (800) 556-1234, Ext. 95. In California, 1 (800) 441-2345, Ext. 95.

Or write: Xerox Systems Marketing Division, 880 Apollo Street, P1-60, El Segundo, CA 90245.

120 pages a minute, and the 8700, which prints 70 pages a minute. In addition, a 5700 printer can be connected to an Ethernet system for the printing of most text and forms at 43 pages a minute (about 40 times faster than typical word processing printers). For distributed processing systems with a serial or parallel interface, the 2700 printer offers a multi-font electronic printing capability, at 12 pages a minute.

A comparison to conventional printing

More than 50,000 in-house and commercial printing facilities now produce business documents with mixed text and graphics. Electronic printers offer such facilities unique advantages in quality, speed, simplicity, and flexibility. In addition, fully integrated electronic publishing systems can eliminate many of the time-consuming mechanical steps required for composition and makeup by conventional systems.

Immediate savings are particularly great for businesses with heavy documentation loads for professionals and for companies in form-intensive industries. But many other commercial activities are also benefitting. Retail chains, for example, are beginning to use electronic printing to prepare bar-code labels, so that prices can be rapidly updated. And one major national cooperative, with 4,300 member stores, now saves a half million dollars annually by printing the nine regional editions of its 5,500-page catalog electronically.

The decision to use either electronic or offset printing systems depends primarily on the number of documents to be produced and the deadlines involved. The cost per page of conventional printing decreases slowly with volume, while that of electronic printing is essentially constant. Where the crossover point occurs for a particular company will depend on the nature of the business. But when speed, flexibility, or the ability to print on demand is critical, there's no comparison—electronic printing is in a league by itself.

Over the years, Xerox has developed a spectrum of products incorporating advanced printing technologies. Diablo Systems Incorporated, a Xerox company, has been pioneering the development of printers since the introduction of the daisywheel in 1970. Their low-cost, professional-quality printers also include matrix and inkjet printers. With the addition of laser printing and its expertise in xerography, Xerox establishes itself as a leader in the broad range of printing applications found in business and industry today.

The Mighty Little "Printer of the Year"

In 1982, Xerox introduced its smallest electronic printer, the Xerox 2700 electronic printer, designed to capture some of the distributed processing market away from conventional office printers. The introduction was greeted by yawns from two groups of skeptics: those who watched competing vendors fail to get simi-

lar (but much more expensive) products off the ground and those who believed the office automation market simply didn't need the extra power and capability of an electronic page printer.

Both groups got a big surprise. The 2700 immediately took off in the marketplace, and the editors of *Printout* selected it as the "Printer of the Year." In their annual review of printers, the editors said the 2700 had become the first "to make any significant inroads into the long-awaited office automation page printer market."

Designed primarily for use in distributed data processing environments, with minicomputers and small business computers, the 2700 has a multi-font capability and the same high-quality resolution (90,000 dots per square inch) as Xerox's larger electronic printing systems. It can create simple forms

and can also produce logos and signatures. The printer is exceptionally quiet, occupies only five square feet of floor space, and has no special electrical requirements.

The versatility of the Xerox 2700 is best established by reports from its current users:

- A manufacturer of heavy equipment cut the cost of printing its word processed documents from 12 cents a copy to about 5 cents a copy by switching to the 2700.
- An airline guide publisher reduced the time required to update an internal reference manual from 2 or 3 days to 5 hours.
- The accounting department of a large life insurance company knocked 2 to 3 days off the time required to produce financial reports.

"We haven't begun to scratch the surface yet," says the computing director of a major engineering school. "There are applications out there that we haven't begun to think about."

Xerox: Where "User Friendliness" Began, and the "Office of the Future" Continues

Every era heralds its own arrival with a flourish of new jargon. Thus one previous revolution in office equipment was marked by the appearance of the verb "to type," while another introduced the concept of "photocopying." Now another revolution is upon us, whose goals can be pretty well ex-

pressed by two new clichés: "user friendly" and "the office of the future."

These seem trite today because they lost their meaning when people forgot where they came from and what they originally meant. Take "user friendliness." This valuable idea arose as the hoped-for solution to a very serious problem. As inexpensive integrated circuits began to make computers more common in offices, many workers felt intimidated by these new machines. Computers had always been the province of an elite corps of technical experts. How could these complex machines now be made usable by a wide range of office personnel?

To find a solution, computer scientists at the Xerox Palo Alto Research Center (PARC) began to work with psychologists, sociologists, and professionals from many other disciplines. Their aim was to design a computer system that could do so much for a user and be so easy to learn that it would actually seem "friendly." The system took a decade to perfect and eventually involved one of the most elaborate prototyping efforts ever undertaken by an office equipment manufacturer.

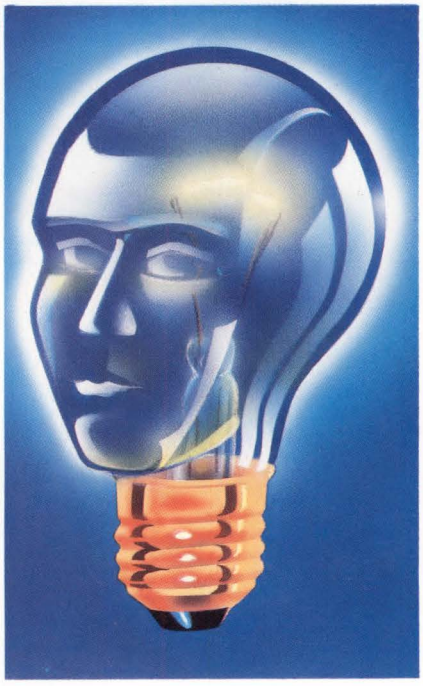
The designers introduced several innovative ideas. The keyboard of the system's terminal would be supplemented by a "mouse," whose movement along a tabletop controlled the movement of a cursor on the terminal screen. "Windows" to different documents or software programs would also appear on the screen, so a user could go quickly from one task to another. Instead of having to remember letter codes for common operations (like "delete file"), symbolic pictures, or "icons" (like the outline of a file folder or an out-basket) were used. The screen itself was "bit-mapped"—each point made individually addressable—to provide better resolution and flexibility. And a variety of advanced graphics-creation features were included.

After a decade of work, the first workstation that could truly be called "user friendly" was introduced commercially in 1981—the Xerox 8010 professional workstation. Designed specifically to respond to user behavior patterns, its technology was widely acclaimed. Many of the innovations incorporated into the 8010 workstation soon found their way into personal computers and the term "user friendly" became almost too familiar. People forgot that it had originally been applied to part of the revolutionary Xerox office *system*.

Eventually, of course, the realization that integrated systems could do more for offices than small individual computers began to catch hold, and such systems became the focus of discussions about "the office of the future." Again Xerox lead the way, for the widely copied workstation belonged to the first fully integrated office system to include an "open" local area network and electronic page printers.

To attempt so much from the very beginning had been not only very ambitious, but also a very risky strategy. The marketplace embraced personal computers before realizing the value of complete systems, and the need to incorporate electronic printers as an integral part of those systems has been realized even more slowly. The Xerox commitment has remained firm, however, and the payoff is now becoming evident.

But this is only the beginning of the Information Age, and Xerox intends to continue to lead the office equipment revolution needed to respond to the challenge of this new age. The "office of the future" is still evolving and some exciting new capabilities are just around the corner:



- Pioneering work by Xerox scientists on artificial intelligence will help untrained workers use the next generation of even more complex machines. Advanced copiers, for example, are being designed to diagnose some of their own problems, whether caused by human error or mechanical malfunction.
- New, proprietary, very large scale integrated (VLSI) circuits will help lower costs and increase the power of the Xerox information management and printing systems. In particular, these circuits will provide the speed required to apply artificial intelligence to a host of new problems—including the design of even better VLSI circuits.
- Optical media will greatly reduce the cost of communicating and storing by office information systems. Xerox has already entered a joint venture to manufacture a 1-gigabyte optical disk (the Optimem 1000) and an optical Fibernet will eventually give integrated office systems the ability to communicate very large volumes of information inexpensively.

To see that these ideas get quickly translated into the products offices need most, PARC and various Xerox manufacturing divisions have established a new program to exchange both workers and ideas. Xerox remains committed to more than just user friendliness and the office of the future. By automating many of today's routine business tasks and thus relieving office workers of much present drudgery, Xerox office systems can help people become more productive and creative.

The time has come to move beyond old clichés to new ideas. Xerox systems are now more than just "user friendly" and for Xerox the "office of the future" is here today. A new term is needed to describe the unique ability of these systems to enhance productivity and creativity. Xerox integrated information systems are *user responsive*. Users have a variety of needs and requirements. Being responsive to their goals is something that cannot become a cliché.

XEROX

The Star of Team Xerox.

By itself, the Xerox 8010 Star professional workstation is a computer of dazzling capabilities—in graphics, information processing and document preparation.

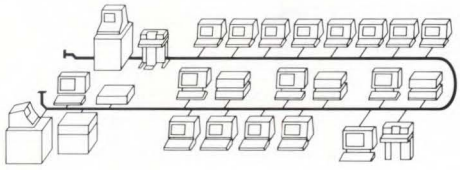
But it's also the key element in Team Xerox, a wide array of computers, mainframes, printers, mail and file services, facsimile terminals, communicating Memorywriters, other networks and, of course, other 8010s, all on an Ethernet network. It also provides 3270 and TTY emulation.

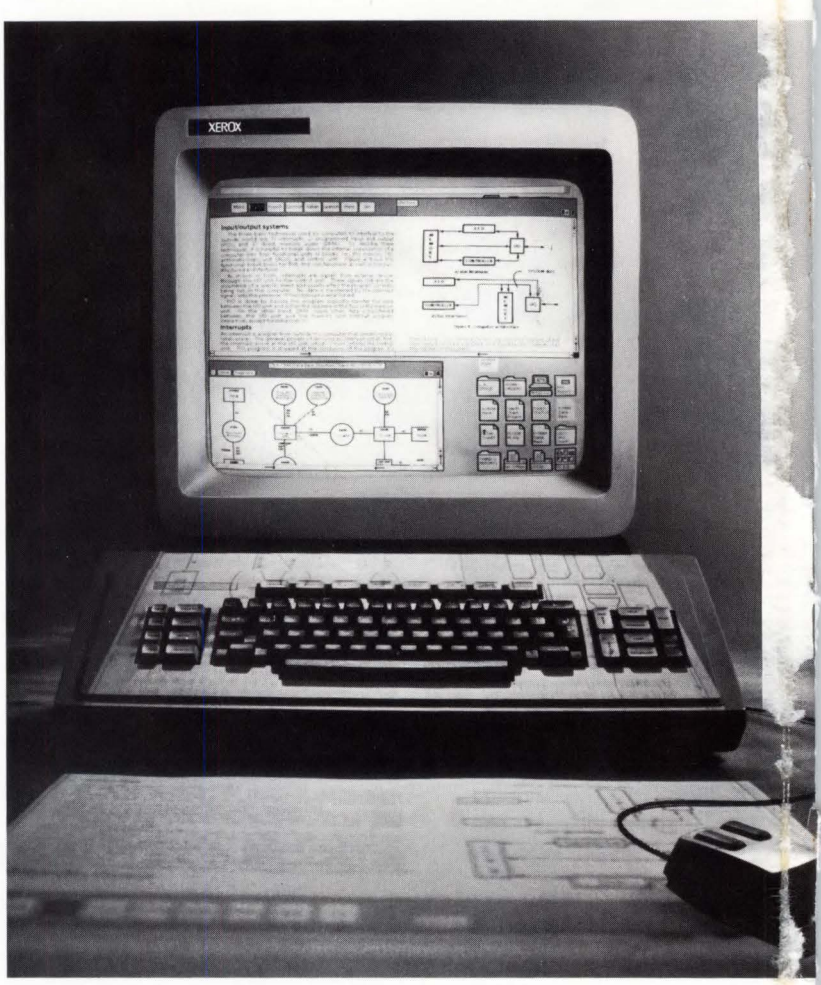
Its full 17″ bit-mapped screen lets you view two full pages at once. It's the only workstation that lets you create documents in more than a dozen languages, among them Russian and Japanese, including Kanji.

While other workstations may use Xerox innovations like the mouse, icons, windows, property sheets and combined text and graphics, Star simply does more with them. For example, its extensive software is fully integrated, to allow you to work with text and graphics simultaneously, without the need for separate programs.

Team Xerox

Star is also available as a stand-alone unit, or as a remote workstation, accessing Ethernet through a PBX. For more information on what has to be considered the stellar workstation in the industry, contact your local Xerox Office Systems Sales Office.





XEROX

Xerox Systems Marketing Division
880 Apollo Street, P1-60
El Segundo, CA 90245

BULK RATE
U.S. POSTAGE
PAID
SYLMAR, CA
PERMIT #110

(Continued from page 32)

the spread of advanced communications technologies like fiberoptics. The first of those advanced offerings may have arrived. Ungermann-Bass Inc. has announced what it claims is the first commercially available, fiberoptic, Ethernet-compatible LAN.

Called Fiber Optic Net/One, the new LAN is an expansion of the vendor's existing baseband and broadband offerings. It provides the advantages of fiberoptics—noise immunity, secure transmissions, and greater network span—to local-area networks. Network bridges and repeaters allow users to interconnect baseband, broadband, and fiberoptic Net/One LANs. "This expansion of our product line permits end users to select the medium, or combination of media, most appropriate for their applications," says James F. Jordan, vice president of marketing.

Fiber Optic Net/One is available in single- or multiple-cable versions. It operates at 10 million bits per second (Mbps). Net/One network-interface units use electro-optical transceivers to connect existing LANs to the fiberoptic cable. The interface is compatible with Ethernet standards and employs access methods and collision-detection signals similar to those used in Ethernet baseband systems.

Star-configuration couplers allow connection of 62 network-interface units per star. Stars can be interconnected to form complex networks. The maximum distance between network-interface units in a single star is 10,000 feet; Ungermann-Bass claims multi-star systems have no distance limits. Fiber Optic Net/One electro-optical transceivers, star couplers, and optical fiber are supplied through Siecor Fiberlan (Hickory, NC).

The cost of an entry-level system starts at about $25,000, including network interfaces, a network-management facility, transceivers, star couplers, and the network operating-system software. A typical fiberoptic Net/One with 200 interface ports costs approximately $135,000. Ungermann-Bass can be reached at (408) 496-0111.

A portable PC leads IBM parade

Portable personal computers may cost even less once IBM's new portable becomes available in significant numbers, according to several experts.

IBM's portable, with its "very aggressive" $2,795 price, will cause a shakeout in the current market, predicts Jack Karp, a personal-computing specialist with the Gartner Group, Stamford, CT. When the new machine becomes available in significant numbers—perhaps in late summer or fall—its competitors may have to slash prices to stay competitive, Karp says.

The IBM Portable Personal Computer.

IBM's new Model 9002 computer for engineering and scientific applications.

But a spokesman for Compaq Computer Corp. (Houston, TX), said to be the largest portable-computer vendor, says his company does not plan "knee-jerk" price cuts in reaction to IBM's announcement of its portable. "We have had price reductions in our plans for a long time," says Ken Price, Compaq's director of corporate communications. **Price** reductions are planned in response to manufacturing gains, not competition, he adds. Price declines to reveal the schedule for the price reductions.

The new IBM machine is comparable to other portables, experts say. But even if it doesn't quite match the performance of competitors, users with large investments in IBM equipment who are seeking to keep the number of vendors with which they deal to a minimum will buy it, predicts Karp.

The IBM Portable Personal Computer weighs 30 pounds, and has a 9-inch amber monitor that displays graphics and up to 25 lines of text with 80 characters per line. It has 256 Kbytes of random-access memory.

Several analysts believe the IBM portable is very similiar to the one made by Compaq, which sells for about $200 more, weighs two pounds less, and is IBM-compatible. But one expert described a key difference. Text displayed on the new portable is not as sharp as it is on a Compaq or even on an IBM Personal Computer with a monochrome screen, says John Hemphill, vice president of technology for Future Computing Inc., a market-research house in Dallas. "Compaq's advantage is that it allows you to do graphics on a monochrome screen while at the same time providing high-resolution text," he says. "The IBM portable has a monochrome screen but it operates only in the color-graphics mode. Thus, text has lower resolution."

For this reason and others, Compaq considers the IBM portable to be inferior, according to Price. Compaq also offers a hard-disk model, which stores 30 times as much information as is possible using diskettes, a re-

quirement of many Fortune 1,000 users, according to Price. IBM allows users to add a second 360-Kbyte diskette drive to the portable, but that setup still leaves the IBM Portable PC with more than 10 times *less* memory than the more expensive hard-disk Compaq.

Other new products recently announced by IBM include the Personal Computer Cluster, which is said to allow up to 64 IBM Personal Computers to share information, a new Model 9002 microcomputer designed primarily for scientific and engineering uses, and new graphic capabilities for the IBM 3270 PC, which originally had none. To get the expanded capabilities, you'll need graphics-adapter cards that allow the 3270 PC to generate pie charts, bar charts, and other business-graphics presentations from a program on a host computer or one loaded into the workstation from a diskette. The cards cost $800 for host graphics and $550 for PC graphics.

The Personal Computer Cluster is an initial attempt by IBM to allow its PCs to share information and messages, analysts say. An IBM spokesman emphasizes that the product is not a local-area network, and, with its relatively slow data-transmission rate of 375,000 bits per second, can't quickly handle file transfers among several users. A cluster connection utilizing an IBM PC XT, the hard-disk version of the PC, as a file server with four attached PCs costs $2,540.

The price becomes cost-effective when divided among five machines, IBM concedes. "It's for small groups in offices and it could be ideal for classrooms," the spokesman says. Although IBM claims up to 64 PCs can be tied together, only five PCs can be hooked up if users want relatively quick information exchanges, says Christine Hughes, vice president of the Gartner Group. In addition, clusters can't be connected and PCs in a cluster can't share printers and other peripherals, she says. This means, for instance, that if your PC doesn't have a printer connected directly to it, you can't push a button and print a document on a printer residing at another micro.

Hughes says users not in dire need of a long-term solution to connecting their IBM PCs may be better off waiting until IBM introduces its anticipated token-passing local-area network. That product may be announced next month, she says. "IBM had to do something to be com-

(Continued on page 57)

One word from us could solve your PC service problems.

AMER

We've noticed that some words cause PC owners extreme anxiety. Words like "The disk drive blew..." "The data won't come up on the screen..." and "The printer won't print."

Service for a variety of systems.

Well, the next time words like that are echoing in your ears, just ask for Americare service from Xerox.

Unlike a lot of manufacturers and dealers, we don't restrict our repair service to one select brand. Instead, we service 22 of them, including 82 different models. From IBM PCs to Quadram boards. And from Amdek monitors to Okidata printers.

Repairs in 48 hours or less.

Our technicians undergo intensive training on the equipment we service. In fact, they probably know as much about servicing it as the people who made it.

And they work fast, so in most cases they can have your PC up and running

XEROX® and Americare™ are trademarks of XEROX CORPORATION.
IBM PC® and the IBM logo are registered trademarks of International Business Machines Corporation.
Quadram® is a registered trademark of Quadram Corporation.

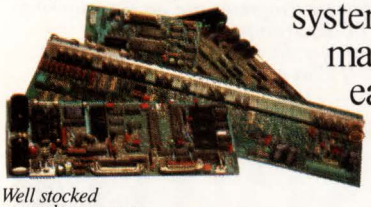
XEROX

ICARE™

again in 48 hours or less.

Of course, you can't get it back fast if the parts aren't available. Which is why we're downright obsessive about keeping our parts department well stocked.

Americare has Xerox Service Centers that provide you with a nationwide support system. And to make service even easier, you can reach us through our network of over 3,000 authorized computer dealers.



Well stocked parts departments.

A nationwide support system.

In addition, we offer a choice of on-site, depot or pick-up and delivery service. Year-long service contracts or time and materials service agreements are available.

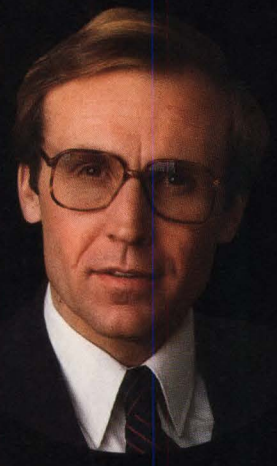
So call 800-238-2300 for the Americare dealer nearest you.

AMERICARE™
PC repair beyond compare from Xerox

It's the first thing to do when you're looking for the last word in service.

CIRCLE 16

"Thoughtware, How Can I Become A More Effective Leader?"



Thoughtware is new, easy-to-use software that will help you see and understand how to become a better manager. It's a unique series of personal, computer-based management diagnostic and training programs.

® Thoughtware is a registered trademark of the Institute for Management Improvement.

How can you become a more effective leader? Thoughtware Program 2.1, "Leading Effectively," will tell you. This four part program has been designed to help managers improve their effectiveness as leaders. It gives you an opportunity to assess your own management style and to compare your results to the self-assessments of other managers.

Unit 1 defines leadership and discusses its three key elements—style, situation and strategy. It stresses the importance of matching the leadership style to the situation and of getting and giving feedback.

Unit 2 is designed to improve your leadership style and increase your ability to perform more effectively. You will see the difference between the kinds of power you exert and the importance of using your influence to affect the behavior of others. You'll also learn about three factors affecting your leadership style: the assumptions you make about people, the degree to which you are task- or people-oriented, and the attitudes you have about the competence of those you supervise.

Unit 3 asks you to analyze a leadership situation you currently face in order to determine what style of leadership is appropriate for your particular situation.

Unit 4 offers guidance on how to use eight effective leadership conditions.

To take advantage of the incredible new technology that is Thoughtware, see the adjacent column.

Thoughtware Programs run on the following:
IBM® PC and compatibles with color graphics card.
Apple® II Plus and IIe.

Thoughtware®

Expanding The Universe Of Learning.

news & comment

(Continued from page 52)

petitive," Hughes says. "It could not say to users, 'We're going to abandon you, we're not going to do anything in the short term.'"

The 32-bit Model 9002 desk-top personal computer is a smaller version of Big Blue's 9001 micro, which is about 30 percent larger. IBM is also offering an optional Xenix operating system on the 9002 that will allow up to four operators to use the system simultaneously. Moreover, users opting for Xenix will be able to take advantage of many third-party software packages.

The 9002's 32-bit design makes it of primary appeal to scientists and engineers with heavy number-crunching tasks. A simple 9002 with a standard operating system goes for $6,495. If you order the Xenix package with the required 10-Mbyte hard disk, diskette, and additional memory and memory-management cards, the 9002 costs $15,960.

Hideaway stations improve security

The best way to keep personal computers from falling into the hands of thieves may be to hide them in locking compartments after working hours. Two new products—one horizontal, the other vertical—secure computers in this way.

Global Computer Supplies offers the horizontal unit, dubbed the PC Action Station. The front of the station swings open to reveal cubbyholes for a printer and paper feeder, a slide-out keyboard shelf, a compartment for a central-processing unit (cpu), and a 16-inch-deep storage area for accessories. A crt is fastened to the top of the unit. When a user is finished working, the station folds up and locks.

PC Action Station is made of plastic laminate wood with a steel base and has wheels for easy movement. The unit costs $495, with a $25 discount on each station if a buyer purchases more than three. For more information, call (516) 485-1000.

Users of Wright Line's PC Workcenter can lock their personal computers and software inside storage compartments.

Wright Line Inc. offers many of the same security features in its PC Workcenter, a vertical steel unit that is available in two heights and widths. A crt fits *inside* this product. A tambour door slides down the front of the unit and connects to a lock in a bottom storage compartment, effectively securing all hardware components and disks. Wright Line gives customers the option of purchasing up to 50 different locks.

The 50-inch-high PC Workcenter costs $775; the 63-inch unit goes for $825. Quantity discounts are available. Call (617) 842-4300 for more information.

More lucrative pay in applications

Applications-programming managers are earning more money than systems-programming managers, according to a recent survey by the Administrative Management Society (Willow Grove, PA).

In 1982, systems-programming

(Continued on page 60)

Give your PC some exciting new personalities.

Our EtherGuide™ seminar-on-a-diskette will show you how.

This diskette seminar demonstrates how easy it is to get into personal networking. With 3Com's EtherSeries.™ The effect is dramatic. Instead of a solid, useful, but limited business assistant, your PC shows its true potential.

In a local area network, you and your PC take on a series of exciting new personalities. You become a better business consultant, secretary, messenger, meeting planner, graphic artist, author, financial analyst, executive, and friend.

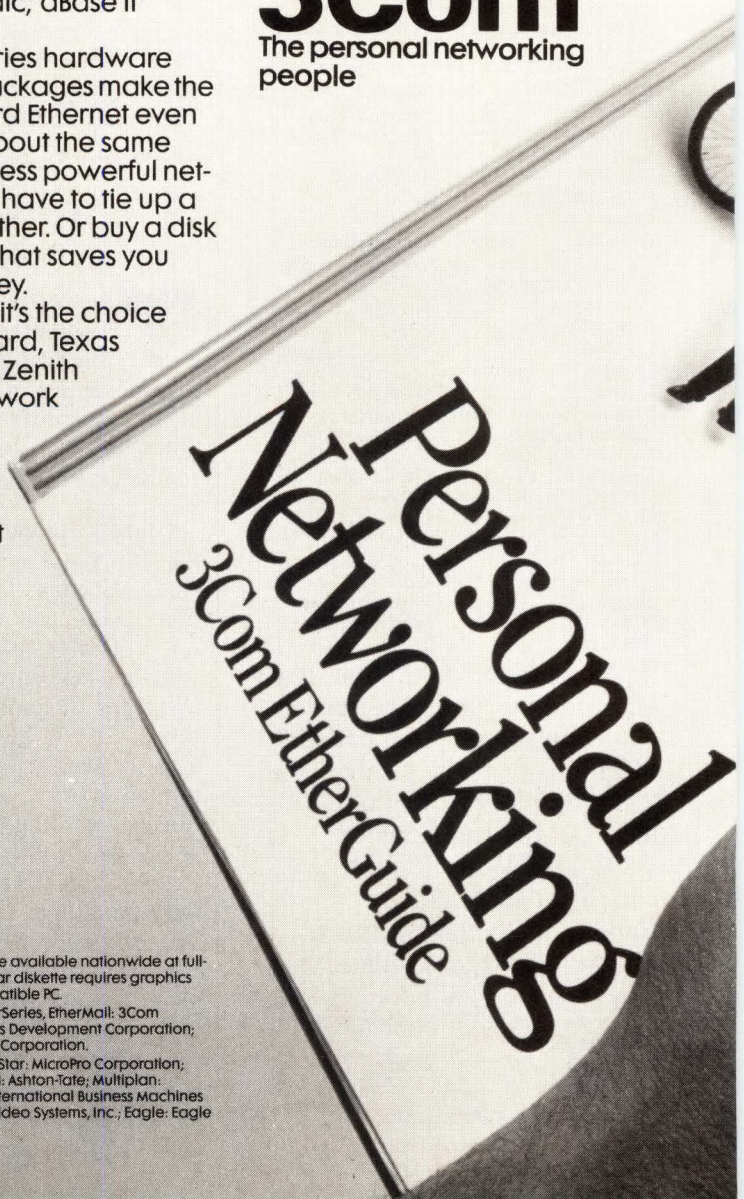
You'll be able to reach out to colleagues with electronic mail, using our award-winning EtherMail.™ Share data bases, printers and plotters, while running hundreds of leading programs such as 1-2-3™ from Lotus,™ WordStar,® VisiCalc,® dBase II® and MultiPlan.®

Our EtherSeries hardware and software packages make the industry-standard Ethernet even better. And it's about the same price as slower, less powerful networks. You don't have to tie up a PC as a server, either. Or buy a disk for every PC. So that saves you even more money.

No wonder it's the choice of Hewlett-Packard, Texas Instruments and Zenith for their own network products. As well as hundreds of companies using IBM PCs and most compatibles, such as COMPAQ,™ TeleVideo® and Eagle.®

So find out how easy it is to get into personal networking. Send in the coupon and a check for $10—that's $10 off the usual $20 price. Or just check the box for complete information on how to do your personal best.

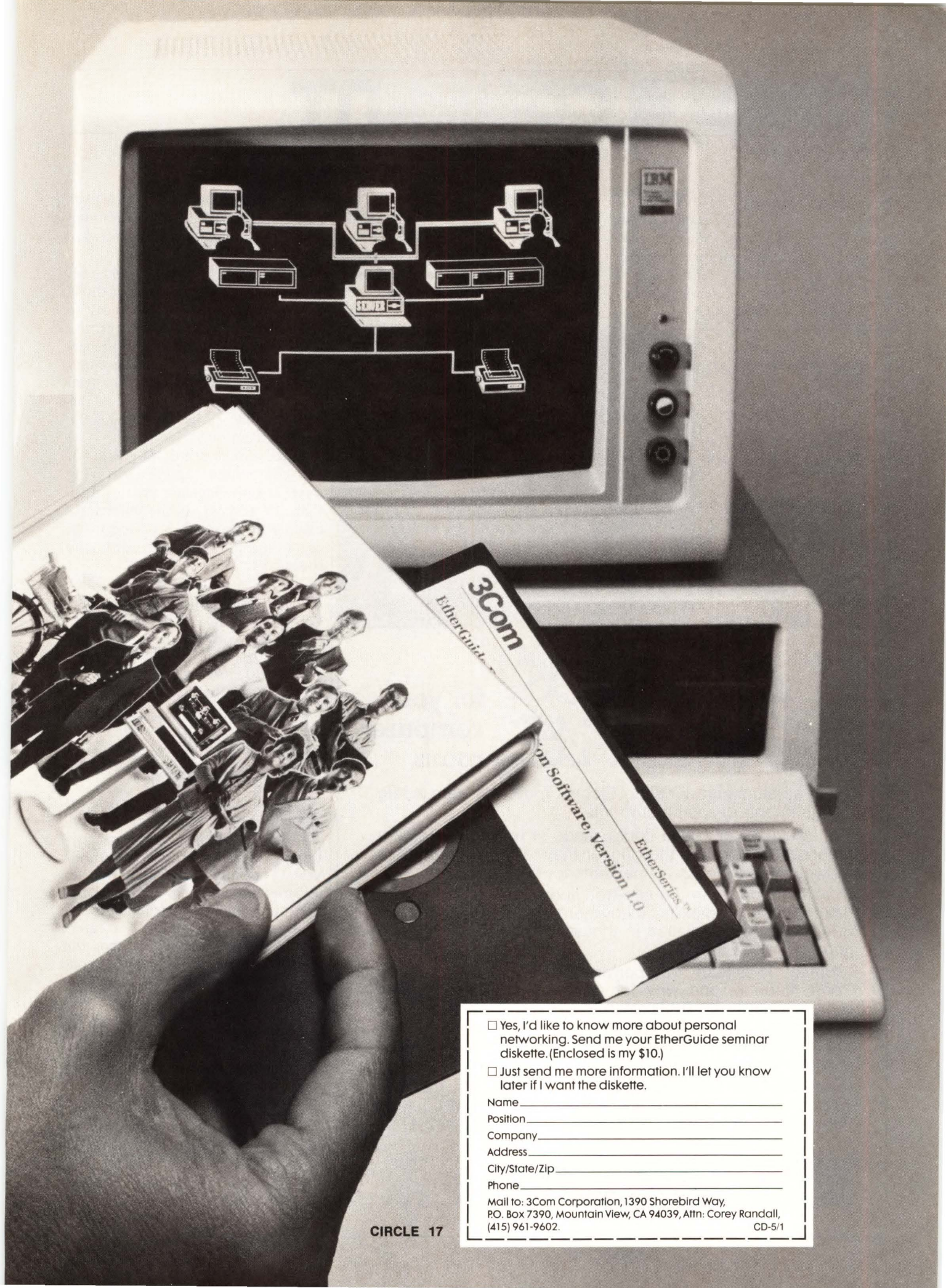
3Com
The personal networking people



3Com EtherSeries products are available nationwide at full-service PC retailers. The seminar diskette requires graphics capability on an IBM or compatible PC.

Trademarks: EtherGuide, EtherSeries, EtherMail: 3Com Corporation; 1-2-3, Lotus: Lotus Development Corporation; COMPAQ: Compaq Computer Corporation.

Registered trademarks: WordStar: MicroPro Corporation; VisiCalc: VisiCorp, Inc.; dBase II: Ashton-Tate; Multiplan: Microsoft Corporation; IBM: International Business Machines Corporation; TeleVideo: TeleVideo Systems, Inc.; Eagle: Eagle Computer, Inc.



☐ Yes, I'd like to know more about personal networking. Send me your EtherGuide seminar diskette. (Enclosed is my $10.)

☐ Just send me more information. I'll let you know later if I want the diskette.

Name_____

Position_____

Company_____

Address_____

City/State/Zip_____

Phone_____

Mail to: 3Com Corporation, 1390 Shorebird Way, P.O. Box 7390, Mountain View, CA 94039, Attn: Corey Randall, (415) 961-9602. CD-5/1

CIRCLE 17

(Continued from page 57)

managers earned an average of $36,100 annually, while their applications peers earned $36,000. But last year, the applications managers edged ahead, earning an average of $38,700 a year. Systems honchos earned $38,200.

The Administrative Management Society compiled results from more than 2,585 companies in the United States and Canada. Applications-programming managers are responsible for handling end-user requirements; systems-programming managers maintain existing software systems.

Other survey results showed that the average salaries of operations managers increased 5.7 percent to $35,000, and database administrators earned an average of 7 percent more, raising the average salary to $35,000. Project leaders, or lead programmer/analysts in applications programming earned up to $33,800, a 5.3 percent hike.

In the United States, 81 percent of the companies reported offering merit raises to increase salaries. Less than 10 percent of the companies claimed to base raises on longevity, cost of living, or equity, according to the survey.

The 44-page "EDP Report," which includes information on personnel, recruiting, and training and development policies, costs $90. For more information, call the Administrative Management Society at (215) 659-4300.

Computer-camp listing available

Archery, canoeing, and toasting marshmallows are fun, but will your kids learn anything valuable at summer camp this year? They might if you send them to a camp that combines outdoor activities and computer instruction.

"Camps 'n Computers," a reference guide, will help you spot the right computer camp. Jointly sponsored by Verbatim Corp., a Sunnyvale, CA, flexible-disk supplier, and the American Camping Association, the directory lists more than 100 camps across the country. Each entry includes the name of a person to call at each camp, tuition costs, length of sessions, and descriptions of recreational facilities. Also included are the number and types of computers, the student-computer ratio, instructor qualifications, the type of computer programming taught, and the

SECURITY

Protect sensitive information with *Ven-Tel's 212 SECURITY PLUS.* Password restrict any terminal to calling only the destinations and applications you authorize. Telephone numbers, passwords, account numbers, and log-in codes are concealed to prevent unauthorized disclosure or use.

Ven-Tel security is not limited to password protection. You are secure in the confidence that your Ven-Tel modem is the most reliable and dependable in the world.

Security is the assurance that Ven-Tel has committed the investment in research, development and production facilities necessary to continued industry leadership and provide off-the-shelf delivery.

Security is knowing that the modem you buy from Ven-Tel is the most modern, technologically advanced product available on the market today. It is knowing that when you need help, a Ven-Tel technical support specialist is as close as a telephone call. It is the confidence that Ven-Tel will be there with service and support for your equipment as long as you own it.

For information call: (800) 538-5121.

CUSTOM & OEM CONFIGURATIONS AVAILABLE

Ven-Tel 2342 Walsh Avenue, Santa Clara, California 95051 **(408) 727-5721**

CIRCLE 8

news & comment

amount of daily computer time allotted to each camper.

For a copy of the directory, send a check for $1 to Verbatim Corp., "Camps 'n Computers," Suite 228, 4966 El Camino Real, Los Altos, CA 94022.

4th-generation symposia

The ways that new data-management and fourth-generation software can improve data-processing departments and information centers will be the subject of the National Database and Fourth-Generation Language Symposia in Chicago and New York. Attendees will compare and evaluate 50 major database management systems and fourth-generation languages.

The four-day symposia will feature intensive discussions of products, providing attendees with "practical, ready-to-use facts." The sessions are designed to prepare dp professionals and non-dp managers to evaluate products, understand what they do, and pick the best solutions, according to Digital Consulting Associates, developer of the programs. Attendees will learn how to develop customized applications software while reducing dp staff, the sponsor claims.

The Chicago symposium is scheduled for May 15 through 18, and the New York symposium for June 18 through 21. For more information, call (617) 246-4850.

Telecomm in 1990: A look ahead

As business-telephone rates rise, the percentage of organizations bypassing telecommunications carriers via shared or private networks will increase to 11 percent by the end of the decade, up from 2 percent in 1982, according to a survey of telecommunications leaders.

Moreover, cellular-radio telephones—almost nonexistent a mere two years ago—should be selling at the rate of 550,000 a year in 1990, comprising 12 percent of the mobile-telephone market, according to the survey.

These are two of the findings of a survey of 200 government officials and telecommunications executives conducted last summer by Arthur Andersen & Co, the New York-based Big Eight accounting firm. Surveyed were engineering, marketing, planning, and finance executives of telephone companies, common carriers, and telecommunications-equipment manufacturers. CEOs and industry analysts also responded. Their opinions form the basis for a look ahead to 1990.

The experts foresee rapid expansion of privately owned telecommunications systems. By the end of the decade, about 60 percent of private automatic branch exchanges (PABXs) and key systems will be owned by users, they predict. Other predictions include the following.

- Sales of PABXs will increase to more than 500,000, up

from 212,000 in 1980.

- Sales of key telephone systems, the small telephone exchanges that let users manually switch voice calls, will grow to 5 million units from 3 million in 1980.
- The respondents do not agree on how popular local-area networks (LANs) will be in 1990. Their projections of LAN sales in 1990 range from 15,000 to 200,000 units.

In the wake of the AT&T divestiture, rising costs have become a major concern for corporations. Government officials in the survey predict that by 1990, business-telephone rates will be increasing 21 percent per year for rural customers, 16 percent for users in medium-sized cities, and 14 percent for customers in large metropolitan areas. Industry executives disagree, however. They forecast much smaller yearly increases, about 8 percent for rural areas, 7 percent for mid-sized cities, and 5 percent for metropolitan areas.

Citing the cost increases forecast in the survey, Arthur Anderson counsels major users to consider installing private bypass networks. A bypass network is defined in the survey as an end-to-end communications network either owned or shared by a user that is independent of service providers like AT&T, MCI, and the other common carriers.

By 1990, large organizations will be spending $9 billion on bypass networks, estimates John Kohlmeier, a partner in Arthur Andersen's Chicago-based management-information-consulting division. Ironically, the trend toward bypass may help to raise telephone rates. Telecommunications-service providers may be prompted to raise rates to replace revenue lost to bypass networks.

The experts predict that digital-termination systems will be widely used for high-speed data transmission by 1990. In addition, they predict that up to 51 percent of all central-office switches will be converted to digital.

In selecting transmission circuits for 1990, the respondents say copper cable will still be the best way to connect two points in a network that are less than one mile apart. Fiberoptic cable is generally the preferred choice for links of between one and 100 miles, and satellite is the preferred medium for distances of more than 1,000 miles.

Survey respondents also expect the equipment in the average office to change dramatically by the beginning of the next decade. They make the following predictions.

- Communicating word processors will be used by 55 percent of all businesses.
- About one-third of businesses will use electronic mail and smart copiers.
- Roughly one-third of the Fortune 1,000 corporations will have video-teleconferencing facilities.
- Most of the business telephones sold in 1990 will have special features like automatic dialing. The majority will be voice-only devices (41 percent), but a significant number will handle voice and data (33 percent).

The 56-page report costs $100. For information, call Arthur Andersen at (312) 580-0069.

(News continued on page 64)

news & comment

Tongue in check

"There is a tendency in specialized groups, for reasons of either establishing a kind of mystic bond or asserting a kind of self-importance, to employ esoteric or pretentious words," wrote the late Theodore M. Bernstein. The computer industry is notorious for its baffling jargon, and many MIS/dp managers share in that reputation. But jargon and puffery often are the cause of only half the confusion. Hyperbole accounts for the remainder.

Hyperbole can be fun, and we all engage in it now and then to liven up a conversation or a piece of writing. "Years ago, a clerk had to prepare tons of spreadsheets" is more colorful than "Manual preparation of spreadsheets was once a time-consuming chore." The exaggerated statement isn't true, but its meaning is clear because the hyperbole is obvious. Unfortunately, the hyperbole isn't always so obvious.

One MIS/dp manager, when asked how much time a new software package had saved his staff, replied: "Large-system design takes 20 times as long to complete without it [the package]." Accomplishing a once-manual task 20 times faster with a computer is within the realm of possibility. Is that statement hyperbole or is it fact? Computer systems have introduced us to such extremes—high speeds, huge capacities, tiny sizes—that we just can't be sure. As a matter of fact, in this case the manager's statement was hyperbole; because that isn't clear, however, the statement winds up being meaningless.

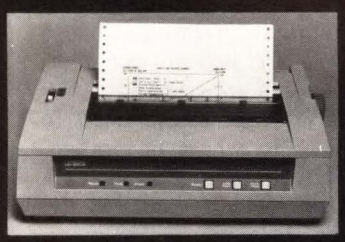
Many managers also fall into the practice, so popular among vendors, of overstating everything. A software vendor's package can't merely be a good value, it must *make history* or *improve performance by orders of magnitude*.

One manager, for instance, described an upgrading of his employer's data center as "a near revolution." The data center in question is huge and the upgrade requires lots of new equipment and software. But *revolution*, one of the vendors' favorite words, is best reserved for truly momentous occasions.

In language, as in all things, moderation is a good rule to follow. If you overuse hyperbole and exaggeration, the first casualty will be your meaning. The second could be your credibility as a straightforward, no-nonsense business communicator. —*John Rymer*

Advancing The Standard

With full VT100 performance, the new VT220 becomes the price/performance leader. More sleek and compact than its predecessor, the VT220 includes such features as a 12" non-glare amber, green or gray screen with 80/132 column by 24 line display, a new streamlined keyboard with 30mm key height, 15 programmable function keys, advanced video, built-in serial printer port, 7- and 8- bit control modes, operates up to 19.2K baud and supports full duplex, asynchronous communications. If you want graphic capabilities, the VT240 gives you text and graphics in a single display. The VT241 adds color with a 13" screen and it supports a broad range of graphic software.



LA50. A PC compatible printer, prints up to 100CPS and comes in a compact, low cost package. Features two printing test modes and a graphics mode.

AUTHORIZED digital® TERMINALS DISTRIBUTOR

LA100. A highly flexible printer which will give the user 240 CPS output in a standard report format, as well as a 30 CPS letter quality output for word processing applications.

Data Access Systems, Inc. is an Authorized Terminal Distributor for Digital Equipment Corporation. We offer a full range of Digital's popular, quality terminal products. And with sales and service offices nationwide and a multi-million dollar inventory and leasing base, DASI will tailor a financial package to meet any budget.

Digital Equipment Corporation and DASI... An Industry Leader for Fifteen Years.

D A S DATA ACCESS SYSTEMS, INC.

Coles Rd. and Camden Ave. • Blackwood, NJ 08012

Call Us Today. CIRCLE 22

800-257-7748

in New Jersey 800-232-6510

District Offices: Atlanta (404) 998-2255 • Boston (617) 769-6420 • Chicago (312) 967-0440 • Cincinnati (513) 793-4430 Cleveland (216) 473-2131 • Denver (303) 337-4103 • Detroit (313) 978-7309 • Houston (713) 682-5965 • Los Angeles (213) 532-2238 Minneapolis (612) 854-4466 • New Jersey (201) 227-8880 • New York City (212) 564-9301 • Philadelphia (609) 228-6660 Phoenix (602) 273-6989 • San Francisco (415) 872-1811 • Seattle (206) 575-1448 • Washington, DC (301) 459-3377.

news & comment

(Continued from page 64)

Shared micros put security at risk

As personal computers are shared via local-area networks (LANs) and communications schemes, there is an increasing danger that corporate data will be lost, compromised, or sabotaged, participants in a recent seminar suggested.

Think of a personal computer as a file cabinet for data, said several speakers. When a micro sits in a manager's office, a spy, saboteur, or bumbling employee has to get into the office to gain access to files in the electronic file cabinet. In a shared system, it's much easier to raid the files. "When a personal computer is accessible to many users, you open files to anybody in the organization," said Andrew M. Seybold, editor of the *Seybold Report on Professional Computing*.

At the seminar, a variety of users, consultants, and vendor representatives discussed the security issues raised by personal computers. "Data Security Issues in Microcomputer Applications" was sponsored by Tallgrass Technologies Corp., an Overland Park, KS, supplier of disks.

The security problems of shared systems will become more acute during the next few years, the speakers said. Only 3 percent of the personal computers in corporations have been hooked up to LANs, noted L. William Krause, president of 3Com, the Mountain View, CA, maker of LAN-connection hardware. But by 1988, when 18 percent of micros are expected to be attached to LANs, the problem will be all too evident.

Hard disks—particularly those used as shared-storage facilities—increase the likelihood of data loss from poor backup practices, the speakers said. Backup is considered by many experts to be a security issue. More complex personal-computer applications require memory capacity that only hard disks can provide (hard disks store about 30 times as much as standard floppy disks). Frank Carau, R&D section manager for Hewlett-Packard Co., Palo Alto, CA, said HP is selling 25 percent of its personal computers with 15-Mbyte Winchester disks. He expects 20-Mbyte disks to soon become the industry standard.

With an LAN or a multi-user microsystem, no single employee is responsible for backing up information that is entered on shared hard disks. Because backing up a hard disk on floppies is time-consuming, many users neglect to make backup copies of their work, several speakers said.

Failure to back up files is costly if employees have to restore data that is lost during a system malfunction, said Krause. However, the human cost of backing up files can also be costly. If a CEO or other highly paid executive is using a hard disk with a personal computer, the cost in lost effectiveness of the executive backing up the hard disk with as many as 30 floppies is high, said Krause.

Tallgrass Technologies recommends its cartridge-tape-backup subsystems to back up files. Tallgrass offers a 60-Mbyte tape cartridge-backup unit for $1,995 that is compatible with IBM's Personal Computer XT, the version that comes with a hard disk, and similiar units, said David M. Allen, president of Tallgrass. With 60 Mbytes of storage, a tape cartridge eliminates the need to use many floppies to back up hard disks, the company claims.

William L. O'Neil, director of microcomputing at the First Boston Capital Group, an investment house in Tarrytown, NY, believes personal-computer vendors are responsible for educating users about the need to back up data—by whatever method. "You see Charlie Chaplin taking care of all his troubles with his IBM PC XT in his hat factory," said O'Neill, referring to IBM's television commercial. "I always wondered what Charlie did to back up his system. Does he sit for two hours and shuffle 17 or 30 diskettes to back up his hard disk? As the leader in the market, IBM has a responsibility to educate the public."

As your terminal needs accelerate, move to Ann Arbor. We make the CRTs used by hard-driving professionals from M.I.T. to Stanford.

Take our Ann Arbor Ambassador, for instance. Nothing about it slows you down. The editing commands use line pointers to virtually eliminate the need for pad characters. The ANSI coding lets you put parameters in your commands to speed up execution.

And that's just for starters. The Ambassador does what no other alphanumeric terminal can: it gives you a 60-line display with zoom. You choose the format best suited to your software and your comfort—24 lines, 30 lines, 48 lines. Whatever. Then instantly zoom up to 60 to see what a printout will look like. Recapture something that scrolled by too fast. Or simply check for context.

Like all Ann Arbor products, the Ambassador uses a large, easy-to-read screen—either portrait or landscape. The case can be tilt/swivel or rack mounted. And the detached keyboard provides dozens of programmable keys to save you time.

Of course, starting at $1595, the Ambassador isn't for everyone. Just for the thousands of professionals who really want to move.

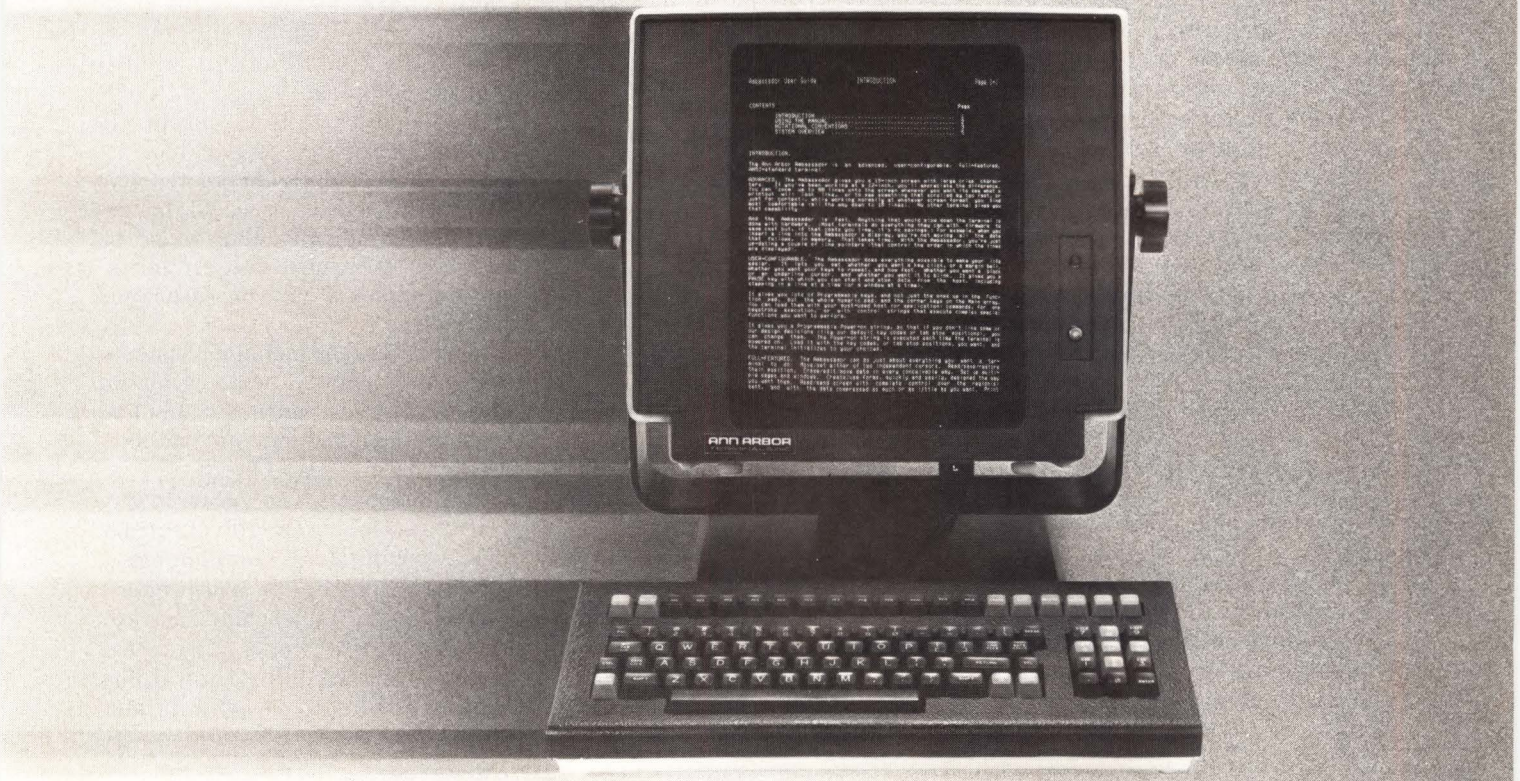
For more information, call 313/663-8000. Or write us at Ann Arbor Terminals, Inc., 6175 Jackson Road, Ann Arbor, Michigan 48103. But don't wait too long—the Ambassadors are going fast!

ANN ARBOR
TERMINALS

Once you've worked with them, you won't work without them.

0 to 60 in less than a second.

CIRCLE 18



by Susan Foster Bryant, Microsystems Editor

PERSONAL COMPUTING

Old computers don't die—they're recycled

Now that your organization's squeaky-new personal computers have arrived, what can you do with the old ones that have already begun to gather dust? And what about the micros that are displaced when the accounting department gets its new multi-user system? How do you prevent yesterday's investments in personal computers from becoming dead letters? By recycling your old machines.

The hottest new market in personal computers is for used micros. There are two reasons for this development. First, used micros are reliable—electronic components don't wear out. Second, personal computers—so far—have been retaining much of their original value. Most dealers say used Apple models are selling for at least 50 percent of their original sale price. The Apple Lisa is commanding a *higher-than-new* price. And used IBM Personal Computers and PC XTs (the XT is the hard-disk version) are selling for at least 80 percent of their original prices.

Take the case of the Big Eight accounting firm that bought more than 1,000 desk-top computers a year ago. Since then, executives at the firm (which will go unnamed) have made a disheartening discovery: Its employees really wanted *portable* computers. "This firm is faced with two options," says Edward Owens, founder of Scientific Computer Systems Inc., Boulder, CO. "It can abandon a tremendous investment—in excess of $250,000—in new equipment. Or it can call us. We'll sell the used micros on consignment. Until we sell the machines, the firm retains ownership of them and still gets investment tax credits and depreciation allowances. We've got a waiting list for such products."

Scientific Computer Systems is just one of several new enterprises dedicated to helping large corporations dispose of used, unwanted micros without "abandoning" their investments. Computer Reruns, Ann Arbor, MI, and Interstate Computer Bank, Mountain View, CA, are other dealers in used micros.

According to Owens, Apples and IBM PCs and XTs are most in demand on the used-equipment market. He also sees a lot of used Radio Shack equipment. Surprisingly, used Apple Lisas are selling for prices higher than their original $10,000 purchase price—despite Apple's recent price reductions. The reason? It's the law of supply and demand, says Owens. This may be the effect of the disappointing early sales of the Lisa. Early sales were slow, therefore the supply of used Lisas is low, and prices are high.

Used-computer dealers like Scientific Computer Systems give corporations an alternative to distributing old equipment to branch offices or finding buyers for old micros themselves. As one agency in the federal government learned, used-equipment dealers can simplify the whole process. The agency had 2,000 Apples to unload. Owens advertised the availability of the machines to locate a buyer. In the end, the agency recouped some of its initial investment.

Within six months, Scientific Computer Systems plans to open a network of "master" and satellite stores in what will be the first nationwide chain of used-computer outlets. The master stores will be located in Dallas, San Francisco, Los Angeles, Seattle, Denver, Minneapolis, Chicago, Atlanta, Boston, and New York. The chain will publish a *Blue Disk* (analogous to the auto industry's *Blue Book*), listing the values and suggested prices of used micros and peripheral equipment. Each store in the network will be connected via an online system to a database.

"If a company in southern California, for example, wants to sell machines on consignment, the information will be put in the database," says Owens. "The machines will be available for any of the stores to sell. The network will open up a bigger market to corporations."

Scientific Computer Systems guarantees that the equipment it sells will be accepted for maintenance contracts. For example, Owens' company recently bought a batch of Hewlett-Packard terminals from a company that had replaced its HP 250 system with an IBM System/36. The terminals were covered under a maintenance contract. Scientific Computer Systems inspected the terminals to ensure that they would be approved by Hewlett-Packard for inclusion under a new maintenance contract.

Warranties and maintenance contracts are usually not a problem when it comes to personal computers because the machines are trouble-free by nature, says Owens.

Still, managers who decide to buy used equipment should carefully check mechanical components—keyboards, disk drives, and printers. Test keyboards by touching each key to make sure it works. Check the quality of printed output for warning signs. If quality is low, the printer

DIMENSION. THE MOST POWERFUL, MOST COMPATIBLE PERSONAL COMPUTER YOU CAN BUY.

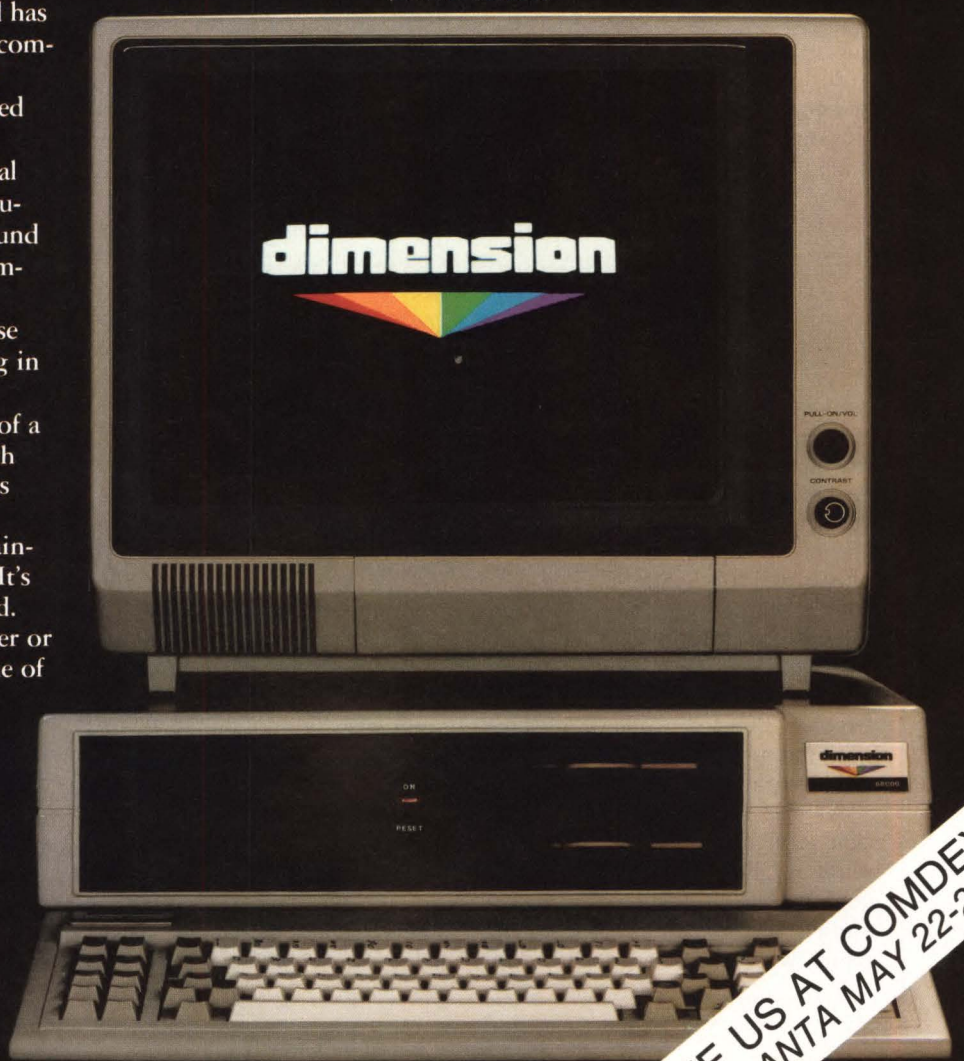
Introducing the capability the world has been waiting for. A single personal computer able to handle Apple,® IBM,® TRS-80,® UNIX™ and CP/M® based software.

The Dimension 68000 Professional Personal Computer does it all. It actually contains the microprocessors found in all of today's popular personal computers. And a dramatic innovation creates the environment that lets these systems function merely by plugging in the software.

Add to this the incredible power of a 32 bit MC68000 microprocessor with up to 16 megabytes of random access memory.

Dimension has the power of a mainframe at a personal computer price. It's obviously the best value you can find. For more information ask your dealer or call us at (214) 630-2562 for the name of your nearest dealer.

(CRT not included)



dimension™ 68000

A product of
Micro Craft Corporation
4747 Irving Blvd., Suite 241
Dallas, Texas 75247. ©1983

CIRCLE 23

SEE US AT COMDEX ATLANTA MAY 22-25

may need repair. Check the disk drives—and the entire system—by running it through a strenuous test.

In most cases, Owens asserts, users don't unload machines because they're malfunctioning. The biggest cause of discontent is user-driven problems. "Two weeks ago," he recalls, "a guy flew in from San Antonio, TX, to deliver a Compaq portable for us to sell. He had spent $6,500 on the machine, but been totally oversold and used it for only about two hours. He couldn't figure out how to use the computer. All he wanted was to recoup enough of his investment to buy a Macintosh [from Apple]." The reason this disenchanted user wanted a Macintosh, says Owens, was that he believed he could use it without having to read a manual. "The guy really wanted to use a personal computer, but he didn't want to spend time reading manuals," says Owens. That attitude is unrealistic, he adds.

For managers who want to sell used equipment, check with local computer retailers. Frequently, they are in touch with used-computer dealers. At the very least, they can give you an idea of the price you can expect to get for the equipment. For information on Scientific Computer Systems (and the *Blue Disk*), write to the company at 2690 28th St., Boulder, CO 80301. □

Rx for micro mania

by Joseph Braue, News Editor

Micromania, the uncontrolled spread of personal computers in corporations, can be treated in ways that are as diverse as the individual corporate patients.

That was the message of two executives from A.O. Smith Corp., a decentralized manufacturer based in Milwaukee, and the giant General Foods Corp., White Plains, NY. Eugene R. Kleinberg, dp-audit manager at A.O. Smith, and Robert Judge, associate director of General Foods' division of information services, described their prescriptions at a recent conference of the National Association of Accountants in New York.

According to Kleinberg and Judge, the uncontrolled spread of personal computers is responsible for a variety of corporate ills. Armed with machines but no procedures, employees often input and create redundant data and applications, for example. The same employees are capable of compromising the integrity of corporate data, particularly if their machines are hooked to the corporate database. Without controls on purchasing, incompatible machines often are brought in.

At General Foods, the information-services division began grappling with the spread of personal computers several years ago, said Judge, using "friendly" consultations with operating divisions. These sessions involved an employee-training program, a computer-familiarity project for top executives, and a central-purchasing arrangement that allows the department to stay on top of equipment purchases, he said. "The spread of these machines was going to happen anyway, and we didn't want the user community to circumvent our department as it had often done in the past," Judge said.

The major thrust of General Foods' micro program is not so much *control* as it is productive *growth*, said Judge. There's a fine line between the two approaches, he said. For example, Judge feared that if micros were placed in manager's offices, they'd be used not only to prepare budgets, but to compute bowling averages as well. He recommended to executives that the machines be made accessible to many employees by placing them in open offices. However, he stopped short of dictating where personal computers should be placed.

The information-services department also promoted the formation of an advisory council of managers authorized to approve purchases. It encouraged the corporation's president and other top executives to take personal computers home for a trial run with Visicalc, a spreadsheet package. This program helped foster an informed attitude among top executives.

General Foods also opened a headquarters user center modeled on the typical retail computer store.

Micros began spreading at A.O. Smith two or three years ago, as departments started purchasing machines independently, said Kleinberg. "It didn't take long before we were dealing with three different vendors, each of which offered a different operating system," he recalled.

A.O. Smith adopted a collaborative approach out of structural necessity, said Kleinberg. A policy built on strong central control would have been out of step with the manufacturer's structure as a federation of semiautonomous divisions.

The corporation gave the divisions guidelines and standards to promote the proper use of micros. For example, if data will take longer than a week to recover, users are required to make backup copies.

Kleinberg's staff also surveyed users to discern the preferred spreadsheet and word-processing programs, and then promulgated a list of recommended programs. To help users understand security, A.O. Smith publishes a newsletter on dp controls.

Like General Foods, A.O. Smith opened an information center, but it is structured a bit differently. The center is responsible for curing the problems that inevitably arise.

Decision-making tools for the Information Age

With the Matrix QCR™, charts, graphs and text of colorful artist-quality can be instantly formatted by management, DP, MIS and other personnel. This is accomplished right from your mainframe or network, for 35mm slide and 8″ x 10″ transparency presentations. In addition, you get the in-house advantages of quick turn around and controlled confidentiality.

We will supply you without charge, for your evaluation, the necessary driver software for *your* decision-making on the Matrix QCR™ D4/2 color film recorder.

#MATRIX INSTRUMENTS INC.

One Ramland Road, Orangeburg, NY 10962, Telephone: 914-365-0190 or Telex: 6853232
In Europe, please contact:
Honeywell Europe S.A., Avenue Henri Matisse 14, B1140 Brussels, Belgium, Tel: (32) (02) 243 1487 or Telex: 24535

GDDM is a trademark of IBM.
SAS/GRAPH is a registered trademark of SAS Institute Inc.
ISSCO is a registered trademark of Integrated Software Systems Corporation.

CIRCLE 24

by Jan Snyders, Midwestern Editor

SNYDERS ON SOFTWARE

You, too, can break into pictures

Ask graphics-software users what they like about their packages, and the key words you'll hear are "fast results," "cost savings," "improved productivity," and "clarity in presentations."

Graphic displays have long been recognized as an invaluable aid in business presentations of every variety; the hitch was that they were time-consuming and expensive to produce. Graphics software solves that problem, often allowing users to produce their own graphs and charts, sometimes in minutes, for a fraction of what it used to cost to commission such artwork.

Accurately plotted graphs can be as useful in-house as they are in presentations to clients—as managers at Beatrice Chemical discovered. Beatrice Chemical is a division of Beatrice Foods Co., the Chicago-based company with sales last year of $9.2 billion. The division, which manufactures specialty chemicals, uses graphs and charts for trend analysis of sales, budgets, and other financial data. The graphics software it uses is Sagegraf from Sage Data Inc., installed in late 1982.

Beatrice Chemical does not have its own mainframe but uses a DECwriter III terminal linked by dial-up modem to Sage's computer. A Hewlett-Packard 7221 plotter produces the graphs.

Computer-generated graphics

Selected graphics software

Vendor	Package	Equipment	Price	Circle
Ask Computer Syst. (415) 969-4442	Manman/Grafman	Hewlett-Packard 3000 series	$2,000 turnkey $3,000 software only	591
Cortex Corp. (617) 237-2304	EDDS (Executive Data Display System)	DEC VAX 11 series	$7,500	592
Data Processing Design (714) 970-1515	IBG	DEC PDP-11, VAX, and Micro-11	$3,000 to $7,500	593
Dynamic Graphics (415) 845-8180	Surface Display Library (SDL)	IBM; Sperry; DEC VAX, 10, 20; Prime; Honeywell; Perkin Elmer	$17,500	594
	Surface Gridding Library (SGL)		$17,500	
	Polygon Operations Library (POL)		$20,000	
	Interactive Surface Modeling (ISM)		$62,500	
Genigraphics (315) 451-6600	100D	Turnkey with DEC PDP-11/23	$66,900	595
	100V		$94,500	
Geographix (215) 925-6690	Graphix-11	DEC PDP-11, LSI-11, VAX	$1,095 to $2,995	596
Intel (512) 258-5171	Graphics Report Writer w/Genius	Control Data; Sperry 1160; IBM 4300	$20,000	597
		Sperry 1800; IBM larger than 4300	$35,000	

SCAN/370

SCAN/370—The system that automatically simulates the execution of every cleanly compiled **COBOL** program. SCAN/370 gives you critical analysis information that reveals how each program will execute at run time—information not obtainable via cross referencers, flowcharters, or other analysis tools.

SCAN/370 is a comprehensive **COBOL** enhancement system designed to speed the development and maintenance of **COBOL** programs and improve their operational reliability.

MAINTENANCE AND DEVELOPMENT PRODUCTIVITY: Isolates problem areas in **COBOL** programs—before testing. Simplifies resolution of compiler diagnostics. Removes the drudgery from new program development. Reduces the time required to analyze **COBOL** programs.

PROGRAM RELIABILITY: Detects and flags latent bugs in production programs—before they happen. Highlights maintenance booby-traps.

DYNAMIC PROGRAM DOCUMENTATION: Generates concise and accurate program level documentation. Recreates documentation automatically with every clean compilation.

QUALITY ASSURANCE: Graphically distinguishes well structured code versus poorly structured code. Detects and flags **COBOL** keywords that do not conform to user defined restrictions. **EDP AUDITING:** Documents the differences between two versions of the same **COBOL** program.

SYSTEM RESOURCE SAVINGS: Saves millions of lines of computer output every single month. Reduces the load on your teleprocessing network.

OPERATING ENVIRONMENT: IBM 360/370 and compatible systems.

GROUP OPERATIONS, INCORPORATED
1110 Vermont Ave., N.W. Washington, D.C. 20005 (202) 887-5420
Offices in: Boston, Chicago, Cleveland, Columbia, S.C.,
Dallas, Los Angeles and New York.

have raised productivity at Sikorsky Aircraft in Stratford, CT, according to Paul Proulx, decision-support analyst. "Using Speakeasy," he says, "we can do a day's work in half an hour."

Sikorsky Aircraft, the well-known helicopter manufacturer (1983 sales: $1.3 billion), has 12,500 employees. It is a division of United Technologies Corp., which also includes Otis (the elevator manufacturer) and Carrier (the air-conditioner company). The company uses two 32-Mbyte IBM 3081s with 600 terminals online. The terminals include 40 Tektronix 4014s and about 560 IBM 3270-series units. Major applications on the computers include all financial functions, work-order generation, and manufacturing.

According to Proulx, Speakeasy was originally brought in as an ad hoc programming language. Speakeasy's graphics feature encouraged its use as a graphics tool. Before the package was installed, the company was using Tektronix software that could be run only on application programs. It took a programmer to produce graphics, and turnaround was very slow. With Speakeasy, users could get at graphics themselves through a language they could run without programmer intervention.

Since Speakeasy is primarily a mathematical package, it is used mainly in engineering. The engineers can develop Speakeasy programs and produce graphic mathematical analyses for use in designing aircraft.

Saving time creating a drawing is nice, agrees Lou Deitch, senior data administrator at the U.S. Postal Service, "but the real benefits come when you have to update drawings. And we do an extensive amount of updating."

Deitch and his staff use Tektronix 4113s to access an IBM 3033 located at the National Information Systems Development Center in Raleigh, NC. They are using Stradis/Draw from McDonnell Douglas Automation Co. (McAuto) for data-flow diagrams, information systems, and application development.

The need for a graphics package arose, Deitch explains, when the USPS developed a business-systems plan a few years ago, identifying each

Selected graphics software

Vendor	Package	Equipment	Price	Circle
ISSCO (619) 452-0170	Dissplа	A variety of systems	$9,500 to $61,000	598
	Tell-A-Graf		$9,500 to $52,600	
	Tellaplan		$4,000 to $12,500	
	Data Connection		$5,000 to $25,900	
Johnson Syst. (703) 821-1700	Graphic On-Line Display System (GOLD)	IBM 370, 43XX, 30XX, and PCMs	$2,000 DOS $4,000 OS	599
McAuto (314) 232-5715	Stradis/Draw	IBM 370 and PCMs	$25,000	600
Megagroup (714) 474-0800	Megagraph	IBM 370, 43XX w/MVS/TSO and VM/CMS operating system	$4,000	601
		IBM 30XX w/MVS/TSO and VM/CMS operating system	$5,000	
Megatek (619) 455-5590	Template	Device-independent	$25,000	602
MSA (404) 239-2000	MSA Color Graphics	IBM 360, 370, 43XX, and 30XX using MSA's Forecasting and Modeling System	$29,000 to $58,000	603
Nova Graphics Int'l. (512) 327-9300	Nova*GKS	Any 16-bit or larger computer	$7,500	604
Precision Visuals (303) 530-9000	DI-3000	Most mainframes	$5,000 to $24,000	605
	Grafmaker		$3,500 to $10,000	
	Contouring		$2,500 to $8,000	
	Grafmaster	DEC VAX	$9,500 to $18,000	
Sage Data (609) 924-3000	Sagegraf	IBM 370, 43XX, 30XX, and PCMs	$8,500	606
SAS Institute (919) 467-8000	SAS/Graph	IBM 370, 43XX, 30XX, and PCMs	$5,500	607
Software AG (703) 860-5050	Natural/Graphics	IBM 370, 43XX, 30XX, and PCMs	$15,000	608

A minimum of moving parts and an exceptionally rugged design make the CI-600 from CIE Terminals the *first* 600 LPM matrix line printer you can depend on.

And when you compare the CI-600 with other 600 LPM line printers, you'll find others either do a lot less, cost a lot more, or both.

A 600 LPM built on a simple principle.

The CI-600 is plug-in compatible with virtually every type of computer system, including IBM and DEC.® It doubles the throughput of our CI-300. It gives you 600 LPM data processing and letter quality to 170 LPM. It has variable shuttle speeds. And it delivers graphics up to 4800 DLPM.

The CI-600 is ideal for retail, business, engineering and scientific graphics applications, all of which are easily accessed and used. And there's more.

You get high resolution graphics for Bar Codes, Optical Character Recognition, Form Generation, Labels and Word Processing. An unusually small print head diameter for needle-sharp character clarity. Hundreds of unique character fonts. And three built-in interfaces, two parallel and one serial.

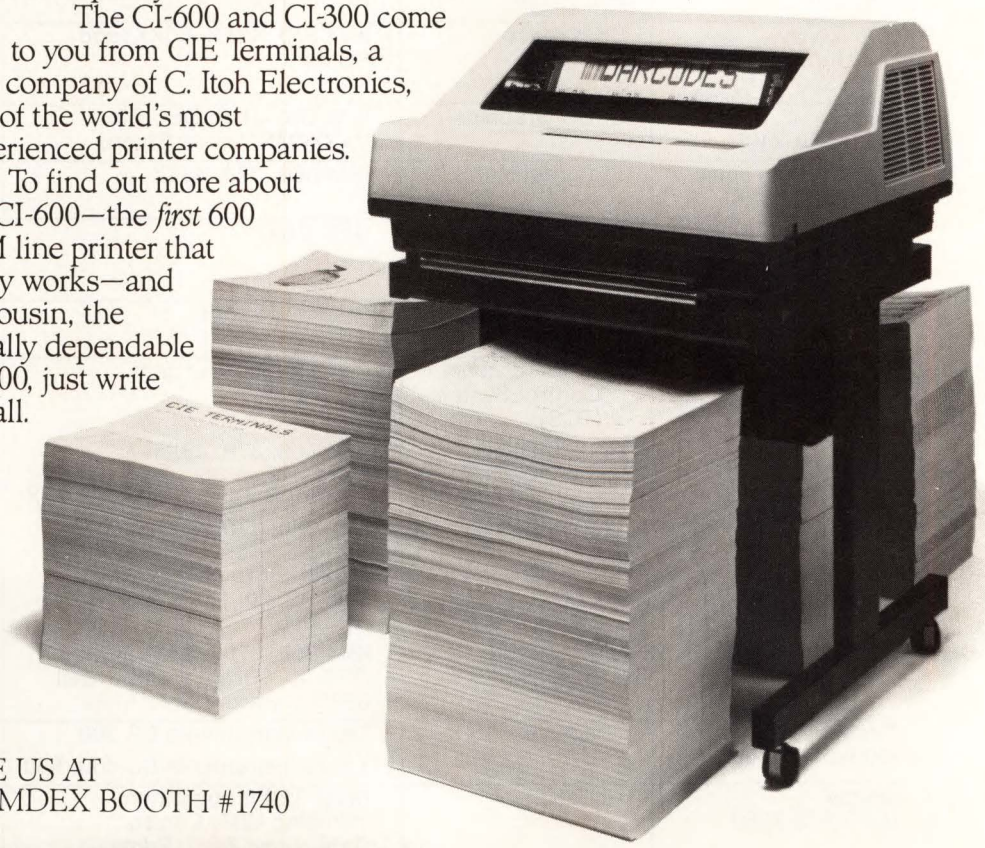
There are also two paper-loading points—front and bottom. Plus flexible line spacing and line feed speed.

If you'd like the same quality, but don't need as much speed, we also offer the CI-300—with 300 LPM data processing and 85 LPM of letter quality.

It really works.

The CI-600 and CI-300 come to you from CIE Terminals, a new company of C. Itoh Electronics, one of the world's most experienced printer companies.

To find out more about the CI-600—the *first* 600 LPM line printer that really works—and its cousin, the equally dependable CI-300, just write or call.



SEE US AT
COMDEX BOOTH #1740

CIE TERMINALS

A new company of
C. ITOH ELECTRONICS, INC.

2505 McCabe Way, Irvine, CA 92714-6297. (714) 660-1421. Call toll-free 1-800-854-5959.
In California, call toll-free 1-800-432-3687.

® DEC is a Registered Trademark of Digital Equipment Corporation.

major business aspect, including finance, personnel, and management.

Graphics software improved the productivity of managers at Central Maine Power in Augusta, according to Margie Force, senior programmer analyst. "Managers can now obtain what would otherwise be detailed, voluminous data in a more readable form," she explains.

Central Maine Power provides electricity to about 410,000 residential and industrial customers in about one-third of the state of Maine. The utility uses an 8-Mbyte IBM 4341 with 28 IBM 3279 terminals and a 512-Kword Honeywell 6640. Plotters include two Zeta 8s and a Tektronix 4662.

"SPSS has many statistical routines," Force explains, "and we use half a dozen of them, as well as the graphics function, for research. In some cases we can produce graphs with SPSS just by typing in the X and Y values; the software does the rest. Other times, X and Y are the results of calculations done by SPSS."

Ray Thompson, data-processing manager for the City of Olathe, KN, cites improved clarity as the main benefit of using graphics software.

Olathe (Population: 47,000), located 25 miles south of Kansas City, is classified as a full-service city. That is, it offers water, sewer and sanitation, and parks and recreation services to residents. The city uses a 3-Mbyte Magnuson M8031 computer with 46 Telex, IBM, and Memorex terminals for online applications. The main systems are for budget accounting, utility billing, payroll and personnel, and the municipal courts.

The impetus to install Natural/Graphics from Software AG of North America was a 1982 directive from Olathe's city manager: All division heads were to begin using charts in their quarterly manage-

Selected graphics software

Vendor	Package	Equipment	Price	Circle
Speakeasy Computing (312) 346-2745	Speakeasy	IBM 370, 43XX, 30XX, and PCMs	$6,500	609
SPSS (312) 329-2400	SPSS Graphics	IBM OS, CMS; DEC 20, VAX/VMS; Prime Primos	$3,000	610
Statistical Graphics (609) 924-9374	Statgraphics	IBM 360, 370, 43XX	$3,800	611
Stone Mountain Computing (805) 964-9101	Graphic Outlook	DEC VAX	$4,950	612
Systems Applications (415) 472-4011	SAIplot	Prime 50 series	$6,500	613
Tektronix (503) 682-3411	Plot 10 Terminal Control System (TCS)	Machine-independent	$1,900	614
	Plot 10 GKS	IBM 360, 370, 43XX, 30XX; Prime 350-850; Control Data; DEC 10, 20, VAX	$8,070 to $8,270	
	Plot 10 IGL	IBM 360, 370, 43XX, 30XX; Prime 350-850; Control Data; Perkin-Elmer 3200; Sperry; DEC 10, 20, PDP-11, VAX; HP 3000	$4,270 to $17,270	
	Plot 10 Easy Graphing II	IBM 360, 370, 43XX, 30XX; DEC 10, 20, VAX; Honeywell 6000; Control Data; Prime	$2,670 to $2,725	
Timberline Syst. (503) 684-3660	Graphics	Texas Instruments BS 300	$2,500	615
		Texas Instruments BS 600, 800	$3,100	
Uniras (617) 272-7260	UNIGKS	Most 32-bit computers including IBM, Control Data, Cray, DEC, Prime	$9,500	616
	RASPAK		$9,000	
	Interras		$12,000 to $15,000	
Visual Intelligence (413) 253-3482	Dataviews	Most minis including DEC VAX	$10,000	617

BASIS retrieves information from 1 to 10,000,000 records in nothing flat.

Tired of manually searching through massive files of data? Let BASIS turn your existing files into an automated Information Center.

Imagine a system that retrieves textual information within seconds, the same way a database management system retrieves data. That's BASIS, a proven, interactive retrieval system that does much more than examine titles.

BASIS actually probes to find the key word or phrase you're looking for within any record. Then it displays a list of all records containing the word or phrase you specified. BASIS also displays any or all of the information, and prints hard copy if you want.

BASIS can turn your existing files into an automated Information Center within a few days. *So if you have one or ten million records that need rapid referencing, see what BASIS can do for you.* Call or write for a descriptive brochure today.

Battelle

Software Products Center
505 King Avenue
Columbus, Ohio 43201-2693
Telephone (614) 424-5524

**Visit us at NCC '84-
Booth C4336 and Syntopican X11-Booth 112**

BASIS runs on DEC VAX®, IBM, Prime and Wang VS minicomputers, and on IBM, CDC, DEC® and Univac mainframes. DEC and VAX are trademarks of Digital Equipment Corporation.

CIRCLE 27

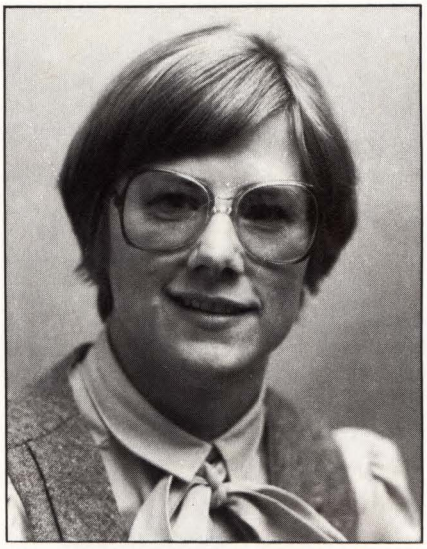
ment-by-objective reports. "Since we don't have a large engineering staff," reports Thompson, "the managers decided they would need software on the computer to help them do this."

Granted that generating graphics with software is easier than trying to do it manually, but what about the cost? That question was on the mind of Edward Tepper, economist and manager of economic database at Merrill Lynch Economics. Before he began using Tell-A-Graf from Integrated Software Systems Corp. (ISSCO), Tepper analyzed the numbers. The verdict? "It costs us between $8 and $10 a drawing using Tell-A-Graf—as opposed to anywhere from $50 to $150 per chart hand-drawn by an artist," he says. "You would have to pay for the graphic artist's time, as well as overhead."

Merrill Lynch Economics is an economics-consulting subsidiary of Merrill Lynch and Co. The parent company, with 40,000 employees worldwide, consists of several smaller companies, including the well-known Merrill Lynch, Pierce, Fenner and Smith brokerage house and Merrill Lynch Capital Markets, an investment-banking operation of which Merrill Lynch Economics is a part.

The computer, operated by Merrill Lynch Information Services, is a 16-Mbyte IBM 3081 located in North Brunswick, NJ, and accessed by IBM 3278s.

"I was hired by Merrill Lynch," says Tepper, "to produce a new publication—a chart book describing the entire economy. I collected a set of about 100 charts that I wanted to present on a regular basis. The next logical step was to figure out how I could produce updated versions every month. A full-time art staff of three could draw the charts in about eight weeks. Or I could use the computer with Tell-A-Graf. Having an art staff do the job would have taken more of *my* time, though, than using the computer."



"Graphs make trends apparent. Those same trends might otherwise be buried in a lot of numbers, and not so easy to see." *Force, Central Maine Power*

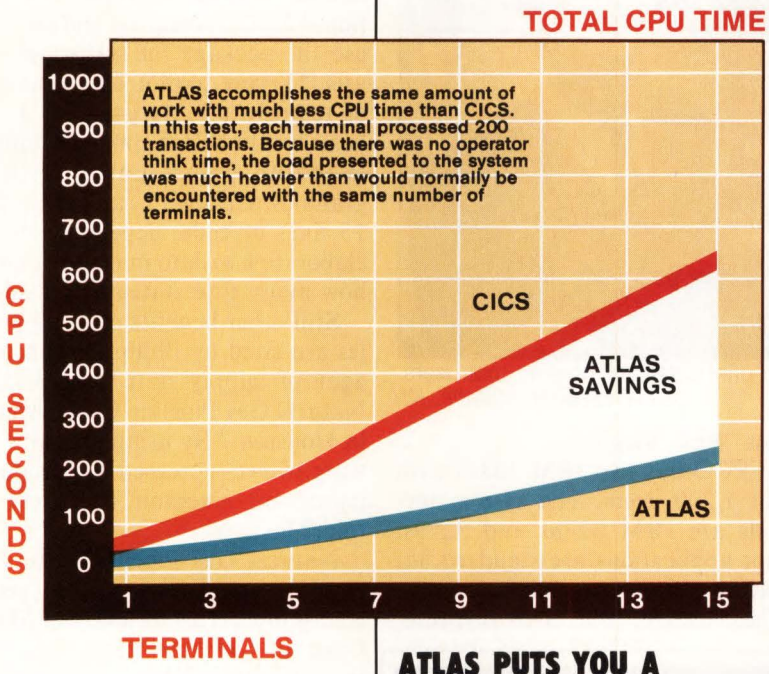
At Johns Hopkins Hospital in Baltimore, MD, as at many hospitals, revenues are regulated and must be kept within specific boundaries. It is important that profit and loss figures be presented in such a way that all staffers understand them.

"You can explain numbers all day, but if people don't want to look at numbers, they aren't going to," says Barbara Penatzer, manager of accounting systems. That's why she prefers to present information graphically. "You can show people just what you really want to show them."

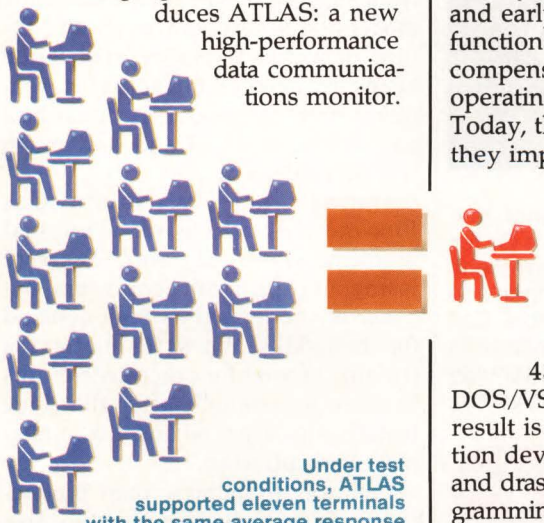
The 1,100-bed Johns Hopkins Hospital has 5,000 employees, including nurses, doctors, researchers, administrators, and clerical staff. It has two IBM 16-Mbyte 3081s with about 500 IBM 3278 and 3279 terminals. There are also many subsystems throughout the hospital, such as nursing stations that feed information into the main computers. Major applications for the hospital's computers include all financial reporting as well as patient-care information.

Even a switch from semi-automatic to automatic graph production

IF YOU KNOW RAMIS II, YOU'LL UNDERSTAND WHY ATLAS™ BEATS CICS!



With the same combination of innovative technology and practical features that has made RAMIS II the leading fourth-generation language, Mathematica introduces ATLAS: a new high-performance data communications monitor.



Under test conditions, ATLAS supported eleven terminals with the same average response time as a single terminal under CICS.

CICS/VS is a registered trademark of International Business Machines Corp.

ATLAS PUTS YOU A GENERATION AHEAD

ATLAS inaugurates a whole new generation in data communications software. Because CICS and other traditional monitors were initially developed in the late 1960s and early 1970s, they incorporated functions like "pseudo-tasking" to compensate for deficiencies in the operating systems then in use. Today, those functions remain and they impose layers of overhead to burden your computer—unless you use ATLAS.

Designed for the 1980s and beyond, ATLAS is the first monitor to truly unlock the power of IBM's 4300 series computers and DOS/VSE operating system. The result is more productive application development, high reliability, and drastically reduced systems programming demands. But most of all, dramatically improved performance.

TEST ATLAS YOURSELF

In a recent test, ATLAS outperformed CICS/VS by more than 2 to 1 in both elapsed time and CPU time. And the heavier the load, the better ATLAS performed.

To find out exactly what the next generation in data communications can mean to your organization, try the ATLAS performance test on your computer. Whether you use ATLAS alone or together with RAMIS II, you will be able to support more terminals, improve response time, and get more work done in the rest of your DOS/VSE partitions.

To arrange a free trial or for more information, contact your local Mathematica office, call toll free (800) 257-5171, or return the coupon below.

MATHEMATICA PRODUCTS GROUP

A MARTIN MARIETTA DATA SYSTEMS COMPANY
P.O. Box 2392
Princeton, NJ
08540

MATHEMATICA
PRODUCTS GROUP
P.O. Box 2392, Princeton, NJ 08540

☐ I would like to try the ATLAS performance test.
☐ I would like additional ATLAS information.

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____

Computer _____ Operating System _____

CD5

RAMIS® II AND ATLAS...THE LEADERS BY DESIGN

Boston (617) 357-9424 Chicago (312) 870-9710 Dallas (214) 788-1916 Houston (713) 850-8697 Los Angeles (213) 670-6962
New York (212) 980-9077 Princeton (609) 799-2600 San Francisco (415) 461-6315 St. Louis (314) 725-0046
Washington, DC (202) 484-5752 Basel (061) 429923 Bergen (5) 321300 Calgary (403) 290-0668 Heidelberg (06221) 14051
Hong Kong 5-435714 Johannesburg (011) 789-1808 Kingston (809) 929-7223 London (01) 580 3681 Milan (02) 546-8080
Montevideo (2) 906788 Ottawa (613) 236-8616 Paris (1) 776 41 71 Santiago (2) 31014 Sao Paulo (11) 289-0077
Singapore 2739255 Stockholm (8) 520720 Sydney (02) 923 1677 Tel Aviv (052) 70364 Toronto (416) 671-2272

SNYDERS ON SOFTWARE

"We end up generating a lot of waste paper to print basic information that users really only wanted in summary form." *Thompson, Olathe, KN*

can offer significant savings, as Virginia Electric and Power Co. of Richmond discovered. VEPCO serves over 1 million customers in an area that extends south from the suburbs of Washington, DC, to eastern North Carolina and west halfway across West Virginia.

VEPCO has two IBM 3081s with about 1,200 users. The system terminals are IBM 3278s and 3279s. Major applications are standard accounting and engineering functions.

The package, from SAS Institute, is used to prepare everything from simple text slides to investigative-type graphs, materials for meetings, and illustrations for reports. In addition, VEPCO scientists and engineers use the package for statistical analysis. "Trying to plot 10 years' worth of temperature statistics on a daily basis would be too time-consuming," Wooding points out. "With the graphics package, I can call in 10 or 15 lines of code, depending on how elaborate I wish to make my plot and how many title statements I add."

Still other benefits of using graphics are cited by Philip Dowlin, manager of supply data processing at Natural Gas Pipeline Co. of America in Houston. "By using graphics software, we've increased the productivity of our reservoir engineers tenfold," he says.

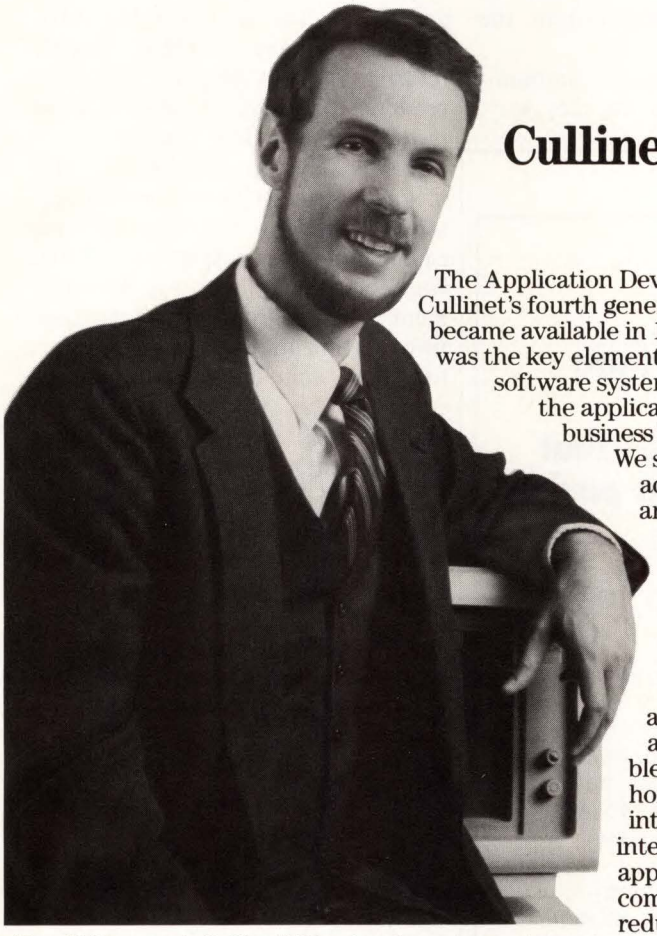
Natural Gas Pipeline, with 2,700 employees and revenues last year of $3.7 billion, is a subsidiary of Midcon Corp. of Chicago. It purchases gas, transports it to Chicago, and delivers it to distributors.

The company's 8-Mbyte Wang VS100 with 87 online Wang terminals is used in a variety of ways. It analyzes the amount of gas available from suppliers and creates a graphic model of the reservoir to predict future deliveries. Another application keeps track of contractual agreements with gas producers about how gas will be handled and how much will be paid for it.

During the 1970s, Natural Gas Pipeline was having some unusual problems. Dowlin explains, "We were losing our reservoir engineers because of the industry's high demand for their skills. We were, in effect, a training ground for other distributors because we couldn't offer the same benefits the larger oil and gas companies were offering."

One way to increase their productivity, Dowlin decided, was to give the engineers the ability to project the declines and pressure curves, as well as the ability to change those curves depending on what they knew about a reservoir and its traits, so

"In your development center, ADS/OnLine will increase productivity and reduce your company's applications backlog." —Don Heitzmann*



Using ADS/OnLine Cullinet created the best applications software ever built.

The Application Development System, Cullinet's fourth generation language, became available in 1981. ADS/OnLine was the key element in our database software system needed to address the application software business in a whole new way.

We set out to develop advanced financial and manufacturing applications; applications designed in the 1980's all built using this fourth generation language. Today, Cullinet offers the finest financial and manufacturing applications available, featuring both horizontal and vertical integration. Horizontal integration means that all applications share a common database so redundancies and inconsistencies are eliminated. Vertical integration means all applications are built using ADS/OnLine and advanced database technology so they are easier to install, tailor and maintain.

Using ADS/OnLine, we developed advanced applications much faster than if we used traditional methods. In your development center, ADS/OnLine can increase productivity and reduce your company's backlog.

ADS/OnLine eliminates up to 70% of the lines of code in a typical COBOL program. This can result in a dramatic increase in programmer productivity. In addition, ADS/OnLine is easily learned by COBOL programmers, so your programming staff can become more productive in less time.

Applications can be built more efficiently with ADS/OnLine because it is a non-procedural language. The developer simply paints the screens on a terminal and fills in the blanks to define the applications program. Plus, automatic editing and automatic error handling detect input errors with no code written at all. And the complete integration of ADS/OnLine, with all Cullinet database facilities, not only ensures control over the application development function, but also guarantees the performance necessary to run these applications in day-to-day operations.

ADS/OnLine has been a key to our success in applications software. It could do the same for you in establishing new information systems and eliminating your applications backlog in the 1980's and 1990's.

Attend a comprehensive seminar explaining this advanced fourth generation language and Cullinet's other database software products. To participate in one of the 700 Cullinet seminars scheduled internationally, send in the coupon or call 1-800-225-9930. In MA, 617-329-7700.

Computer_____

Name/Title_____

Company/Department_____

Address_____

City_____

State_____ Zip_____

Phone ( )_____

Mail to: Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, MA 02090-2198 Attn: Corporate Meetings

Cullinet Software products are designed to run on IBM 360/370, 30XX or 43XX or plug-compatible computers.

CD 5/84

Don Heitzmann is Cullinet's Director of System Software Development. Don joined Cullinet seven years ago. His early efforts were in design and development of IDMS-DC and he is now responsible for the complete IDMS database product line. Don is a graduate of Princeton University with a B.S. in Electrical Engineering and a Masters in Architecture.

Database: Cullinet

CIRCLE 31

they could calculate predicted reservoir volumes faster and more accurately. The solution was Grafmaker from Precision Visuals.

Grafmaker is used to project pressure declines and production curves for the life of each well. The graphs can be altered if the view they present doesn't show the relationships the engineers are looking for.

Graphics helps remove communication roadblocks in another way, too, according to John Nollet, systems manager at Temple, Barker and Sloane Inc. in Lexington, MA. "When you have to explain graphic information so a graphics artist can render the chart you need, a lot is lost in the interpretation," he says.

Temple, Barker and Sloane, with 654 employees, is a management consultancy broken into seven groups, each with its own specialty. Nollet works for the Information Management Systems group, which develops information-management systems for client companies (in much the same way as an accounting firm might set up accounting procedures for a client) while other Temple, Barker and Sloane groups are assisting the client with other functions.

The consultancy has a 4-Mbyte DEC VAX 11/780 supporting 20 DEC VT terminals. Although all accounting functions are performed on the computer, the major application is software development.

The next step, naturally, is showing the client company how the new setup will work. That's where graphics comes in. "One of the best ways to explain things and have the clients understand them *well* is to present the information visually. With our Calcomp 1051 drum plotter and Cortex' Executive Data Display System, we can show how all the employees, in all departments, fit into the overall company structure."

Graphics software can be used to produce high-quality illustrations for presentation to customers and clients, too. "We used to prepare graphs and charts in-house, have them copied, and then send them out to get slides made for $25 apiece. Now we do the whole job in-house," says Norman White, vice president of research and development for OR/MS Dialogue Inc. in New York.

OR/MS Dialogue, a management consultancy specializing in packaged foods, had 1983 sales of $3 million. It advises clients, including Kraft Foods, Pepsi Cola, and General Foods, on consumer acceptance of

(Continued on page 86)

Can you play the "WHAT-IF" MANUFACTURING PLANNING GAME?

FORMAN says you can...

with unique simulation capabilities that enable you to test the impact of alternative production plans before you commit to a change.

With FORMAN's simulation capabilities, you can have the answer to complex "What-If" questions within minutes of asking.

FORMAN is a functionally complete, easy to use MRP II software system. With FORMAN you can access manufacturing data for "What-If" simulations without interrupting the day-to-day manufacturing operations.

With FORMAN's simulation capability, you'll know the impact of several alternative production plans in many dimensions, such as:

Material Requirements to meet each plan

Cash Flow Projections

Inventory Level Projections

Direct Labor Cost Forecasts

Meeting shorter than standard delivery times —before you commit to a customer order.

FORMAN allows for detailed and aggregate simulations as well as multiple simulations.

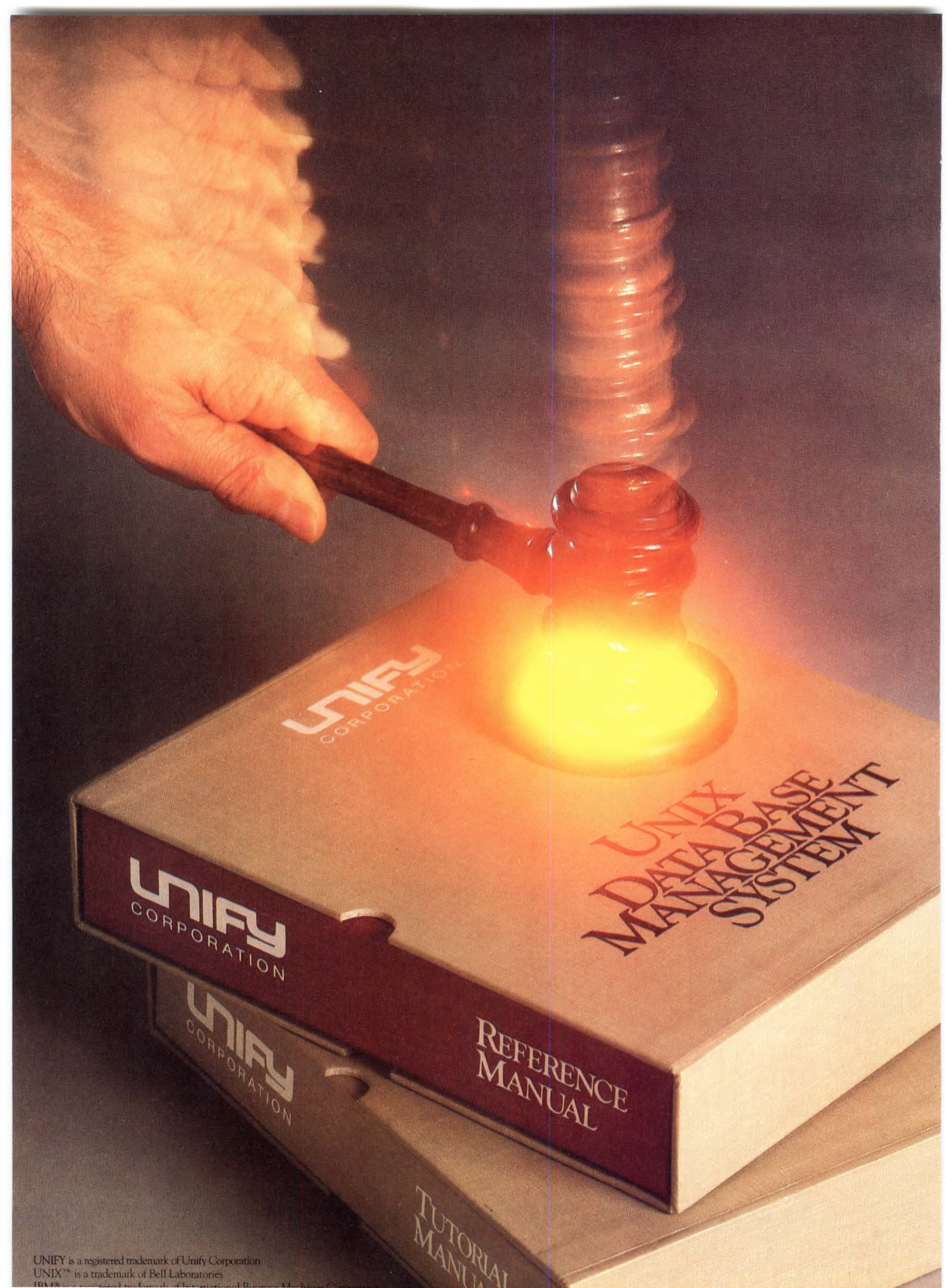
If you want to take the guess work out of business planning and improve your ability to identify problems and opportunities, FORMAN can help you.

For fast information call (609) 234-5020

FORMAN™

Fulfilling the MRP II Promise.

formation



One UNIX computer manufacturer after another has come to the same decision: UNIFY is the fastest, most powerful, most flexible data base management system for users of all skill levels.

By their own investigation and by system integrator requests, computer manufacturers representing some 90% of the market choose to offer UNIFY with their UNIX computers.

They include DEC. Perkin-Elmer. NCR. Tandy. Pixel. Onyx. Cadmus. Codata. Cromemco. Momentum. Plexus. Altos. Callan Data. And many more.

The evidence is overwhelming. In independent benchmarks, UNIFY consistently ranks as the top performer

Completely menu-driven design and industry standard IBM SQL query language make it easy for non-programmers to develop data base applications.

The most powerful "back end" design in the industry, including 90 subroutines at the host language interface level, promises that UNIFY can keep adding features, keep adding users, without eroding performance.

Judge for yourself. Our comprehensive 300-page tutorial and 500-page reference manual system are yours for only $95. Together they show you how to build virtually any application of your choice.

To order, contact UNIFY, Department CD-5, 9570 S.W. Barbur Blvd., Portland, Oregon 97219, 503-245-6585.

UNIFY®

THE PREFERRED UNIX DBMS.

CIRCLE 146

SNYDERS ON SOFTWARE

(Continued from page 82)

new products and packaging. Naturally, graphs and charts have long played an important role in the work of such an agency. Until two years ago, OR/MS was using GPS, a graphics package distributed free by the government. Presentation-quality graphs, however, required the intervention of an outside graph-making service. In the spring of 1982, OR/MS installed Template graphics software from Megatek Corp. to bring the entire operation in-house.

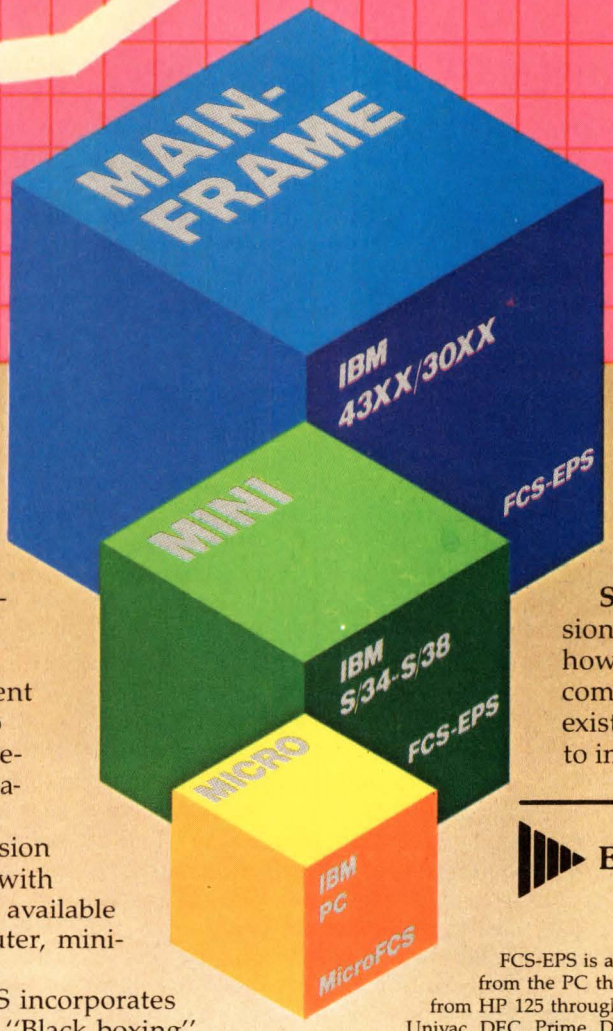
OR/MS Dialogue has two Prime 750 computers, one with 3 Mbytes of memory, and the other with 2 Mbytes. Internal consultants, system-software developers, and clients are tied into the system through a variety of IBM, Prime, and DEC terminals. In addition to standard financial applications, the system incorporates a timesharing service for clients. That service, called Access, was developed in the company's internal system, called Analect.

According to White, "Template is part of our Analect system. We use Analect for data analysis and Template for business graphics—bar charts, pie charts, and line graphs—and for custom graphics like developing company logos for our clients." In addition, Template is used to create production graphics for clients. These replace some of the clients' standard monthly reports with a chart book of anywhere from 100 to 300 charts showing how each product is doing. "In consumer package goods," White explains, "a single company may have hundreds of products in different product categories. You want to track all of them and see how they perform against their competitors. It's much easier to see product performance in a graph than in page after page of numbers."

All those users' experiences probably have you convinced of the advantages computer-generated graphics can offer. The same users offer this before-you-buy advice:

- Make sure top management understands the utility of graphics; don't let the purchase be mistaken for a "toy."
- If the graphics software you purchase is mainframe-bound, you may need a systems programmer, not just applications programmers, to install and run it.
- Check equipment requirements before purchasing a package. (One user confessed to having purchased a drum plotter too large to run off the company's computer.)
- Consider whether you really need mainframe- or mini-based graphics. One of the increasingly effective packages available for personal computers might do your job just as well at less cost. (Graphics software for personal computers will be covered in the September issue.) □

MicroFCS: The Final Link in Distributed Decision Support Systems.



Every decision counts. At every level of management.

And now there's a way to bring the power of the computer into every management decision made in your company . . . to allow every decision to be based on current information, to be shared, to be consolidated with other decision results, to be easily analyzed and used.

It's called Distributed Decision Support. And it works only with FCS-EPS, the first major DSS available for virtually any microcomputer, minicomputer or mainframe.

For all computers, FCS-EPS incorporates standard financial functions. "Black boxing" automates the most complex custom applications. Powerful report writers and color graphics produce exactly the output you need. A relational database, a natural progression from simple row/column "calc" processing to multidimensional consolidation. Statistical analysis, risk analysis and much more. That's FCS-EPS.

Distributed Decision Support through FCS-EPS means a multiplied return on your investment in existing EDP resources and in existing management talent. And standardized budgeting, forecasting, expenditure management, and dozens of other key processes within the organization.

Your Distributed Decision Support begins with one decision. Call EPS today. Find out how the power of the microcomputer can work within your existing planning environment to improve profitability this year.

EPS

One Industrial Drive
Windham, NH 03087
603-898-1800

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 CP/M or UNIX-based microcomputers.

- ☐ Tell me more about Distributed Decision Support
- ☐ Tell me about Micro FCS
- ☐ Tell me about an EPS DSS Seminar in my area.

Name/Title _____

Company _____

Address _____

City/State/Zip _____

Telephone Number _____

NORTH AMERICA Atlanta (404) 972-1980 • Chicago (312) 773-4888 • Cleveland (216) 524-8440 • Dallas (214) 631-0968 • Houston (713) 771-0618 • Los Angeles (213) 827-8961 New York (212) 563-5656 • San Francisco (408) 292-6212 • St. Louis (314) 851-9414 • Tampa (813) 962-3528 • Toronto (416) 279-8711 • Montreal (514) 631-2090 • Ottawa (613) 234-1414 Winnipeg (204) 943-4852 • Calgary (403) 234-9785 • Vancouver (604) 669-4250 • Mexico City (905) 539-2286 **INTERNATIONAL** London (01) 579-6931 • Brussels (02) 3470740 Rotterdam (311) 890-4108 • Cologne 49-2203-210551 • Basel 061 72 27 72 • Paris (01) 321 6457 • Milan (02) 688 6960 • Oslo (02) 67 50 64 • Caracas (58-2) 781-3366 • Lima (51-14) 416705 Buenos Aires 311 2712 • Sao Paulo 284-0085 • Sydney (02) 439 3722 • Tokyo (03) 437-0654 • Madrid 448 5608

CIRCLE 35

by John Seaman, Data Communications Editor

DATA COMMUNICATIONS

Is IBM's IMS your Achilles' heel?

Users of mixed-vendor data-communications systems beware: When terminal users access IBM's Information Management System (IMS), your protocol converters can fail. As a South African bank recently discovered, the result can be costly foul-ups.

IMS is a database package that coordinates and controls mass storage on IBM mainframes and plug-compatibles. Under certain conditions, it becomes a vulnerable point in a dialup network. Users and consultants report that IMS can actually cause protocol converters to fail, particularly when users are emulating IBM 3270 terminals from asynchronous ASCII terminals or personal computers. Failures usually occur in the higher-level protocols and under heavy loads of network traffic.

IMS at fault

The IMS-protocol failures are security problems, and the limitations of IMS—not the protocol converters—are responsible for them. Two levels of security are involved. *Session security* ensures that user sessions will be terminated if the dialup line fails. By halting the session, the protocol converter prevents new transactions from being initiated without proper log-on procedures. Early timesharing systems, for example, failed to complete the cutoff. Thus, users who were disconnected from malfunctioning programs sometimes received huge timesharing bills for repeating programs. *Output security* ensures that output from a given transaction is delivered only to the user who originates it.

Of the two potential breaches, output security is the most critical. A failure of output security allowed checks to be printed at the wrong terminal at the South African bank, for example. Output security can be compromised by the queued-message structure of IMS for 3270 devices.

Heavy-traffic problems

Many queues are maintained in IBM or plug-compatible hosts to support large numbers of terminal users. Three separate kinds of queues are maintained: those of the IMS buffers, those of the Virtual Telecommunications Access Method communications utility, and those of the Network Control Program (NCP) buffers. (The NCP-buffer queues reside in the 3705 or 3725 front-end processor.) The length of these queues and the corresponding delays are determined by message size, message arrival, input processing, and output processing. These buffers do not generally become overextended. However, when usage is heavy, queue lengths rise sharply.

Before buying a particular protocol converter, many organizations test it as a matter of course. However, in many cases these tests take place during hours when traffic is low. During periods of high traffic, however, queues build up. Moreover, output messages from one transaction could be spread across many queues. If a dialup device loses its connection, and another device dials in and captures the same port, output security could be violated. The output message (or part of it) intended for the first device could be sent hither and yon.

The potential for failure and foul-ups increases when many users have personal computers with data stored on floppy or hard disks. Personal computers performing file transfers under 3270-emulation routines don't have the same traffic patterns as manually operated terminals, which have data entered into them slowly, via the keyboard. Personal computers cause queues to become extended.

Given the large numbers of personal computers being outfitted for terminal emulation in corporations, this is a problem that is big and likely to get bigger. Managers using IMS and many personal computers must be wary before installing protocol converters for 3270 emulation.

Certain corporations—financial institutions, for example—have identified two solutions. First, IMS can be modified to allow terminals or micros emulating terminals to purge IMS queues (as well as other queues) at the start of a protocol-converter session. However, most organizations are reluctant to modify IMS. If they do, they'll have to adjust new software systems and future IMS releases from IBM to reflect the alterations.

The second solution is to adapt the protocol converter to present a unique terminal address for each user. In this case, the protocol converter, rather than the host, is made responsible for security. This approach necessitates major hardware changes in both the host mainframe and the protocol converter. In addition, security systems outside the host are not in step with IBM's product evolution—IBM systems are centralized.

With the mushrooming popularity of personal computers and low-cost

(Continued on page 92)

SAVE SHOPPING TIME WITH OUR "BUNDLED" MP1000 LINE

Complete "Turnkey" System – Plotter, Software & Cable – Only $1190

Because we want to see you on line – not in line – Western Graphtec is now "bundling" the MP1000 plotter – and at a very minimal increase in cost. Your "package" includes plotter, application software, cable and interface. The entire cost is only $1190.00 – a savings of almost $600.00.

The MP1000 "bundle" includes the popular KeyChart™ software package which allows you to access most electronic spreadsheet data. The output is in graphs, bar charts, pie charts and diagrams. The system will operate on IBM, TI, Epson, Osborne, Kaypro and other upcoming operating systems.

Also, this lightweight, 6-pen plotter incorporates the HP-GL syntax so that you can use any application program configured for that protocol. This is in addition to our own powerful, built-in firmware.

Automatic selection of up to 6 distinctive color pens enables you to produce bold, brilliant hardcopy graphics. To support your varied requirements, you can select from oil or water base fiber tip, or ink drafting pens.

This complete turnkey system is available with a built-in RS232C, IEEE-488, or 8-bit parallel interface. You only need to tell us which you require. And we even include the connecting cable.

Don't wait – phone us your shopping list today! Call our Customer Service Department for the name of your nearest distributor.

™KeyChart is a registered trademark of SoftKey, inc.

WESTERN GRAPHTEC

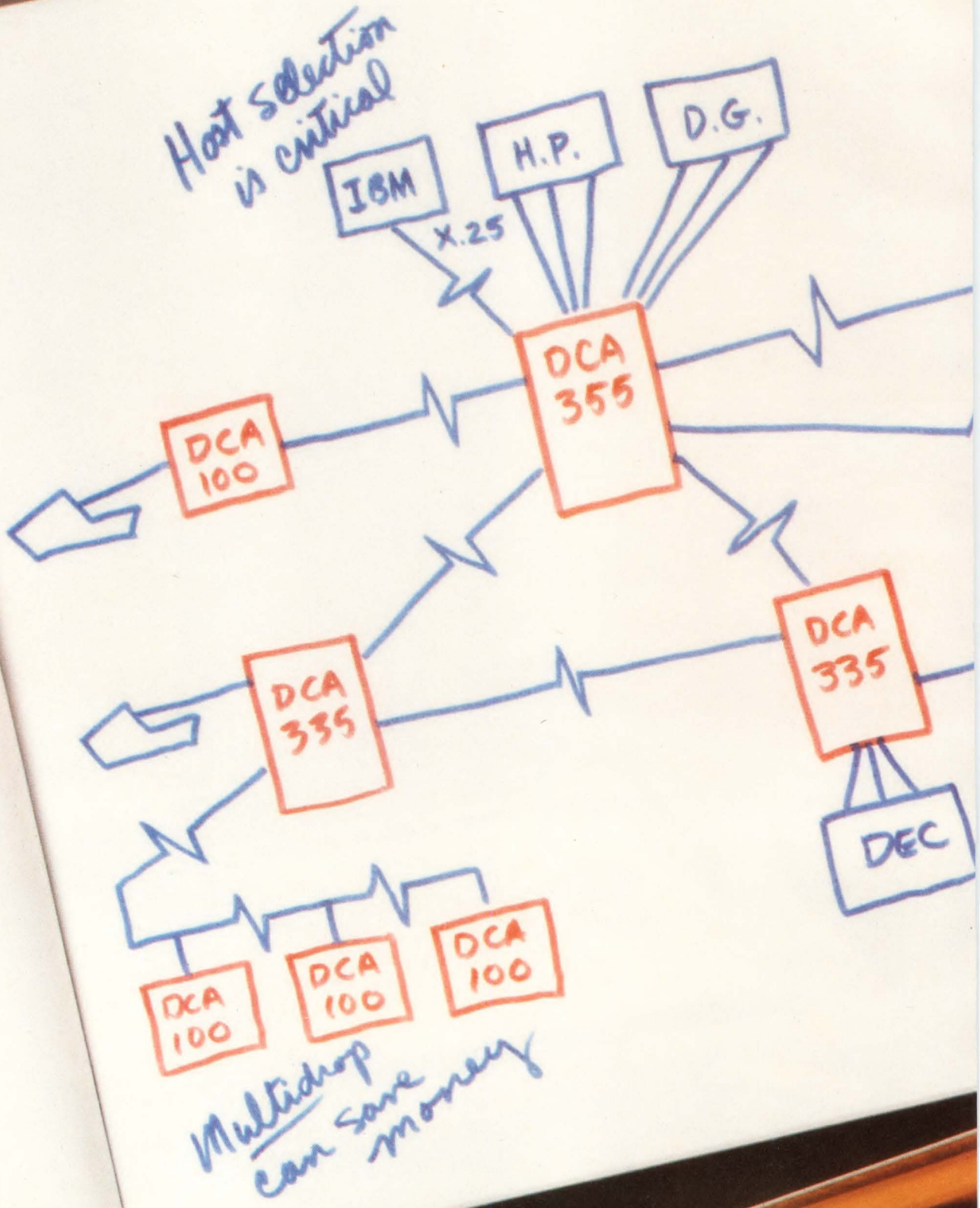
Recording your past... Plotting your future.

12 Chrysler Street, Irvine, California 92714
(714) 770-6010 • Outside Calif: (800) 854-8385

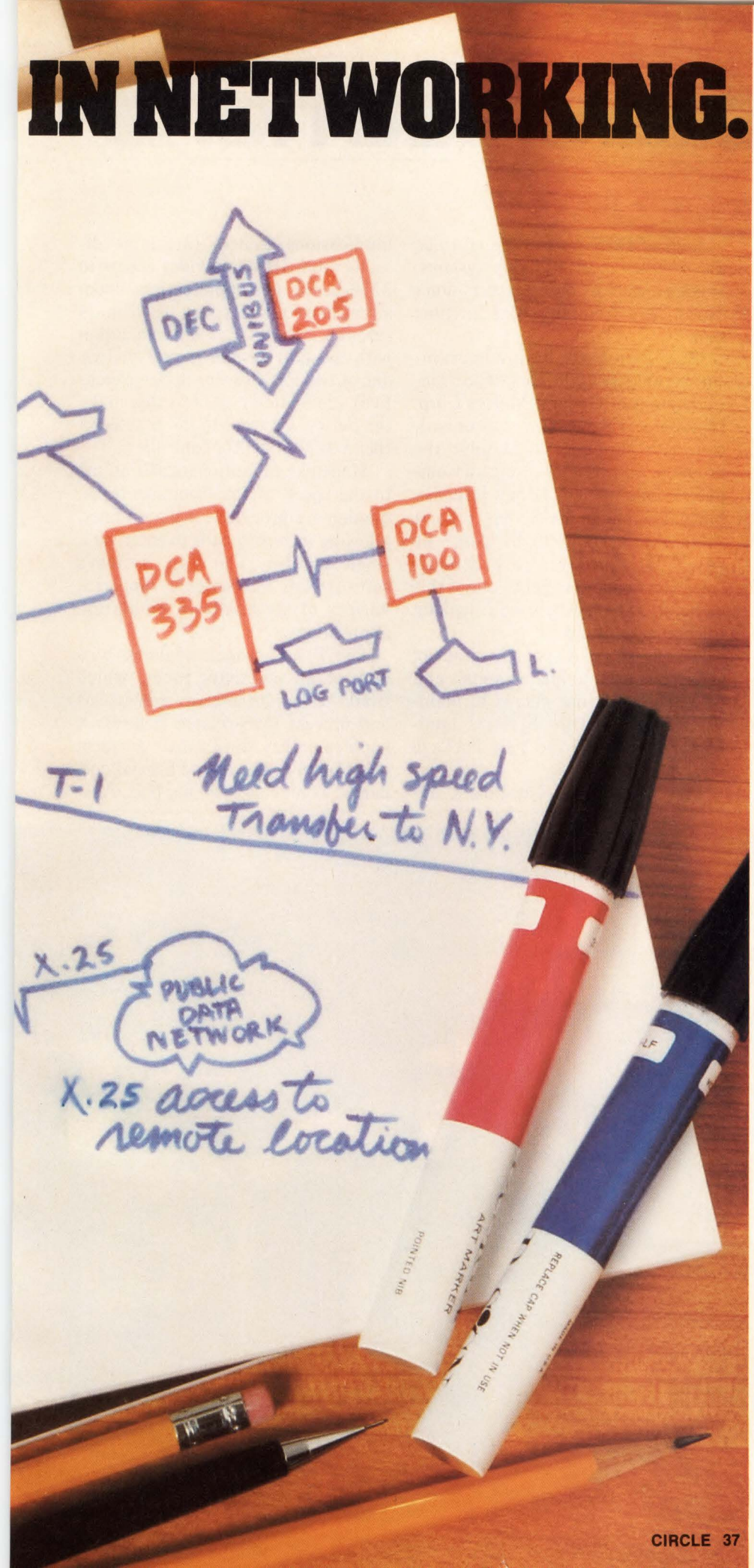
See us at NCGA Booth #622-624

CIRCLE 36

HOW WE MADE OUR MARK



IN NETWORKING.



At DCA, we've developed what many regard as the most efficient, most effective networking design in the industry. We call it Integrated Network Architecture® And here's what makes it work:

Complete network transparency. We make all our networking hardware to interface with all data processing hardware. So you don't have to modify your hosts or terminals.

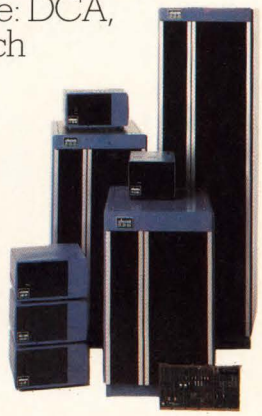
Comprehensive network management. You can monitor transmissions, troubleshoot, even reconfigure parameters on-line from one central point. With a DCA network, you have total control.

Virtual circuit switching. For optimum efficiency, our network provides accessibility for any terminal to any host.

Error controlled transmission. Since we have practically erased the probability for undetected error, low-cost terminals can be used more reliably.

Compatible modular hardware. It makes our networks easy to maintain and inexpensive to expand. All you do is add—instead of replace—DCA components.

Integrated Network Architecture. Let us lay it all out for you. Write: DCA, 303 Research Drive, Norcross, Georgia 30092. Or call toll-free: **1-800-241-5793.**



dca®

Digital Communications Associates, Inc.

CIRCLE 37

(Continued from page 88)

asynchronous communications, many organizations hope to link their personal computers and their hosts via protocol converters. Managers with the IMS security problem can look to two sources for help: IBM and the vendors of protocol converters.

Addison Woods, vice president of national accounts for Protocol Computers Inc. (PCI), Woodland Hills, CA, asserts that responsibility belongs to IBM, not to protocol-converter manufacturers. "If operators keyboard data, protocol converters perform OK," he says. Operators at terminals proceed step by step with input, communications, and output. However, personal computers simply dump data into the protocol converter, Woods explains. "A personal computer doesn't know when to transmit its large volume of data," he adds, "so of course there is trouble."

Unfortunately, although the limitations of IMS are considered to be the Achilles' heel in dialup systems, Woods and most other experts don't expect help from Big Blue anytime soon.

Max Pritchett, data-communications analyst at the Delco Electronics Divison of General Motors Corp. (Kokomo, IN), believes protocol-converter suppliers must solve the problem. "Our vendor, Protocol Computers, believes it is IBM's responsibility to change IMS, but I don't think that's going to happen," he says. "It's up to the protocol-converter vendors to get us out of this difficulty. That's where we're looking for better solutions."

Among the most popular protocol converters used to link terminals and terminal-emulating micros to mainframes are the IBM Series/1 minicomputer running the Yale Package and the PCI 1076.

The Yale ASCII Terminal Communications System (available directly from IBM) provides access to 3270-based host applications from asynchronous display terminals through a Series/1. Communication with the host system is provided by one of two EDX (event-driven executive) application programs that make the Series/1 appear to the host as either a 3271 or a 3272 controller.

Modems that automatically adjust to the speed of the incoming transmission are provided for dialup lines, allowing incoming calls to enter via a single number. The Yale System's software lets the Series/1 support a variety of terminals in emulation applications.

The Yale Package's weakness is its lack of an inactivity timer, which would terminate interrupted sessions and prevent IMS-related failures. A supplementary device can perform this function, but the additional cost can be as high as $100 per port. As it

Inflight presents "The Switcher." Your instant access for up to ten inputs.

We call it "The Switcher."

You'll call it the most versatile video and data source selector you've ever seen.

"The Switcher" provides immediate access for up to ten separate inputs. RGB analog. RGB TTL. Or composite video. In any combination.

Together with its companion, the incomparable BarcoData video projector, "The Switcher" can make you look like the pro you are.

RGB inputs are adjustable to accommodate the scanning rates for virtually every computer in the market today.

Pre-set contrast levels guarantee even-brightness for each selected signal input. Two channel audio follow video.

Inflight's TTL input modules eliminate the need for expensive black box adaptors and coaxial cables for connecting the computer to "The Switcher."

You'll switch from one input to another, effortlessly. With no distracting delays.

You can even rack mount it in your projection room and keep only our infra-red wireless remote control unit at your fingertips.

To learn more about the unparalleled capabilities of "The Switcher," call Inflight Services.

We're the exclusive distributors in the western hemisphere.

"The Switcher."
Some day you'll wonder how you ever got along without it.

Inflight Services, Inc. ■ 485 Madison Avenue ■ New York, NY 10022 ■ 1-800-221-1297 ■ 1-212-751-1800 ■ Telex 126872

CIRCLE 39

is, the Yale System's software sends a "device-end" message to the host when a terminal disconnects. Unfortunately, these messages don't cause IMS to terminate current sessions.

Another approach, same problem

The PCI 1076 is a microprocessor-based "black box" with software contained on read-only memory chips (such software is difficult to alter). To a host computer, the 1076 resembles a Synchronous Data Link Control 3276 controller. The 1076 can be attached to only one host; modems automatically adjust to the required speed. The 1076 uses IBM's System Network Architecture protocol to notify the host when a line is dropped to allow session termination. But like the Yale Package, a device must be added to the 1076 to function as an inactivity-disconnect timer. The device doesn't include a timer.

Although the 1076 maintains adequate session security when a line is disconnected during a session, output security is quite another story. The 1076 doesn't provide a facility for a user to alter the operating software, preventing users from making modifications that might ensure output security in IMS.

Max Pritchett has installed the PCI 1076, but does not use it to support 3270 emulation accessing IMS. Its function is limited to interaction with other IBM systems and utilities that don't present the same security problem as IMS.

Sophisticated solutions

Some suppliers are trying to solve the IMS problem with more sophisticated protocol converters. One product, costing about $1,000 per port, is the Model 874 from Datastream Communications Inc., Santa Clara, CA. "Datastream's 874 solves the security problem in 99.9 percent of the cases," says David Sun, internal consultant at Cigna Corp., the Philadelphia-based insurance carrier. "It's almost, but not quite, perfect." Sun works at the Cigna data center in Voorhees, NJ.

According to Sun, Datastream attacks the IMS-security problem with a two-layered approach: "The first layer uses a password to access the protocol converter. Each terminal or personal computer has an address, which the converter recognizes, and each device is restricted to accessing particular categories of resources—such as operating systems, storage peripherals, and so on. In the second layer, the 874 purges the host-IMS queue." If a line *and* the password protection fail, the 874 purges the host-IMS queue and ends the session.

Cigna had a pilot program with the PCI 1076, but phased it out when it realized the unit's limitations. "The 1076 is a reliable piece of hardware,"

says Sun, "but we needed a software-based system." The 874 stores programs on cassette tape. Because it is software-based, the Datastream device offers greater flexibility, says Sun.

Still, the Datastream 874 isn't foolproof. Addison Woods asserts that software developers must catch up with the hardware technology if the IMS problem is to be solved. However, he believes there is a way to solve the security problem with today's products. "Plug terminals or personal computers into the back of the protocol converter at each remote location," he suggests. "If you don't access a protocol converter over dial-up lines, you should be in the clear with IMS."

One problem with this solution, however, is its potential cost for large corporations with many satellite offices, subsidiaries, and divisions. Putting a protocol converter at each site on the network may solve the problem, but the cost can add up. An 8-port Datastream 874 costs $10,950, and even a comparable version of the less sophisticated PCI 1076 costs $7,000.

Another approach to the problem is to couple protocol converters with local-area networks (LANs). Protocol Computers announced an agreement with Ungermann-Bass Inc., a Santa Clara, CA, network supplier, to jointly develop protocol-conversion products to work on Ungermann-Bass' Net/One local-area network. The first step in this project will comprise products to convert asynchronous ASCII to SNA 3270 and asynchronous ASCII to bisynchronous 3270, as well as certain other protocols. Security considerations seem to have been an important motivating factor behind this agreement, but Woods declined to elaborate on that subject.

Dan Zatyko, head of Zatyko Associates, a consultancy in Tustin, CA, believes IBM will come through with an LAN-based solution in the near future. "IBM will put its personal computers [IBM Personal Computers, PC XTs, and Portable PCs] on an LAN," he predicts. "Security will be maintained locally by the LAN. System-wide integrity will be maintained by each LAN users dial into. Security will no longer be the responsibility of either IMS or a protocol converter."

Protocol converters and IMS are discussed in the March issue of *Network News Reports*, a newsletter published by Zatyko Associates. Zatyko Associates is soliciting protocol-converter success stories from corporations with at least 600 terminals or micros per protocol converter. Contact Zatyko Associates at 202 Fashion Lane, Tustin, CA 92680 or call (714) 838-8294. □

OFFICE AUTOMATION

The vogue in OA is formality

Formality has become the key word in office automation. Although this is particularly true in giant corporations, even medium-sized and small companies are bringing institutional authority to bear on OA decision-making. The trend reveals a general belief that coherent, carefully conceived plans and procedures will successfully raise the output and effectiveness of office workers.

The movement toward formal plans and procedures in office automation is described in a new study by The Omni Group Ltd., an office-systems consultancy based in New York. "The Office Automation Challenge: American Business Responds" is based on interviews with nearly 850 managers responsible for planning or purchasing office systems in large, medium-sized, and smaller companies.

More than half of the nation's largest corporations already have strategic plans to automate their offices, according to the survey. By next year, almost 85 percent of the largest industrial and service corporations expect to implement plans governing the way word processors, personal computers, electronic-mail systems, and other OA tools are evaluated, purchased, and installed.

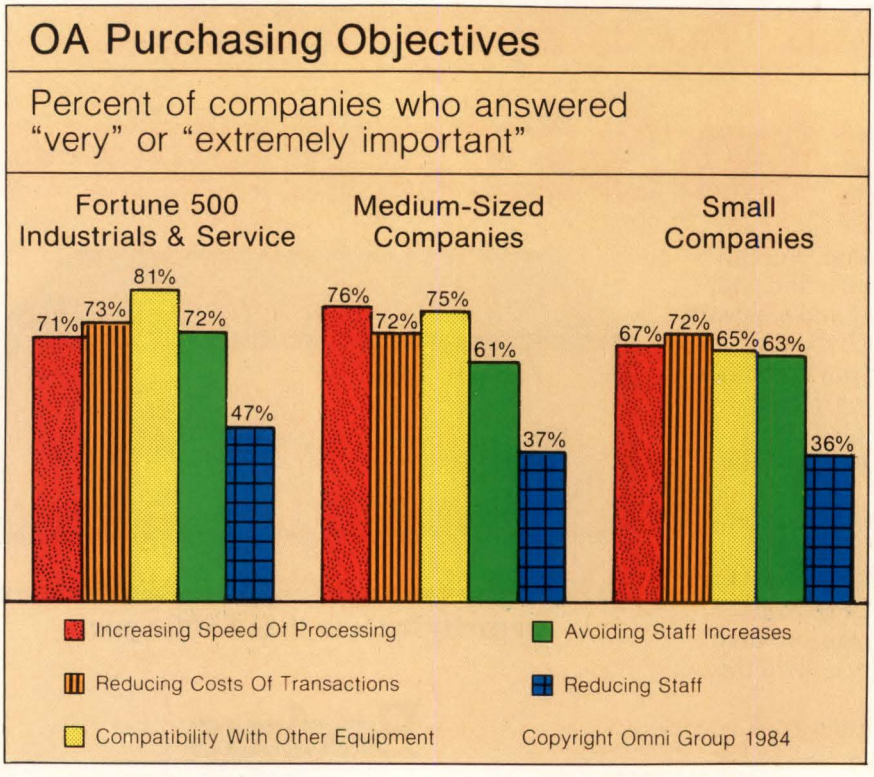
Management lends a primarily supportive role to OA efforts, especially in the larger organizations, but many players are involved in corporate planning and purchasing. In Fortune 500 corporations, OA policy is usually the responsibility of a special committee or a single department charged with creating a strategy, according to the survey results. In either case, the data-processing or management-information systems (MIS/dp) department plays a major role in formulating policies.

When it comes to purchasing OA systems, the survey results suggest that users themselves have much of the authority. "The person who signs the check is not necessarily the one who writes the policy," notes Randy J. Goldfield, president of The Omni Group. The end user's important role is underscored by the significant amount of discretionary spending on OA outside of normal cost-justification procedures.

According to the survey results, data analysis is the most popular application of systems among managers and professionals. Data processing is next. In addition to data processing, transaction processing—tasks like order entry and inventory control—ranked highly among medium-sized and small businesses. "Outside of the Fortune 500, businesses can't support full-blown dp and office systems departments," says Warren Waldbrand, Omni's research director. "These functions seem to merge."

The survey also suggests that many of the most-heralded applications are not heavily used by many corporations. Electronic communications, for example, is regarded as a key application by less than 20 percent of the large corporations in the survey, and less than 10 percent of the small operations. Graphics, another much-touted application, also is not highly valued by corporations.

The survey results also suggest that staff reduction, a widely touted benefit of OA, is not vital to corporations. Rather, respondents want to raise the effectiveness and speed of office transactions. □



You've got a minicomputer. Get a MiniRack II, too.

Even a minicomputer can turn out a mountain of printout. That can be a problem.

The answer? MiniRack II by Wilson Jones.

It's a complete printout storage and retrieval system, including suspension rack and four genuine pressboard binders. For one low price that makes MiniRack II one of the least expensive, most versatile systems you can buy.

MiniRack II holds up to 3600, 14 7/8" x 11" printout sheets. And the printout binders come in four colors — perfect for color coding.

With MiniRack II, you can remove the binders from the top. Or with the optional T-Bar suspension system, you can remove them from the sides.

MiniRack II rolls under desks. Moves easily from desk to desk, department to department. Or sit it on a desktop, counter or credenza by removing the pop-on wheels.

Over the past twenty years, Wilson Jones has introduced 900 printout storage and retrieval products. All are work-efficient. All are cost-efficient.

And now the MiniRack II.

Take two.

WilsonJones T.M.
Computer Furniture

Mail this coupon to Wilson Jones, 6150 Touhy Avenue, Dept. C-5, Chicago, IL 60648 or call toll-free:

1-800-323-2921
(In Ill.: 1-800-942-2568)

Please send me more information on the MiniRack II.

Name/Title _____

Company _____

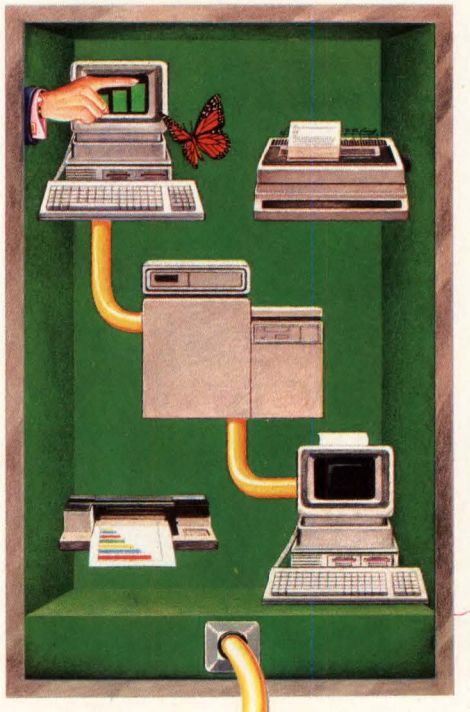
Address _____

City _____ State _____ Zip _____

Phone _____

Hewlett-Packa surge in office

Introducing the Perso



The principle is simple. Boost the productivity of individual PCs. Your people, your department, even your entire company will follow suit.

The first boost occurred when we introduced the touchscreen HP 150 as an office and managerial workstation. This made personal computing so much easier and faster that individual productivity soared.

Now the Personal Productivity Center combines the flexibility of the HP 150 with the power of our HP 3000 family of distributed computer systems.

You can shape each Productivity Center just the way you want it by adding other office and computing products from our extensive range.

You can link managerial and secretarial workstations. Create impressive presentations, merging business graphics and word processing. Store them on large disc files. And print them out on laser printers and color plotters.

Your PCs also grow more productive by increasing the range of software they can run. In addition to leading PC programs like 1-2-3™ from Lotus™ and popular word processing packages, they can use HP 3000 business software like our exclusive Desk-Manager. This combines electronic

rd touches off a productivity.

al Productivity Center.

mail, quick memo writing, personal filing and calendar functions. And each PC can access data processing systems and large corporate data bases.

Personal Productivity Centers can communicate with similar networks in other parts of your company, as well as your mainframes. Each system can expand to handle more than 100 workstations. And you can grow without involving your programmers in any software conversion.

So if PCs alone are making your people more productive, just wait till you see them all working together.

And you can see them right now by calling your local HP sales office listed in the white pages. Or write for complete information to: Hewlett-Packard, Dept. 27191, 19447 Pruneridge Avenue, Cupertino, CA 95014. In Europe, contact Henk van Lammeren, Hewlett-Packard, P.O. Box 529, 1180 Am Amstelveen, The Netherlands.

It could turn your whole company into a productivity center.

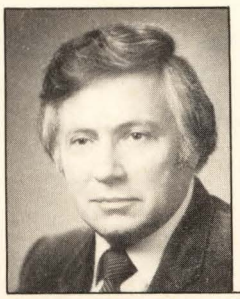
Productivity. Not promises.

HEWLETT PACKARD

1-2-3 and Lotus are trademarks of Lotus Development Corporation.

BD02410

CIRCLE 42



by Robert T. Fertig

FOLLOWING THE LEADERS

Is Apple's boldness folly?

Apple Computer's new Macintosh was warmly received when it made its debut in February, but I believe Apple's fortunes are eroding. Apple has nobody to blame but itself. By declaring independence from the de facto standards IBM is setting with its Personal Computer, Apple has put itself on a risky future course.

I admire Apple's boldness and independent spirit, but will the strategy work? A more prudent approach would have been to provide an IBM mode for the Lisa, the Macintosh, and future personal computers. Maybe the fact that most users are demanding IBM compatibility is unfortunate, but to pretend the trend doesn't exist is to be unrealistic.

IBM may not make the best personal computer. However, most of the system and application software is and will continue to be developed for the IBM PC and its clones. This growing pool of software could have been the key to Apple's future success. Apple could have cashed in on the IBM PC's success by providing a dual-mode or -processor system that allows Apple computers to run software written for the IBM PC.

A dual-mode strategy would require Apple to support the MS-DOS operating system from Microsoft or IBM's version, PC-DOS. Tandy Corp. has embraced this approach by introducing its new Radio Shack Model 2000 with MS-DOS. (Although Tandy hasn't introduced modes to allow the Model 2000 to run the TRS-DOS or Xenix operating systems, I believe it will.)

A dual-mode machine would make Apple more competitive with IBM. Dealers could demonstrate and benchmark IBM software side by side with Apple software designed to be more functional. A dual mode would allow Apple to replace the millions of IBM PCs, assuming it can demonstrate to corporate managers that its products are superior to IBM's. The corporate PC users' major investment is not in hardware, but in *software*. With a dual-mode machine, Apple could gradually wean IBM's corporate users away from their IBM PC software without causing disruption.

> "By declaring independence from IBM's de facto standards, Apple has put itself on a risky future course."

Offering users a dual mode would allow Apple to coexist with Big Blue. Most importantly, IBM compatibility would ensure that Apple's machines would fit into networks of IBM PCs, minis, and mainframes. Also, imitating IBM has paid off for Houston-based Compaq Computer and other vendors of IBM PC-compatible computers—and Apple could get in on the action. [Editor's note: Apple Computer chairman Steven Jobs believes the symbiotic relationship between IBM and its imitators will last only as long as the Blue giant allows it to. Companies living like tick birds on a rhinoceros' back will be crushed when IBM moves to claim a bigger share of the market, he asserts.]

Different corporations and users require different sets of software. No single operating system, database management system (DBMS), spreadsheet, word processor, or application package will fit all of these needs. Apple and other leading micro suppliers must set their sights on target users, corporations, and industries. No single vendor—except possibly IBM or AT&T—has enough resources to attack all markets at the same time.

To date, the most important personal-computer software has come not from the hardware vendors, but from independent software houses. For example, Visicalc, an early spreadsheet-analysis package, helped establish Apple as the leading personal computer during the late 1970s and early '80s, even though Apple didn't invent it. Today, productivity tools like Visicalc have expanded to encompass word processing, spelling checkers, graphics and report generators, calendars, and electronic mail with a single set of user interfaces, or "shells."

IBM, recognizing the importance of the independent software houses, opened the design of the PC to them. Apple, however, has always been secretive about the architecture of its machines. It didn't open the designs of the Apple III and Lisa personal computers, and as a result, the selection of independently developed ap-

ADDRESSING TOMORROW TODAY.

Imagine.

A remarkable new ZIP Code system for business mailers. So precise it can actually pinpoint specific streets, specific buildings. Even specific building floors.

That's the ZIP + 4 code.

Now imagine a computerized sorting system so advanced that it automatically reads the last line of the address off your envelope. Reducing sorting time while increasing sorting efficiency.

That's the Optical Character Reader (OCR).

EFFICIENCY.

Perhaps most amazing is the fact that both the ZIP + 4 program and our OCR's are already in place. Ready to bring technological efficiency to the mountainous task of moving 100 billion pieces of business mail per year.

But to deliver the future, we need your help.

Begin by being sure that the entire address on all your business mail is totally visible, legible and located properly. Your local post office can give you all the information you need.

ECONOMY.

Use of ZIP + 4 codes is voluntary. But by adopting them, you'll be rewarded in the form of more stable postal rates. In fact, when you meet the eligibility requirements, you can start saving postage right away.

If you're a First-Class mailer of 500 pieces or more who already presorts, you can save a half-cent per piece when you use ZIP + 4 codes. And that's on top of the three-cent discount for presorting.

If you're a First-Class mailer who doesn't presort but mails 250 pieces at a time, you can save nine-tenths of a cent per letter.

And no matter how many, or how few, pieces you mail, using ZIP + 4 codes can give you a cleaner, more efficient mailing list. Plus more consistent delivery.

COOPERATION.

Let us show you how you can put more zip in your mail service. Contact your local Postmaster or Customer Service Representative. And send yourself into the future.

U.S.MAIL®

CIRCLE 43

FOLLOWING THE LEADERS

plications packages for those machines is quite limited in comparison to the IBM PC. Apple corrected this fundamental strategic flub when releasing the Macintosh. But it was a late correction, and it remains to be seen if Apple can make up for the time it has already lost in the software race.

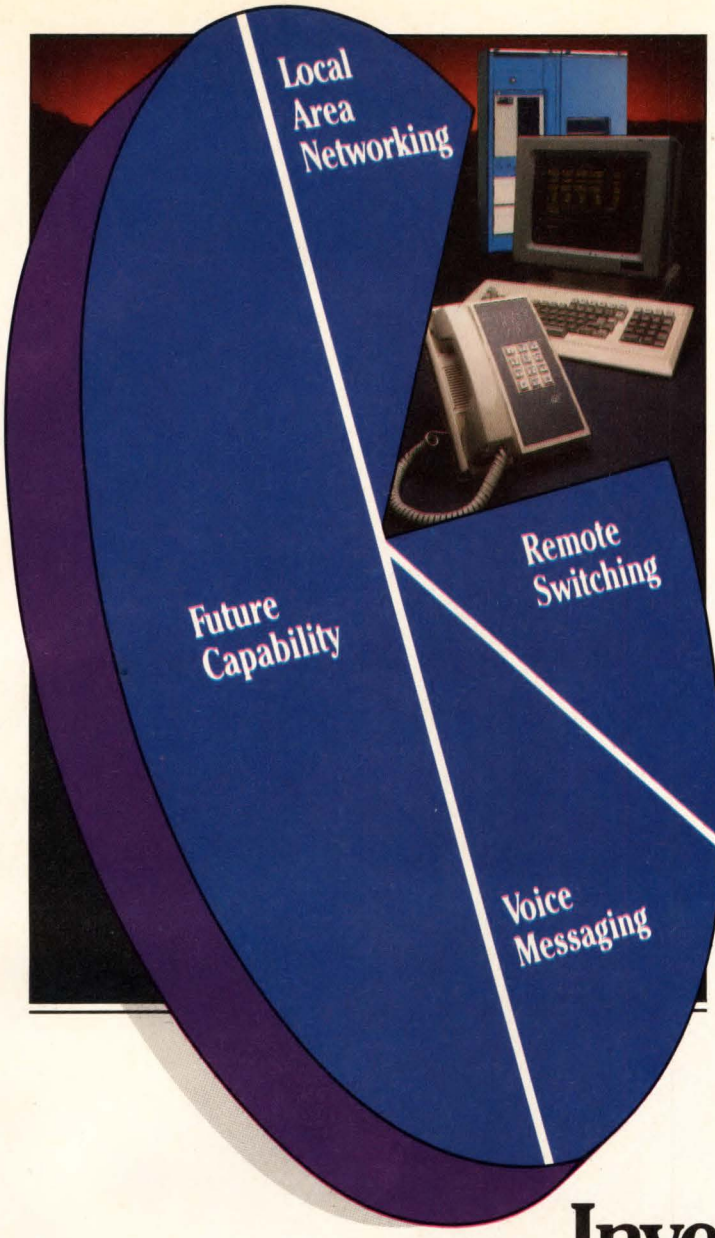
The alternative for Apple is to sell razor blades along with its razors. By doing so, Apple will cash in on the huge software "aftermarket." The typical micro sale worth $1,000 to $2,500 will generate an estimated $400 to $800 worth of software business during a three-year period. Sales worth between $2,500 and $5,000 will generate an estimated $1,500 to $2,000 in software sales during the same period, while in the $5,000-to-$10,000 category, Fortune 1,000 micro buyers are expected to ante up $3,500 for software. Unlike hardware, software has minimal manufacturing costs—software is practically a pure-profit business.

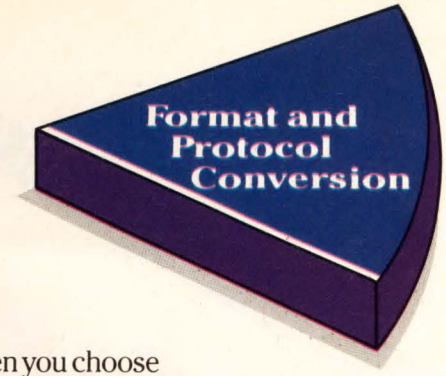
Apple, burdened by the effects of secrecy, will improve its future by providing key application packages for selected industries. Apple could, for example, develop program generators for targeted generic applications.

Apple must also offer a full-featured relational DBMS if it hopes to increase its appeal to corporations. Apple, like other hardware suppliers, already offers a DBMS, but it may be outdated. DBMSs for personal computers are changing fast. Ashton-Tate, whose dBase II is the current leader, has sold an estimated 200,000 packages relying mostly on its marketing prowess. However, the package has been criticized for failing to provide data security, automatic backup and recovery, or multiple files.

Software is the added value in personal computers—the razor blades. About 1.5 million micros from Apple have been installed so far. Given the crushing potential of the IBM PC juggernaut and Apple's determination to go it alone, can Apple afford to ignore the software market? I don't think so. Getting into software could help Apple Computer survive its independent-minded hardware strategy. □

Robert T. Fertig is founder and president of Enterprise Information Systems, P.O. Box 1154, Greenwich, CT 06836.





When you choose the IBX™ Integrated Business Exchange from InteCom, you get some important advantages. Like format and protocol conversion. And a tremendous untapped potential for growth. Plus all the benefits of a time-tested system.

The IBX is the first fully integrated, absolutely non-blocking, digital voice/data switching system in the world. It's already operating in companies across the United States. And it's ready to link your multi-vendor systems and equipment into one efficient communications package. Through its unique architecture and a host of advanced features.

InteNet™ Packet Controllers, the IBX family of format and protocol conversion packages, connect certain dissimilar equipment. Establishing communications between word processing systems. Entering X.25 networks such as Telenet and Tymnet. Or emulating 3270 devices.

The IBX architecture also offers you completely non-blocking operation, at all ports, at no extra cost. Wideband LANmark™ local area networking for superspeed packet switching. Shared tenant service. And convenient voice messaging with InteMail℠. For cost efficiency, the system uses two-pair wiring and modern fiber optics.

Invest in the IBX™ today and reserve vast resources for tomorrow.

Designed for up to 12,000 lines, the IBX switch can start as small as 250 lines. And it's already prepared to incorporate new applications, keeping pace with the industry and meeting your needs for years to come.

The IBX communications system from InteCom. It's the indispensable business tool for the 80's and beyond, from the innovative leader in office technology. For complete details on an IBX investment, write or call: 1-800-INTE-800. In Texas, call 1-214-727-9141.

INTECOM INC.

Integrating Communications

601 InteCom Drive • Allen, Texas 75002 • 214/727-9141

IBX, InteNet and LANmark are trademarks and InteMail a service mark of InteCom Inc.

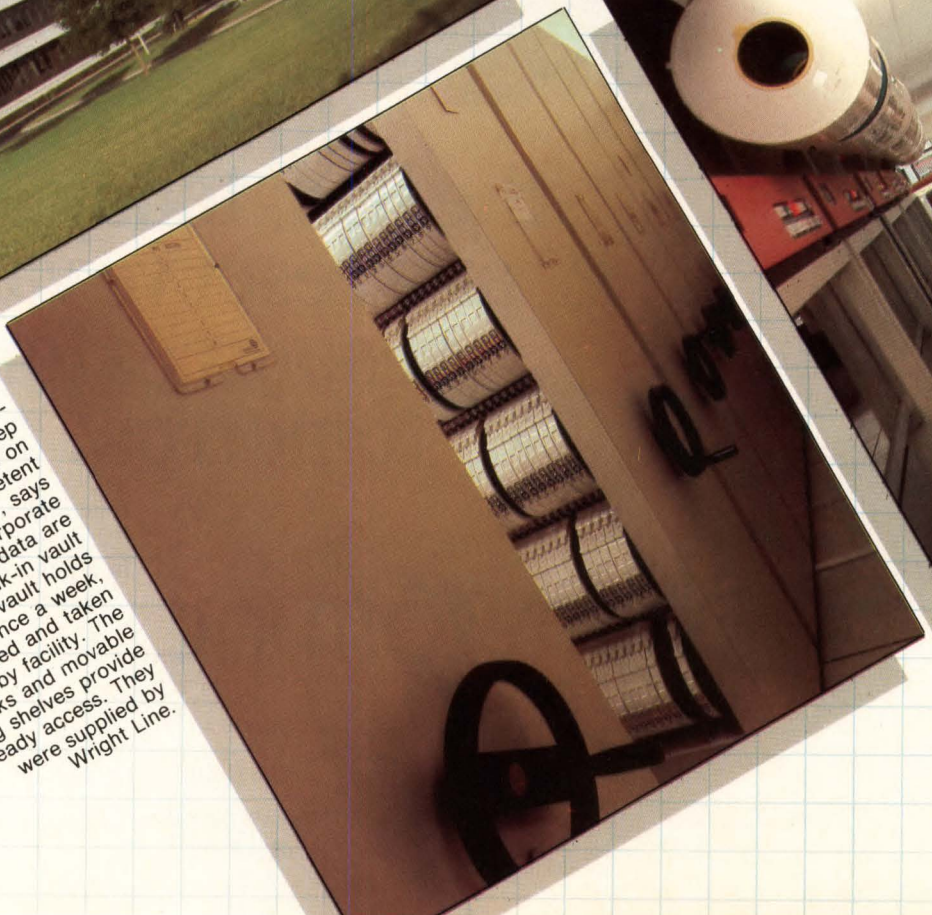
CIRCLE 45

Sundstrand, Rockford, Illinois

Outstanding Data Center

Sundstrand Corp.'s top management left little to chance when it authorized the building of the company's Rockford, IL, data center. Before construction began, the data-processing staff was dispatched to study other data centers in the midwest. "We tried to take the best ideas from every center we visited," says Jack Martocci, manager of corporate computer services. The effort paid off. Sundstrand's center is a clean, efficient, stable environment—just what disk and tape drives need to run reliably.

Sundstrand's data center provides data-processing and -storage services for the corporation's satellite locations. Sundstrand, a



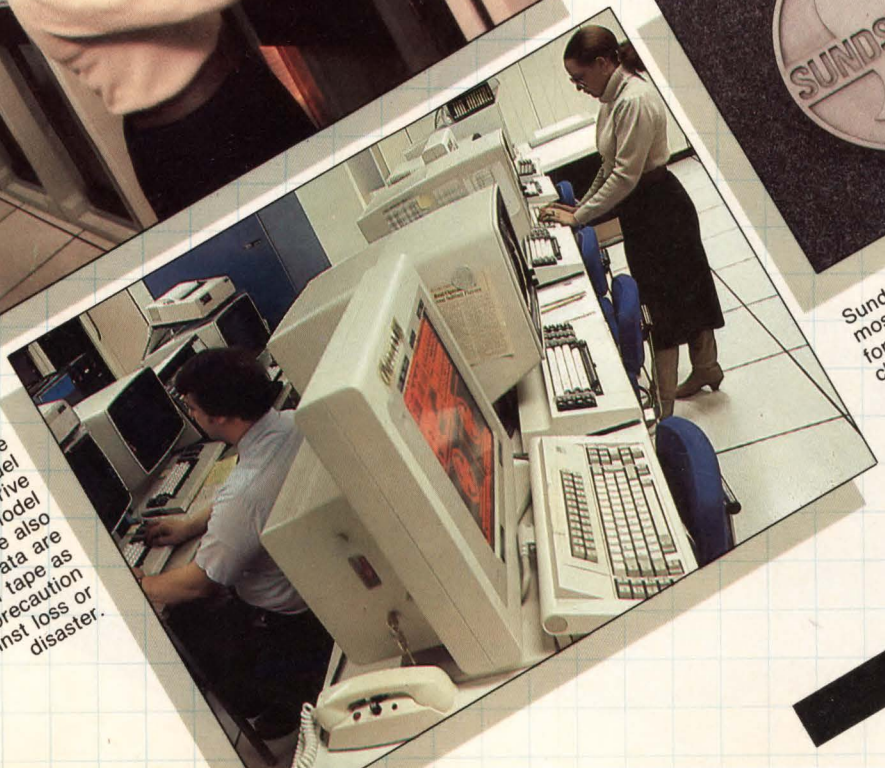
Set outside of Chicago, in suburban Rockford, IL, Sundstrand's data center is part of a large corporate campus (above). It is the nerve center for Sundstrand's far-flung divisions and subsidiaries. To keep operations humming, Sundstrand relies on quality service from vendors, a competent staff, and a "top-notch" data center, says Jack Martocci, manager of corporate computer services. Sundstrand's data are stored in a fireproof walk-in vault from Schwab (right). The vault holds up to 11,200 tapes. Once a week, critical data are duplicated and taken to a nearby facility. The tape-racks and movable filing shelves provide easy, ready access. They were supplied by Wright Line.

by Theresa Conlon, Staff Writer

Photos by Terry Lee

Beverly Jones, senior operator, mounts a tape reel on a Storage Technology Model 3650 tape drive (above). Model 3670s are also used. Data are stored on tape as a precaution against loss or disaster.

Jack Martocci, manager of computer services, and Bruce Rudie, manager of computer operations, review a report on online usage (above). Furniture for professionals in the data center was supplied by All-Steel.



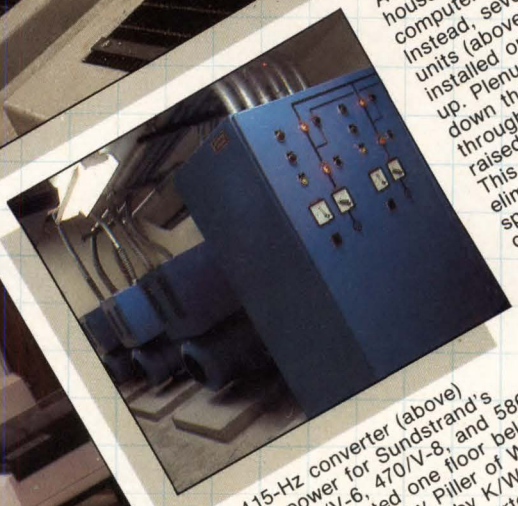
Sundstrand's data center provides most of the processing and storage for its subsidiaries through a variety of channels. A site in Singapore, for example, is linked to Rockford via satellite. Communications are monitored at the control center (left). The logo-bearing stone (above) symbolizes the center's strength: It was built to withstand extreme weather—tornadoes included.

Outstanding Data Center

billion-dollar conglomerate, manufactures and designs a wide variety of products, primarily for the aerospace industry. The corporation's 35 worldwide subsidiaries and divisions have extensive computer-based design and manufacturing systems, and most run manufacturing-resource planning software. They're all linked to the data center in Rockford.

Completed in 1977, Sundstrand's data center was designed by Larson & Darby and built by Sjostrom & Sons. (Both firms are located in Rockford.) Sundstrand is planning to build a second corporate data center, in Milwaukee, that will incorporate most of the same features of the Rockford facility. Says Martocci: "We're looking at what we've done here for the last six years. What's right? What's wrong? What changes should we make? The changes are minor—we're quite pleased with our facility." Sundstrand did it right the first time around. Take this photographic tour and see for yourself.

(Continued on page 108)



Air conditioners aren't housed in the main computer room. Instead, seven giant units (above) are installed one floor up. Plenums run down the back through the raised floors. This method eliminates "hot spots" in the computer room.

This 415-Hz converter (above) supplies power for Sundstrand's Amdahl 470/V-6, 470/V-8, and 5860 mainframes located one floor below. It is manufactured by Piller of West Germany and supplied by K/W Control Systems. The converter is raised on cement blocks to safeguard against water damage.

At right, Russ Moser, supervisor of computer operations, studies a report on system performance in the console area. Sundstrand deploys ACF2 from Cambridge Systems and Reliability Plus from UCC to help secure data.

SECURITY, NATURE'S WAY.

Our Security System Does Something Nature Doesn't Do. It Protects Your Data.

Only one security software is the accepted standard for IBM MVS, VS1, and VM environments: *ACF2, The Access Control Facility.*

Over 1200 organizations, including many Fortune 500 companies, trust ACF2 for access control because it gives peace-of-mind against unauthorized disclosure, modification, or destruction of data.

With ACF2, all data is protected automatically — by default. Authorization access is granted based on a need to know. This avoids confusion, assignment mistakes, and oversights.

Installation is fast. Implementation is painless. Critical data sets can be protected first, while less critical data can be secured in stages to avoid disruption of daily work routines.

All system resource accesses are monitored and controlled as they occur. A complete audit trail provides total accountability.

Surprisingly, all this control uses a minimum of administrative and machine overhead.

So if you would like to see how naturally ACF2 can blend into your data center, please call or write The Cambridge Systems Group for more information.

The Cambridge Systems Group

24275 Elise, Los Altos Hills, CA 94022, U.S.A.,
(415) 941-4558 • Telex 357437

CIRCLE 46

Outstanding Data Center

Operators check the status of all cpus from the command area (above). Users in the remote offices are linked via phone lines to the data center. Racal-Milgo supplied the network. The network is up six days a week, 24 hours a day.

The suppliers

Access control
Rusco Electronic
(213) 725-1411
Circle 830

Air conditioners
AC Mfg.
(609) 428-9800
Circle 831

Liebert
(614) 888-0246
Circle 832

Mainframes
Amdahl
(408) 746-6000
Circle 833

Network control
Racal-Milgo
(305) 592-8600
Circle 834

Power supply
K/W Control Syst.
(914) 355-6741
Circle 835

Reliability monitor
University Computing
(214) 353-7100
Circle 836

Security software
Cambridge Syst.
(415) 941-4558
Circle 837

Storage vault
Schwab Safe
(317) 447-9470
Circle 838

Wright Line
(shelves only)
(617) 852-4300
Circle 839

Tape drives
Storage Tech.
(303) 673-5151
Circle 840

Workstations
All-Steel
(312) 859-2600
Circle 841

Sundstrand pays close attention to security. Strategically placed TV cameras monitor the entire complex. The entrance to the data center is monitored round-the-clock and alarms are linked to a central security office. Employees and visitors must pass through a Rusco RS30-C-4 system (above) to get inside the data center. Employees insert a magnetic card containing a unique number to gain entrance.

Disk drives (right) are located in a room to the rear of the computer room. Sundstrand has four vendors: IBM, Storage Technology, Control Data, and Amdahl. "A multi-vendor setup gives us a chance to compare vendors," says Bruce Rudie, section manager of operations.

A unique company dedicated to the development and enhancement of UNIX* software and support regardless of host hardware! This was the concept pioneered by The Wollongong Group in 1980. The year it introduced the 32-bit UNIX-based operating system for the Perkin-Elmer 3200 Series.

The world's first UNIX utility company.

Since then, we have continued to develop and market a wide spectrum of UNIX software for 32-bit minicomputers. We have also gained an enviable clientele from the ranks of the 'Fortune 1000.' In fact, we have now extended the UNIX utility concept through distribution channels to worldwide markets.

Today, Wollongong software products not only operate under UNIX, but also under DEC's VMS and our proprietary EUNICE which provides a transparent link between UNIX and VMS on the same host computer.

System-level packages

These run under VMS or EUNICE for VAX users, or UNIX for PE 3200 users.

IP/TCP Internet Protocol Transmission Control Protocol is the newly adopted Department of Defense standard which provides a set of cooperative processes allowing two or more host computers to communicate.

R/M COBOL is a high-level implementation of the ANSI 74 COBOL standard, designed for efficient development and execution of COBOL business applications. Features include GSA certified COBOL, Level-2 relative and indexed file access methods, plus full arithmetic capability.

Full Screen Editor supports advanced programming and text processing requirements, concurrent file editing, and formatting.

Metaport products

EUNICE A comprehensive suite of software which provides VAX users with the unique ability to merge their native VMS environment with state of the art UNIX commands and utilities.

REX Runtime EXecutive provides all necessary interface software to allow application-level programs developed under UNIX to properly execute with VMS.

UNIX support services

Comprehensive seminars are provided for both novice and experienced UNIX users. These feature hands-on lab sessions as well as classroom presentations. Yearly support contracts which extend all the services and support provided during the initial product warranty period are also available.

Custom products and services

These include UNIX 'porting', UNIX modifications for special applications, custom hardware/software integration and system performance analysis.

Plug-in now to the world's first UNIX utility company for total service and support. From The Wollongong Group, 1129 San Antonio Rd., Palo Alto, CA 94303. Telephone 415-962-9224. Toll free 800-USA-UNIX (In California call 800-962-UNIX).

WOLLONGONG

*UNIX is a trademark of Bell Laboratories

CIRCLE 47

Photo by George Hausman

CUSTOM-TAILORED FAULT TOLERANCE

by Jennifer E. Beaver, Southwestern Editor

Fault tolerance is fast becoming de rigueur among computer manufacturers. To stand out from the competition, many vendors are beginning to offer special features that can make their systems a custom fit.

The computer is down.

If your business depends on computerized data, those four words will tell you that countless dollars and opportunities have been lost. And, unfortunately, you're likely to hear those words quite often: Statistically, even a computer that's 99 percent reliable will be down seven hours a month when operated 24 hours a day, seven days a week. For some enterprises, such as airline-reservations systems and banking's automated-teller machines (ATMs), even minimal downtime is too much. So these businesses have come to rely on computers that have fault tolerance—the ability to stay up despite failures in modules or components.

By 1986, the market for online transaction processing (OLTP), including software, should reach $32 billion, according to Omri Serlin, consultant and publisher of the *FT Systems Newsletter*. (That is twice the amount for OLTP in 1983.) However, only a small portion of that figure—$1.3 billion—will be spent on computers offering internal redundance, such as those by Tandem and Stratus. Most customers requiring high uptime will continue to buy from more conventional vendors like IBM and DEC, and configure the machines themselves for greater redundancy. A corporation might buy two computers and, in the event of an equipment failure, transfer peripherals from one computer to another with a switching mechanism.

Last year, business organizations spent $577 million on FTSs like Tandem's Nonstop. Companies aren't exactly breaking down doors to get at this kind of equipment, but they would be wise to consider such an investment in the future. For one thing, as hardware gets cheaper, the premium paid for fault tolerance diminishes. The ubiquitous microprocessor chip, upon which most FTS vendors base their products, costs approximately $25; a decade ago, the equivalent functionality would have cost thousands online. Also, as all kinds of businesses begin to use computers more, they are becoming increasingly dependent on the machines. Downtime becomes not only inconvenient, but a threat to survival.

Picking up on the ever-increasing need, hordes of vendors are following the pioneer, Tandem, to the fault-tolerance frontier. The stampede generated among

Fault Tolerance

(Continued from page 111)

these largely venture-capital-backed start-ups—Stratus, Synapse Computer, Auragen Systems, Sequoia Systems (in which Sperry Corp. recently made a small investment), and the like—means that you, the customer, will get more for your money. Fault tolerance will probably one day be standard on *all* computers (according to experts), and many of these manufacturers are beginning to offer extras. You may be tempted by the additional features even if you don't require constant uptime.

Graceful growth

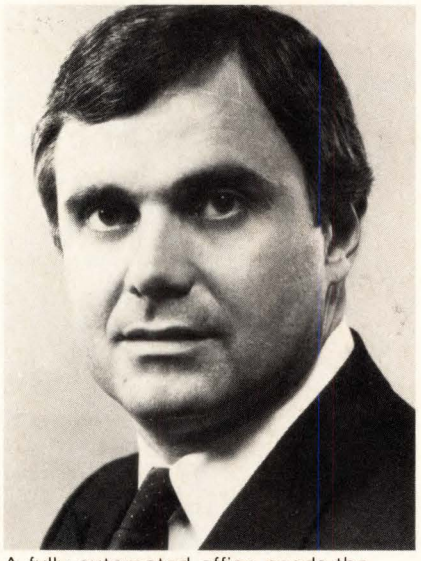
If you've been working with a conventional vendor like IBM, you know what headaches to expect when you need more computing power. After you've reached the point where no more memory can be added to your system, out goes the old computer, in comes the new. In addition, some of your software will need to be rewritten (or, at least, recompiled). This so-called family-architecture approach is disruptive, time-consuming, and expensive.

In contrast, most FTS architecture lends itself to simple and inexpensive modular expansion. An extra processor module can be plugged in —even while the computer is running —and the software adapts automatically, without the need to rewrite. Such processor modules usually cost between $20,000 and $30,000 —much cheaper and simpler to install than an entire new system.

How much power will you gain from such a transition? A small Synapse system, for example, with power comparable to that of a DEC VAX 11/780 supermini, can be expanded with the addition of processors to equal the power of an IBM 3081 mainframe.

Tandem's TXP processor, which was introduced last year, provides the epitome of a smooth transition. It increases by two to three times the processing power of the Nonstop II (TXP's predecessor and the vendor's flagship) while reducing the cost per transaction by 50 percent. TXP processors yoked together in the same cabinet with Nonstop processors improve overall performance of the system. A TXP processor with 2 Mbytes of storage costs $96,400.

Not to be outdone, Stratus began shipping its second-generation, high-powered microprocessor this month. Dubbed the EA (for Extended Architecture), this chip is "50 percent more powerful and 10 percent cheaper" than the TXP, according to a company spokesperson. Completely compatible with existing Stratus architecture, the EA can be used in conjunction with first-generation Stratus microprocessors to boost the overall power of the system. The source at Stratus claims the EA offers three times the power of its predecessor for twice the price.



A fully automated office needs the protection of fault tolerance, says John McNulty, vice president and general manager of Computer Consoles' office-systems group.

Mike Strada expects his business to grow rapidly, and he expects his computer system to grow with it. Strada is president of the Florida Interchange Group, which lets cardholders at 274 financial institutions in Florida access an ATM at any member organization. The Interchange Group acts sort of like a traffic cop, directing requests at ATMs to customers' account balances at their branches.

Four million cardholders have access to the system. Strada expects the number of transactions to grow from 1 million a month this June to 2 million a month by the end of this year. That's one reason why the modular expandability of Tandem's FTS was so enticing. The Interchange Group now runs four Nonstop IIs in production and two for testing, and plans to add TXP processors as the transaction-processing load increases.

An FTS also improves customer service. "ATMs are supposed to be available round the clock," says Strada. "Having an online system that's up all the time reduces the chances of inconveniencing our customers and yet allows us to check their balances at any time."

Strada admits that before he had an FTS he was skeptical of high uptime claims. But, "in five months of operation [with the FTS], we've had only 1.5 hours of downtime, which was due to a minor hardware failure. I'm ecstatic."

Expanding your options

There are several ways to expand FTSs. A Stratus-system user, for example, could increase storage capacity within one cabinet from 4 to 16 Mbytes, simply by sliding printed circuit boards containing processors into the 20-slot chassis.

For greater processing requirements, 32 Stratus minis can be linked together with a local-area network (LAN). Up to 65,000 Stratus minis can be linked with StratusNet software and an X.25-type communication link. The multiple units appear to the user as one big computer.

Synapse systems are also highly expandable. Their processors form a pool, and as more processors are plugged in, the systems can handle more transactions per second.

Some businesses may need easy expandability even more than they need high uptime. According to International Research Development, the Norwalk, CT-based market-research firm, about 20 percent of systems capable of fault tolerance are not being run in an FTS mode.

(Continued on page 114)

If you think a UPS is just for "lights out"...

think again.

A UPS, if it's a *true* UPS, offers more than just blackout protection. Because it's always "on-line," a *true* UPS protects your system and data against all kinds of irregular voltage conditions, including brownouts and blackouts.

The difference between a *true* UPS and a standby UPS is like night and day.

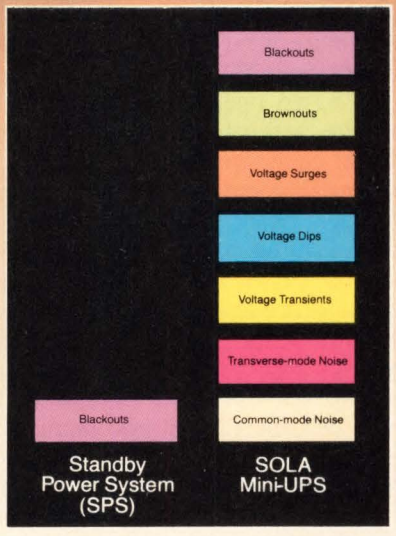
A standby (off-line) unit is designed solely for blackouts. While some models do offer a limited amount of noise filtering, they do not provide continuous, conditioned power. And that leaves you vulnerable to the costly effects of brownouts, overvoltages, sudden power surges, transverse-mode and common-mode noise.

If your power protection needs are critical, you can't afford to "stand by."

For some applications a standby unit is sufficient. If that's the case, we offer our new standby power system (SPS).

But for more critical applications such as computer systems linked to security, medical life support, communications and industrial process control, you can't afford to be without clean, conditioned, "no-break" power for even a few milliseconds. That's when you need the complete protection you get with our portable, plug-in, UL-listed Mini-UPS.

Sure, a standby costs less. But it only operates when voltage drops below a preset transfer point (typically −10% nominal). A Mini-UPS, on the other hand, pays for itself every day by providing conditioned power and instantaneous blackout protection around-the-clock.



We introduced the concept of power protection more than fifty years ago.

In that time we've introduced some things you'd expect from the leader in power protection... like 100% quality testing and mandatory 72 hr. "burn-in" periods for all UPS units. We've also developed the nation's largest network of *stocking* distributors.

Think about it. Can you get by with anything less than *true* UPS protection? For more information on our complete line of UPS units, power conditioners, CV transformers, computer power centers and line monitors, contact:
Sola Electric, 1717 Busse Rd., Elk Grove Village, IL 60007. 312/439-2800.

See us at NCC '84 Booth #A-1702

A UNIT OF GENERAL SIGNAL GS

SOLA

The *Original* Power Protectors

CIRCLE 48

Fault Tolerance

(Continued from page 112)

Designed for rapid growth in transaction processing, these systems simply do a better job of real-time processing than general-purpose computers.

When Tandem shipped its first systems in 1976, there was another reason some customers didn't take advantage of the fault tolerance. Application development on Nonstop Is was costly and so tricky that some programmers couldn't master it.

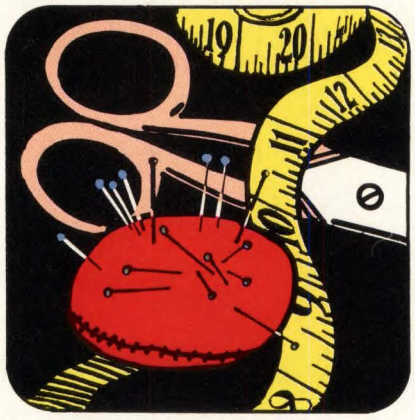
The culprit was checkpointing, the method by which Tandem's dual processors send "I'm alive" messages to each other. It's a buddy system. If the message isn't received, a processor assumes some of its counterpart's duties.

In 1981, Tandem introduced two application-development tools, Transaction Monitoring Facility (TMF) and Pathway, that virtually eliminated checkpointing by the programmer. Tandem's competitors still pick at this feature, however. And to be truthful, though application development is now easier, it's still expensive. TMF and Pathway each cost $2,500 per processor.

Having learned by Tandem's misfortune, newer vendors are building application tools into their systems.

Having learned by Tandem's misfortune, newer vendors are building application tools into their systems. Auragen's system architecture, for example, is similar to Tandem's, but checkpointing is automatic, transparent to the user, and consumes fewer system resources in regular operation. During a failure, however, the Auragen uses more computer power than the Tandem.

The Synthesis software on a Synapse N+1 integrates operating system, relational database, transaction processing, and dictionary. "Synthesis reduces the cost of developing applications and accelerates the investment payback by automating large portions of development. It also reduces the risk of leaving integrity recovery to the programmer," claims Mark Leslie, Synapse's president.



Other FTS vendors have steered away from proprietary operating systems in favor of the more universally applicable Unix, developed by Bell Labs. Rapidly becoming an industry standard, Unix has been called a programmer's dream, but an end user's nightmare. That's why Auragen built a user-friendly interface onto its Unix-based operating system. "We believe a fault-tolerant computer should be as simple to program as a personal computer," asserts Auragen president, Rick Martin.

Like Auragen and many other vendors, Tolerant Transaction Systems markets its FTSs, the Eternity series, through value-added resellers. Its systems also feature an enhanced Unix-based operating system with expanded file capabilities, increased input/output speed, and improved integrity and reliability.

Ease of software conversion can be just as important as software development. In 1982, Stratus' first customer, West Lynn (MA) Creamery, switched from an IBM 4341 to a Stratus/32. "It was the easiest conversion I've ever done," claims Paul Femino, president of Femcon, Westford, MA, the creamery's software consultancy. "It took only six work weeks: one week to convert 80 Cobol programs, and five weeks to rewrite some IBM Assembler-language routines in Stratus Cobol."

The lure of good prepackaged application software may also lead customers to Stratus. That feature helped hook Walter Racquet, chief financial officer of Herzog, Heine, Geduld Inc., one of Wall Street's most prominent over-the-counter traders. The brokerage uses Colt, which was developed by Femcon especially for the brokerage business.

Racquet knew his traders needed a more reliable computer after having problems with a Nixdorf for several months. "When the Nixdorf went down, our traders didn't know their positions. We didn't have real-time processing. We'd be dealing with information that was at least an hour old, and might be trading $10,000 long or short, just going on gut feeling."

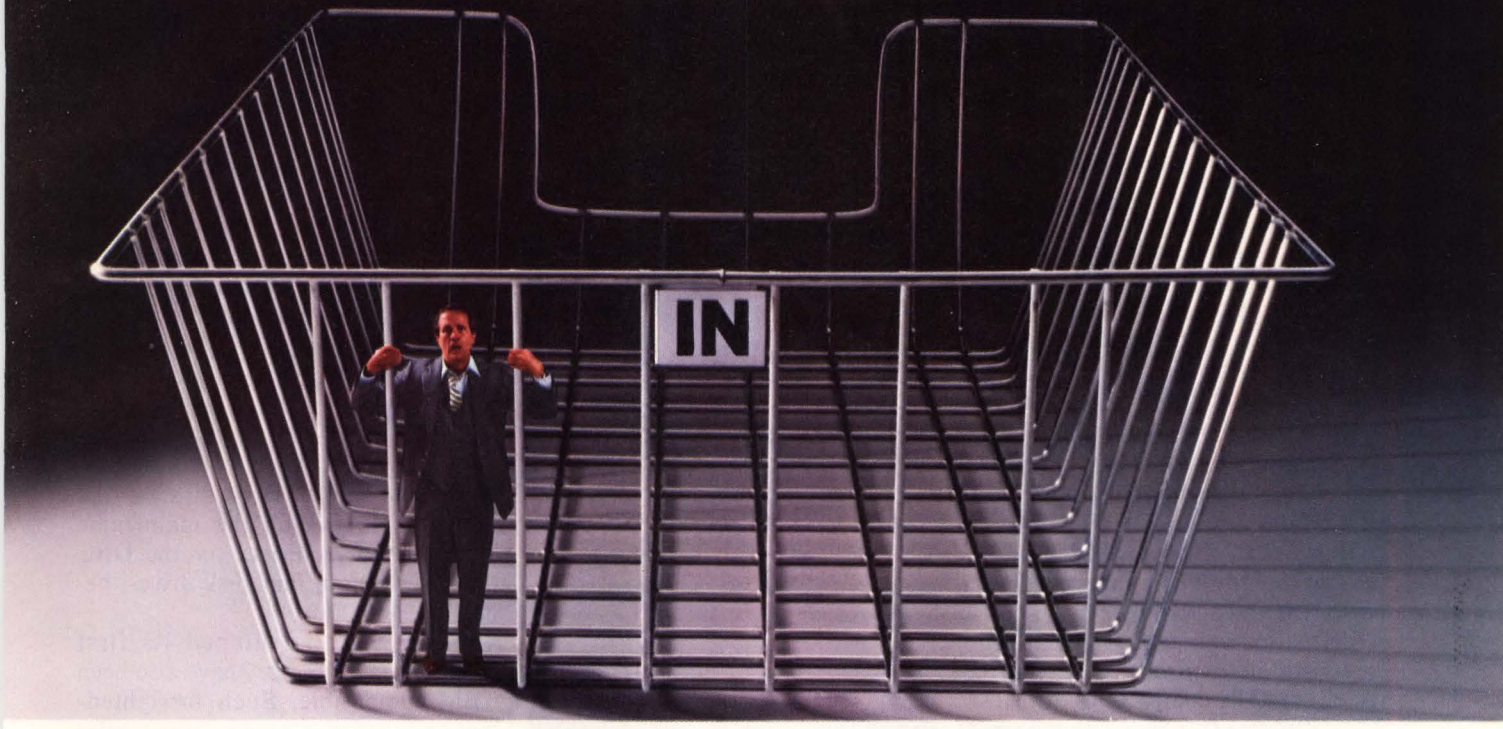
The Colt software and the Stratus system's price prompted Racquet to buy from Stratus. Unlike Tandem, which offers customized hardware, all of Stratus' pieces come off the shelf. And even though the hardware that makes the computer fault-tolerant is totally redundant, it adds only 3 percent to overall costs.

With a conventional vendor, you know what headaches to expect when you need more computing power.

"We try to position ourselves among the vendors that don't offer fault tolerance," explains Nicholas J. Bologna, Stratus' director of product marketing. "If you can have it for the same price, why not take it?" Stratus has 45 software packages, many for financial institutions, and plans to double the number of its offerings by the end of this year.

But Stratus may have another think coming—at least when it comes to the banking industry—if it thinks Nixdorf is going to take the competition lying down. Nixdorf AG has recently entered an OEM arrangement on a nonstop transaction system with Auragen. The system, which

WITH DATA GENERAL, YOU WON'T BE A PRISONER OF YOUR IN-BOX.



DATA GENERAL INTEGRATED OFFICE AUTOMATION

Burying information under a ton of mail at the bottom of your in-box is not the best way to get it when it's critical to a decision.

ELECTRONIC MAIL

With Data General's CEO® Comprehensive Electronic Office, information is delivered electronically. Instantly. Unerringly.

But that's only the beginning.

TOTAL OFFICE AUTOMATION

The CEO system automates just about everything in your office. CEO electronic filing files the way you do. Its electronic calendar keeps tabs on trips, appointments, and meetings—even confirming them all.

Of course, CEO includes easy-to-use word processing. And all this is integrated with data processing for total decision support.

DON'T DUMP YOUR EXISTING EQUIPMENT

Best of all, instead of having to dump your existing equipment to automate your office, you can build the CEO system around it.

Because it not only ties in with other Data General computers, but it also ties in with the most widely-used mainframe and word processor.

Instead of just a series of personal computers, each CEO workstation becomes part of a global network, with access to data from IBM mainframes.

AS LITTLE AS $5,000 A WORKSTATION

And with the CEO system, the cost per workstation can be as low as $5,000, depending on application.

CALL NOW

For more information on office automation that's a generation ahead, call: **1-800-554-4343, Operator 12A** or write Data General, M.S. CEO 12A, 4400 Computer Drive, Westboro, MA 01580.

Data General
a Generation ahead.

CIRCLE 49

Fault Tolerance

(Continued from page 114)

won't be available in the United States until early 1985, will be distributed through Nixdorf's American subsidiary, Nixdorf Computer Corp., Waltham, MA.

Targeted at banking customers, the Nixdorf 8832 will operate under Unix System V and will be almost identical to Auragen's System 4000 in terms of hardware. The price is expected to be similar too—in the neighborhood of $75,000.

Protecting investments

Even with enticements like modular expandability and easy in-house application development, many organizations are justifiably wary of switching to a new vendor when they've already made investments in hardware and software.

Formation can ease such a transition with its Failsoft Architecture, which is totally compatible with IBM 370 software. To achieve this degree of compatibility, Formation had to forgo some measure of automatic recovery, a hallmark of many FTSs. If a Formation module fails, the system takes from one to six minutes (depending on the number of modules) to reconfigure, and restarts automatically, without losing data. A Tandem system doesn't stop at all for a failed processor.

In 1982, Ben Pine, president of the Los Angeles market-research firm that bears his name, chose a Formation system because his software was written for an IBM 370. IBM lost out on the deal because, according to Pine, the 370/138 he needed is about 25 percent more expensive than the Formation machine.

Speed and reliability are important to Pine, who tabulates public-opinion polls and compiles new-product tests. "Decisions must be made as soon as the data get to us," he explains. "On election night, one of the national pollsters uses our services. If he appears on national TV without the information, we all look bad."

Some FTS makers stress communications links to ensure coexistence with more established vendors. Tandem, for example, has Snax, a software interface that enables devices and host computers using IBM's SNA to communicate and share applications with a Nonstop. It costs $2,750 per processor. Auragen expects to introduce a similar link soon.

"A fault-tolerant computer should be as simple to program as a personal computer," says Rick Martin, president of Auragen Systems.

William Foster, president of Stratus Computer, poses with one of his company's 32-bit minicomputers. The vendor recently entered the OA market with a local-area network that links IBM Personal Computers to a Stratus mini. It also introduced a high-powered, second-generation microprocessor.

Despite the fact that Tandem produces IBM-compatible software, it seeks head-to-head hardware competition with Big Blue. Omri Serlin says that, for the moment, Tandem's aspiration looks like a pipe dream. "Tandem hasn't replaced IBM in direct bidding in any contracts I'm aware of," he says. "Its systems are being used as front-end systems [communications controllers], not instead of big mainframes."

Conventional computers may get sandwiched between FTSs. The DBC 1012—a back-end, or database, machine recently released by Teradata—works with IBM mainframes running under the MVS operating system. The database resides on the DBC 1012, freeing the mainframe for other tasks. Prices for the DBC 1012, including four disk drives, begin at $480,000.

Since Stratus shipped its first products in 1982, they have also been IBM-compatible. Such farsightedness has led the vendor into a relatively unplumbed sector of the computer market—office automation.

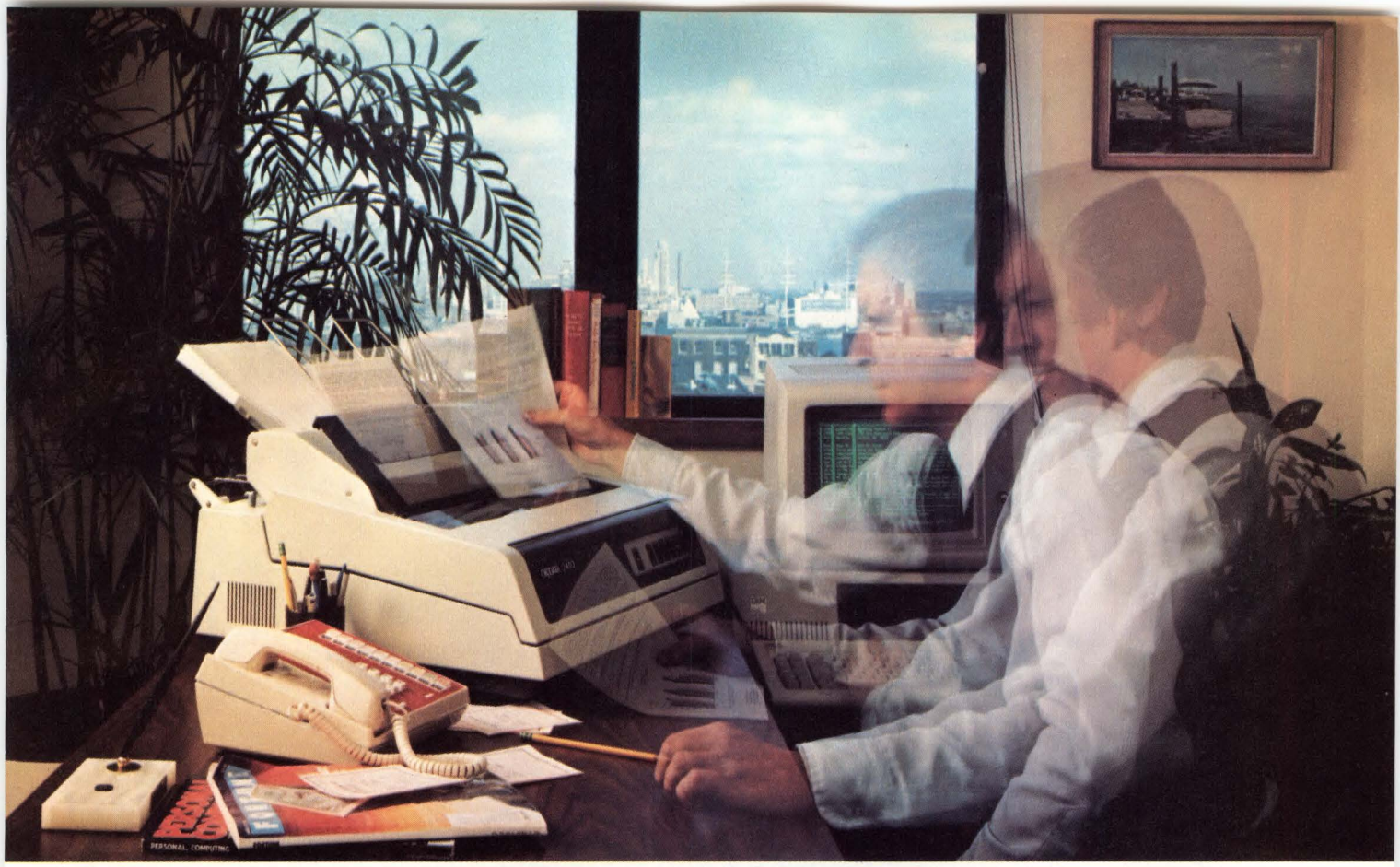
Offices online

The Stratus Office Solution (SOS), introduced late in 1983, brings fault tolerance to IBM Personal Computer and 3270-type terminal users who need shared facilities, electronic mail, and data access. The Stratus/32 resides between the personal computers and an IBM or IBM-compatible host, functioning as both a terminal controller and host emulator. The SOS not only increases the reliability of the system, it also frees the mainframe for other duties. Expect to pay about $200,000 for an SOS that supports 50 terminals.

Do you really need to pay this high a premium for such availability? Yes, according to John McNulty, vice president and general manager of Computer Consoles' (CCI) office-systems group.

"It's investment protection," says McNulty. "When you totally automate your office, you can't afford to let your system go down. If it does, you won't be able to do your job."

(Continued on page 120)



THE PRINTER TO PICK WHEN THE PACE QUICKENS.

It's happening all over the PC and micro worlds.

You're getting hit with a ton of increased throughput requirements. Your applications are generating a deluge of paper. You need more printer speed. A lot more.

You're also looking for more professional-looking presentations so you need better print quality. A lot better.

Who's got the best of both worlds for you?

Okidata's Pacemark 2350 and 2410 dot matrix printers.

They'll not only help you *keep* pace with your world, they'll help you set new and exciting ones. In print speed. In print quality. And in vastly increased compatibility and capability.

Take throughput. The 2350 and 2410 can quickly get you out of the waiting game to where you're *really* cranking it out. And with flexibility, too: up to 5 pages per minute.

But wait. Cranking *what* out, you may ask? A single, restrictive printing mode? No way. The 2410 can give you DP, draft, and a correspondence quality that truly rivals the daisywheel.

And the 2350 and 2410 can both print at up to 350 cps. While producing 120 to 420 lines a minute for you. With bidirectional printing and short line seeking logic. And both high speed horizontal and vertical slew.

PC COMPATIBILITY. SOFTWARE COMPATIBILITY.

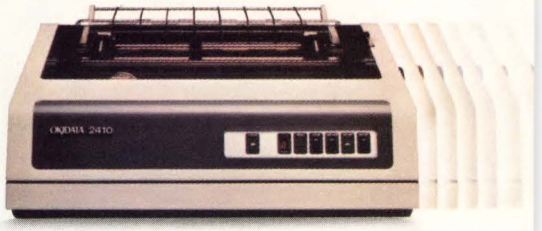
The 2350 and 2410 use industry standard interfaces making them hardware compatible with most mini and microsystems on the market today. In addition, they are supported on the menus of most of the important software being offered to microsystem users like Visicalc, Lotus 1, 2, 3, DBASE 2, Peachtree 500 and General Ledger, Multi-Mate WP, Wordstar, etcetera, etcetera.

But wait, there's more. Like an outstanding all points addressable graphics capability with 144 x 144 dots per inch resolution.

Two color printing for highlighting. Down line loadable font sets for flexibility. Subscripts and superscripts so your scientific and technical usage won't bog down. Six-part forms handling. The capability to print 132 columns on eight-inch paper using 17.1 characters per inch to save paper costs and make output easier to handle.

And—so that you can depend on getting all that good stuff, all the time—a mean time between failure of 2200 hours. A mean time to repair of only 30 minutes. An average printhead life of 500,000,000 characters. And an industry low warranty claim rate of less than 2%.

No doubt about it, the quicker the pace at your place, the more you need Pacemark from our place. For more information, call toll free 1-800-OKIDATA. In New Jersey, 609-235-2600. Or write OKIDATA, Mt. Laurel, NJ 08054.



OKIDATA
an OKI AMERICA company

We're keeping pace with your business

Four-Phase is helping more than 2,000 DP managers win the productivity game.

Now it's your turn.

It's easy to win the distributed information processing game when you play it with the Series 4000 from Four-Phase. The Series 4000 is an integrated, growth-oriented system designed to communicate within your IBM environment. No other vendor gives you so many functions for so many years at such affordable prices. In the distributed processing arena, that's the way to score points with both end-users and top management.

You win the DDP game with software.

Four-Phase provides one of the most impressive and complete collections of software ever offered from one company. Our packages make integrating Four-Phase computers remarkably easy. And guarantee a logical growth path for years to come. Here's just a sample of what we provide:

Interactive processing: VISION®—For creating custom applications from order entry to transaction processing. It provides a high level of functionality that can be used in any distributed environment. And VISION is easier and faster to program than COBOL.

Word processing: FOREWORD®—Our powerful shared-logic word processing system allows text to be entered, stored, edited, distributed and printed.

Graphics—For business graphics, the Graphics Management System (GMS/IV) gives you an easy way to condense and conceptually present data that's easily understood by decision makers.

COBOL—Industry standard COBOL is used to write programs for handling keyboard-entered data and general batch processing.

When they want PC's, you've got them!

If your end-users are like most these days, they're clamoring for their own personal computers. We play that game, too. Because at the flick of a switch, our multifunction terminals suddenly become stand-alone PC's. So now you can give your users the distributed processing capabilities they need, AND the personal computers they want. All in one integrated system.

MFE

The action starts with the Multifunction Executive.

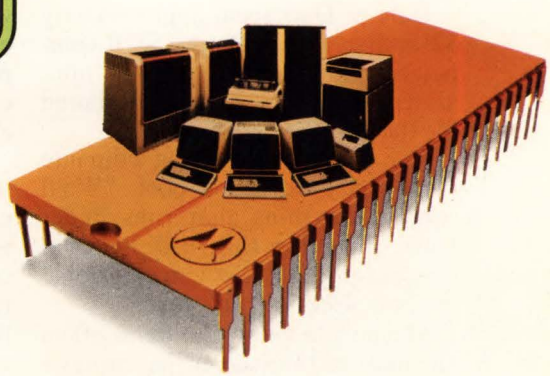
The key to the Series 4000 game plan is the Four-Phase Multifunction Executive (MFE). This unique and powerful control program monitors each multifunction terminal in your system. Its ability to run multiple software programs allows your users to perform 16 different tasks from any terminal on the system. And each of your users can access all of our software packages with one keystroke. You get maximum distributed processing capability and control.

Plus, MFE dynamically allocates selected peripherals so that each device can be used by more than one program. The result—MFE eliminates the need for multiple processors, duplicate terminals and other peripheral devices at installations that require concurrent execution of software.

2,000 winners can't be wrong!

Four-Phase was the first company to introduce the integrated approach to multifunction distributed processing. Today, there are more than 15,000 installed Series 4000 systems, helping people like you manage the information needs of over 150,000 end-users. And every machine is backed by our Customer Support Operation and over 1,000 field service people to provide continuing support and reliability at every level.

Four-Phase customers have been winning the DDP game for years. You can, too. To find out how, call us today at 1-800-528-6050, ext. 1599. In Arizona, call 1-800-352-0458, ext. 1599. For a free poster of this illustration, write to us at 10700 North De Anza Blvd., M/S 52-6A9, Dept. P., Cupertino, CA 95014.



MOTOROLA
Four-Phase Systems

Fault Tolerance

(Continued from page 116)

Office automation is a new venture for CCI, which was originally formed to supply equipment to telephone operating companies for directory-assistance calls. Its automation system, called Officepower, provides integrated software, a Unix-based operating system, and fail-safe computing. The degree of fault tolerance can be determined by the user.

With 190 lawyers and an extensive clerical-support staff, Hale & Dorr is probably Boston's largest law firm. Fault tolerance is one reason the firm's assistant managing partner, James W. Westcott Jr., chose Officepower. "Since we're using the system to produce legal documents, it's essential that it have maximum uptime," says Westcott. "Not being able to retrieve a brief from the system could make or break a case."

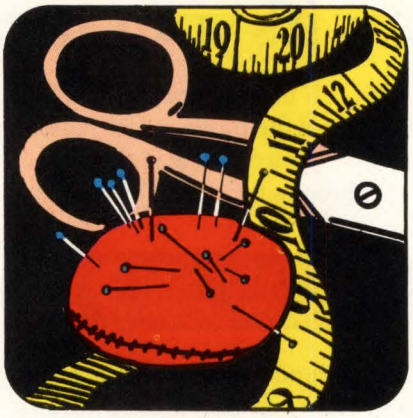
Ease of software conversion can be just as important as software development when you're choosing a system.

The availability of Unix was another factor in Westcott's decision. "We wanted to be under Unix because we knew we'd be making large investments in software and wanted to stay as flexible as possible," he explains.

Hale & Dorr spent approximately $2 million for 25 Power 5/20 computers, 300 terminals, and the integrated Officepower system tailored for the legal profession.

Auragen is also planning a dip into the office-automation pool. "We'll connect anything that runs under Unix, including the IBM Personal Computer with the Unix option," predicts Rick Martin.

Meanwhile, Nestar Systems offers an additional file server that brings a measure of fault tolerance to its Plan series of office systems. (Nestar is a supplier of enhanced IBM PCs linked with an LAN based on Datapoint's Arcnet.) The extra file server, known



as "The Shadow," provides wide-ranging protection from faults as disastrous as a failed disk drive or as commonplace as a kicked-out plug.

Henry Saal, Nestar's chief scientist, sees a market for The Shadow wherever huge volumes of transactions occur. "Transaction-oriented businesses move at high speed for high stakes and can't rely on paper copies to keep track," he says. "If they lose their records of who did what to whom, it could be disastrous."

The software that controls the extra file server will be built into Nestar's networks as a standard feature. The Shadow costs between $10,000 and $25,000, depending on storage capacity.

What about the big guys?

It was relatively simple for Nestar to add a fail-safe feature to its product line, but it's a lot harder for major vendors like IBM and DEC to grab a chunk of the FTS market. Don't expect to see true fault tolerance from either manufacturer at least until the end of the decade, says Serlin.

"Both IBM and DEC have a limited number of options because their commitment to existing architecture is so great," Serlin explains. "They could put fault tolerance deep within the hardware, where it would have a limited impact on the operating system and user software. However, this would require custom microprocessor chips, and they would cancel any price advantage."

DEC is edging into fault tolerance with its VAXcluster system, which allows users to configure a system that will fail predictably. "We are taking an established product—the VAX—and adding fault tolerance to it," says David Chanoux, VAX product manager.

To upgrade an existing VAX 750 or 780, you need two additional components: a CI (high-speed processor connector that supports up to 16 attachments) for $20,000, and an HSC50 (mass-storage device shared by processors) for $32,000. VAX software must be rewritten to take advantage of these high-availability features.

Most VAXclusters are in DEC's traditional engineering and scientific markets, but Chanoux says there are installations in several New York banks.

Honeywell's fault-tolerant offer-

"In the five months we've had our FTS, we've had only 1.5 hours of downtime. I'm ecstatic."

Strada, Florida Interchange Group

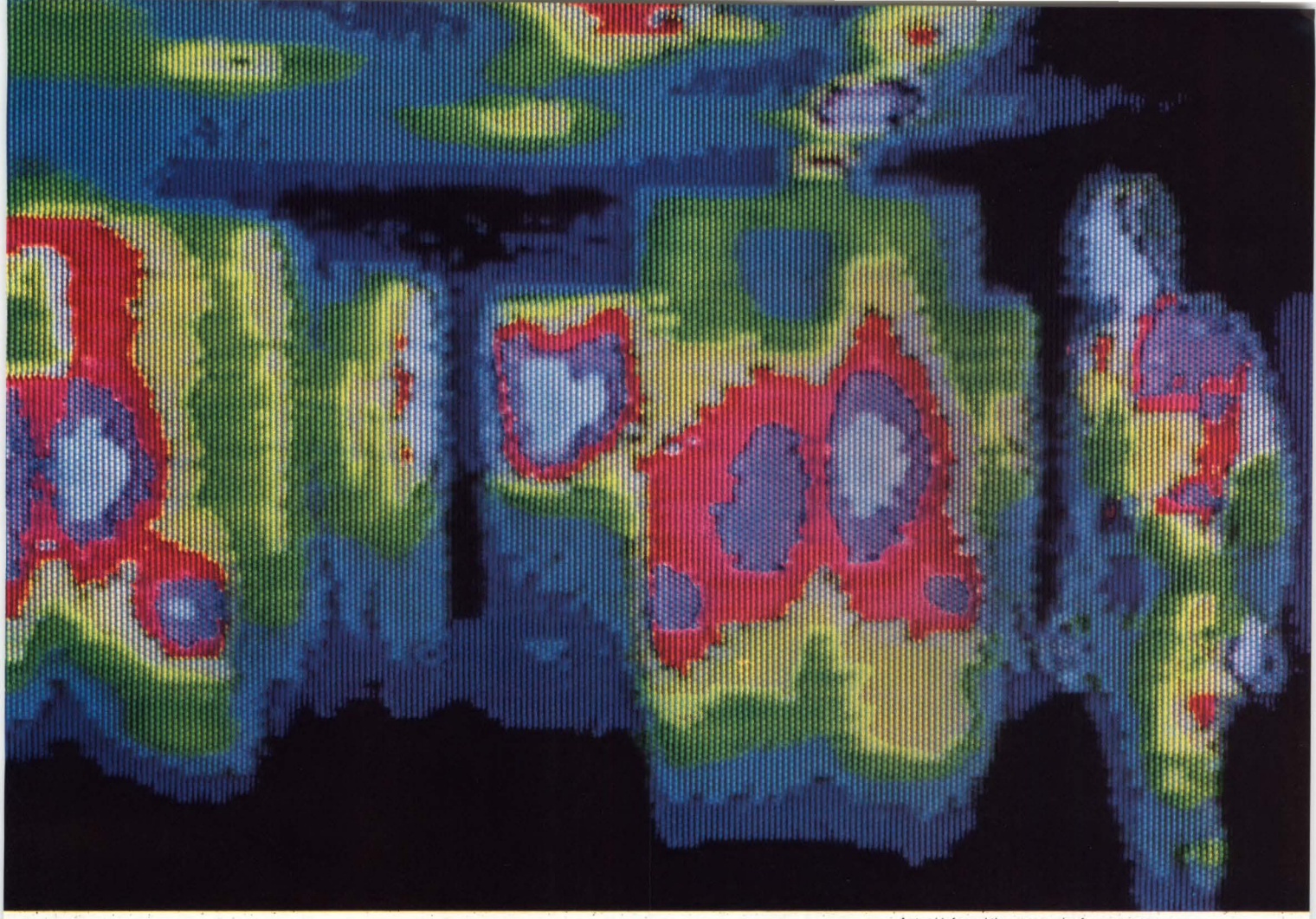
ings consist of multiple processors on its large mainframes, with the ability to add more processors for extra power. Though the systems are hardware fault-tolerant, a failure in the operating system can still cause a crash.

Hewlett-Packard should be introducing a completely fault-tolerant computer in late 1984 or early 1985. "It will be totally compatible with our existing products," claims Andy Sachs, project manager for the Systemsafe/1000, a group of products an end user can configure for high availability. Unlike the Systemsafe, HP's new product will be totally integrated.

A confusing choice

Modular expandability, software development, and office-automation features can all help determine which system will best suit your availability needs. But how do you measure how

(Continued on page 124)



Actual infrared thermograph of a computer room.

The environment only a computer room sees. Give it the protection and savings only EDPAC provides.

Computer rooms depend on a special environment for efficient performance. Without it, the room fails. Independent research concludes that air conditioning problems are one of the most frequent causes of computer center downtime.

EDPAC air conditioning for computer rooms is designed to protect computer hardware from environmental downtime. This modular system electronically monitors the environment and the cooling system itself to maintain strict control of temperature, humidity, air circulation, and air cleanliness. A microprocessor constantly analyzes room and system conditions, commits this information to memory, and prints complete daily reports.

The savings: Typical savings can average $375,000 for a 2,500 sq. ft. computer room over 10 years. The reason: EDPAC systems deliver an optimum environment with less energy consumption.

EDPAC protects the environment the computer room sees, and reduces the cost that *you* see.

SEND FOR YOUR FREE BOOKLET:

"How to keep your uptime UP... and downtime DOWN!"

Learn why special cooling is necessary. Find out how to provide the environment your computer room needs, for less. Just use the reader service card or contact EDPAC direct for this free booklet.

EDPAC®

Specialized environments— our only business.

EDPAC Corporation
200 Welsh Road, P.O. Box 970
Horsham, PA 19044
Phone (215) 657-8030

CIRCLE 52

Managing a Constant Wave of Facts & Figures

That's why over 5,000 companies are running

Requires a Special Touch.

with Software International Financial Applications Software.

Software International has nearly two decades of experience in doing one thing with exceptional expertise: providing on-line, financial applications software for mainframe and mini computers.

We give you the special touch you need to anticipate and manage an increasing flow of numbers with accuracy and ease. When financial and accounting professionals want to run with confidence, they run with Software International.

Software International® software packages include:

- General Ledger and Financial Reporting
- Accounts Payable
- Payroll and Human Resource Management
- Accounts Receivable
- Fixed Assets Management
- Forecasting, Modeling and Reporting
- Micro-Mainframe Smart Link™ and Query.

Call or write:
Software International
One Tech Drive
Andover, MA 01810
1-800-343-4133
In Massachusetts call **1-800-322-0491**.

Software International is a wholly-owned subsidiary of General Electric Software Products Company.

SOFTWARE INTERNATIONAL

Run With Us

CIRCLE 71

Fault Tolerance

(Continued from page 120)

a particular vendor's equipment actually performs?

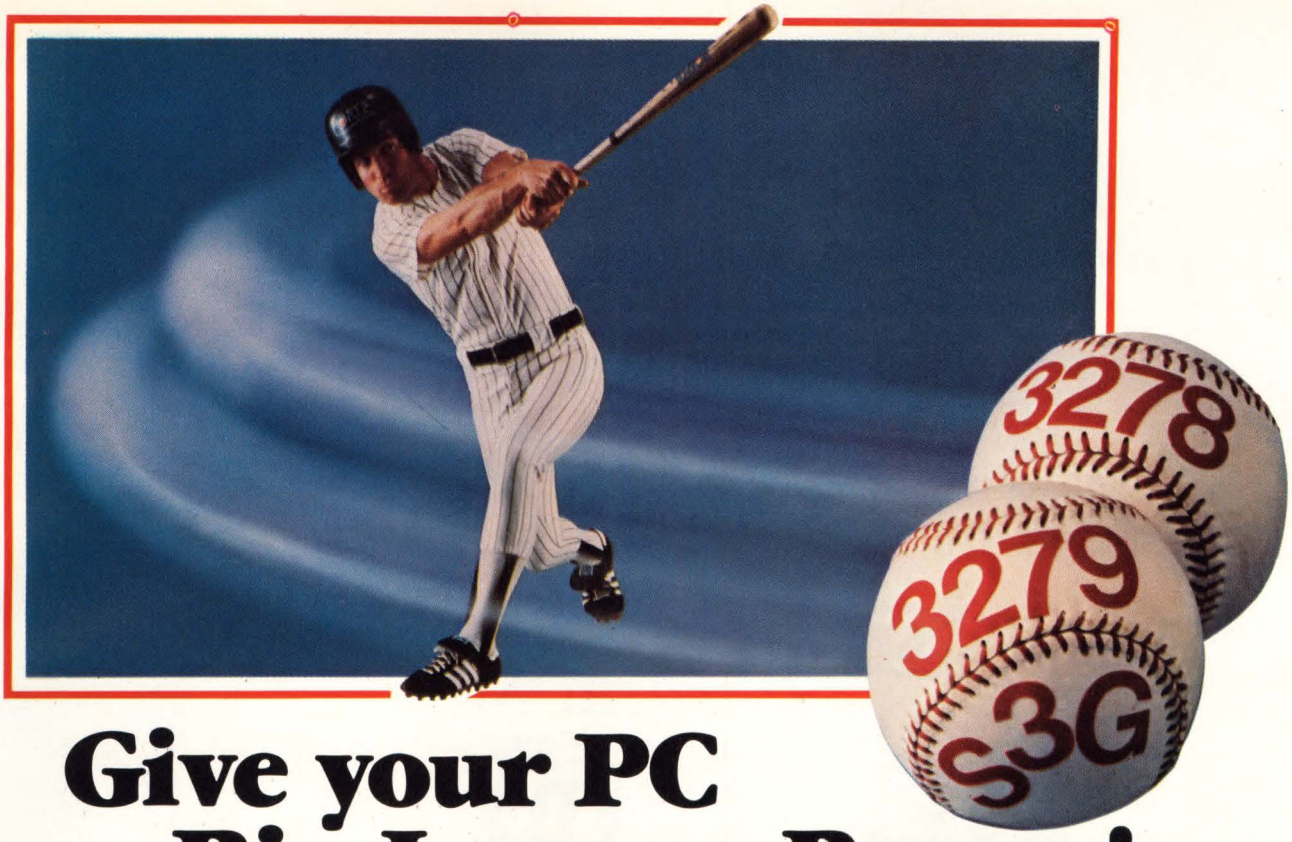
"Transactions per second, per processor," says Serlin. "But every vendor defines this characteristic differently. Demand a detailed explanation of what it means to each supplier, and then compare," he urges.

The ideal architectural structure will protect both the database management system and the end user from the impact of one or more failures of the subsystems. The degree to which an FTS does this depends on coverage (the kinds of faults from which a system can recover) and depth (how many faults the system can sustain and still keep running).

Equipped with expanded, often customized, capabilities, fault-tolerant systems are a cost-effective solution for staying on the leading edge—whether or not your business depends on online processing. □

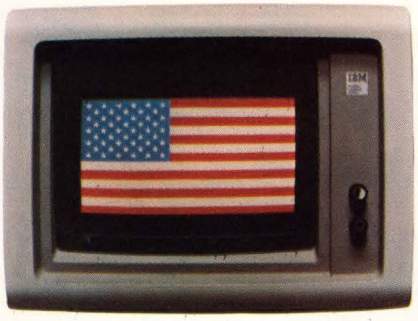
Suppliers of fault-tolerant systems

Vendor	Comments on offerings	Circle
AT&T Tech. (312) 260-4000	3B20-D supermini for reservation systems, command and control systems, and online banking systems.	539
Auragen Syst. (201) 461-3400	System 4000 is based on the 68000 microprocessor with enhanced Unix-based operating system; sold direct and through systems houses.	540
BTI Computer Syst. (408) 733-1122	Fail-soft architecture restarts system in seconds after removal of faulty module.	541
Computer Consoles (703) 471-6860	Office-power OA system with enhanced Unix-based operating system.	542
Data Systems for Industry (213) 493-4541	Mirror software provides a migration path for applications of Image/3000 (Hewlett-Packard) to fault-tolerant multiprocessor environment.	559
Digital Equipment (617) 897-5111	Clustered VAX minis provide high reliability.	543
Formation (609) 234-5020	Fail-soft system that uses IBM 370 software.	544
Hewlett-Packard (Contact local sales office)	A totally fault-tolerant system that's compatible with existing products; will be available late 1984 or early 1985.	545
IBM (Contact local sales office)	Software that enables Series/1 minis to be coupled in a high-availability mode.	546
Infinet (617) 681-0600	Systems that provide fault-tolerant operation of private data-communication networks.	547
IPL Syst. (617) 890-6620	Model 4480 compatible with IBM software.	548
Nestar Syst. (415) 493-2223	"The Shadow" option gives high reliability to the Plan series of LANs.	549
No Halt Computers (516) 420-9740	Redundant microcomputer business system sold through systems houses.	550
Parallel Computers (408) 429-1338	Low-cost system, based on 68000 microprocessor, being shipped to systems integrators.	551
Sequoia Syst. (617) 481-9520	A 68000-based system with Unix-based operating system.	552
Stratus Computer (617) 653-1466	Systems based on 68000 and SOS, an OA integrator that can link IBM PCs. Super high-powered EA processor, introduced last year. (Stratus is No. 2 in the market.)	553
Synapse Computer (408) 946-3191	68000-based transaction-oriented systems.	554
Syntrex (201) 542-1500	Small systems for offices.	555
Tandem Computers (408) 725-6000	Super high-powered TXP processors, introduced last year. (Tandem is the leader in the market and is likely to remain so.)	556
Teradata (213) 827-8777	Database management system that works with IBM mainframes running MVS operating systems.	557
Tolerant Transaction Syst. (408) 946-5667	System based on National 16000 with enhanced Unix-based operating system; sold through systems houses.	558



Give your PC Big League Power!

with Major League Graphics



With the Forte-PJ™ 3278/79 Emulator/Adapter Board, your IBM PC™ or compatible system bats 1000 from both sides of the plate. You gain the speed and power of a coaxial cable-connected IBM 3278 display terminal while retaining all the functions of the Personal Computer. A single keyboard command moves you back and forth between DOS and terminal mode.

If your business game plan calls for color graphics, add the Forte-GRAPH™ 3279/SG3 Color Graphics Emulator/Adapter Option Board and unleash IBM's arsenal of S3G Programmed Symbols software (including GDDM™ and SAS/GRAPH™). You'll have bar and pie charts, histograms and conceptual drawings at your finger tips, not to mention foreign language fonts, scientific notation and even your own custom-designed characters.

Whether you're working in color or monochrome, you can use PC spreadsheet programs and other packaged software to work with current data from your IBM host. Forte's automatic file transfer utility allows you to send, receive and store host files without ever leaving terminal emulation mode.

Forte provides all the hardware and software you need to emulate any full-function 3278 or 3279 terminal. Installation is a snap: no host hardware or software modifications are necessary and only one slot is required.

HOTLINE (800) 233-3278

If you're ready to play mainframe ball with your PC, you're ready for Forte.

FORTE

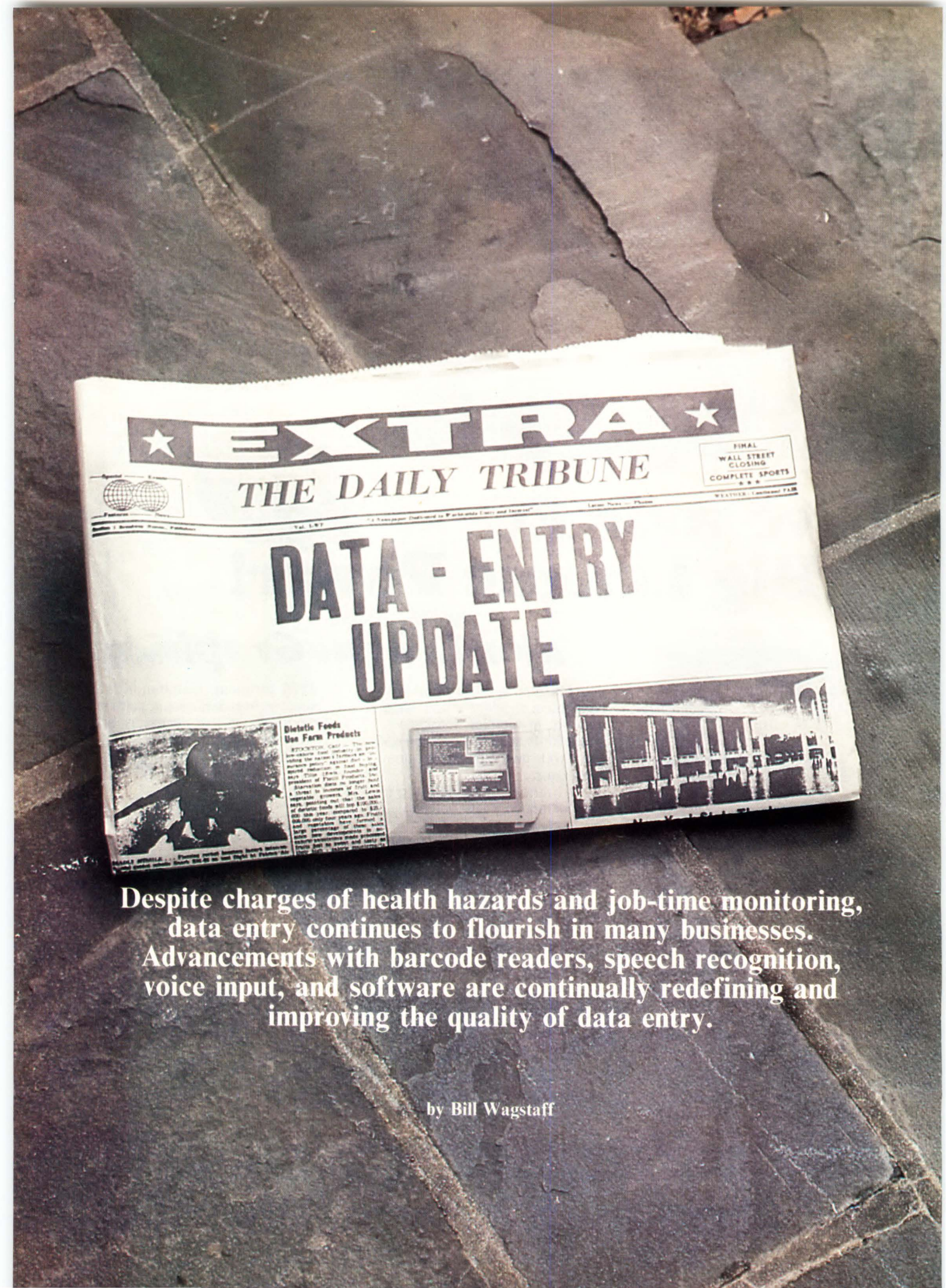
Forte Data Systems, Inc.

1500 Norman Avenue • Santa Clara, CA 95050 • (408) 980-1750

Your Micro-to-Mainframe Connection

*Forte and all associated product names are trademarks of Forte Data Systems, Inc.
*IBM, IBM Personal Computer and IBM PC-XT are trademarks of IBM Corporation.
*GDDM is a registered trademark of IBM Corp.
*SAS/GRAPH is a registered trademark of SAS

CIRCLE 54



Despite charges of health hazards and job-time monitoring, data entry continues to flourish in many businesses. Advancements with barcode readers, speech recognition, voice input, and software are continually redefining and improving the quality of data entry.

by Bill Wagstaff

It's no secret that data entry is a tedious and time-consuming process, using large amounts of both labor and hardware. Maintaining a motivated data-entry department is an especially challenging job for managers, given the fact that the work is usually routine, clerical, fast-paced, and not very high-paying.

However unpleasant the task might be—accurate, efficient, timely data entry is the food upon which your business feeds. Ripples in the smooth flow of data can carry repercussions from the very roots of your system right on up to the executive suite.

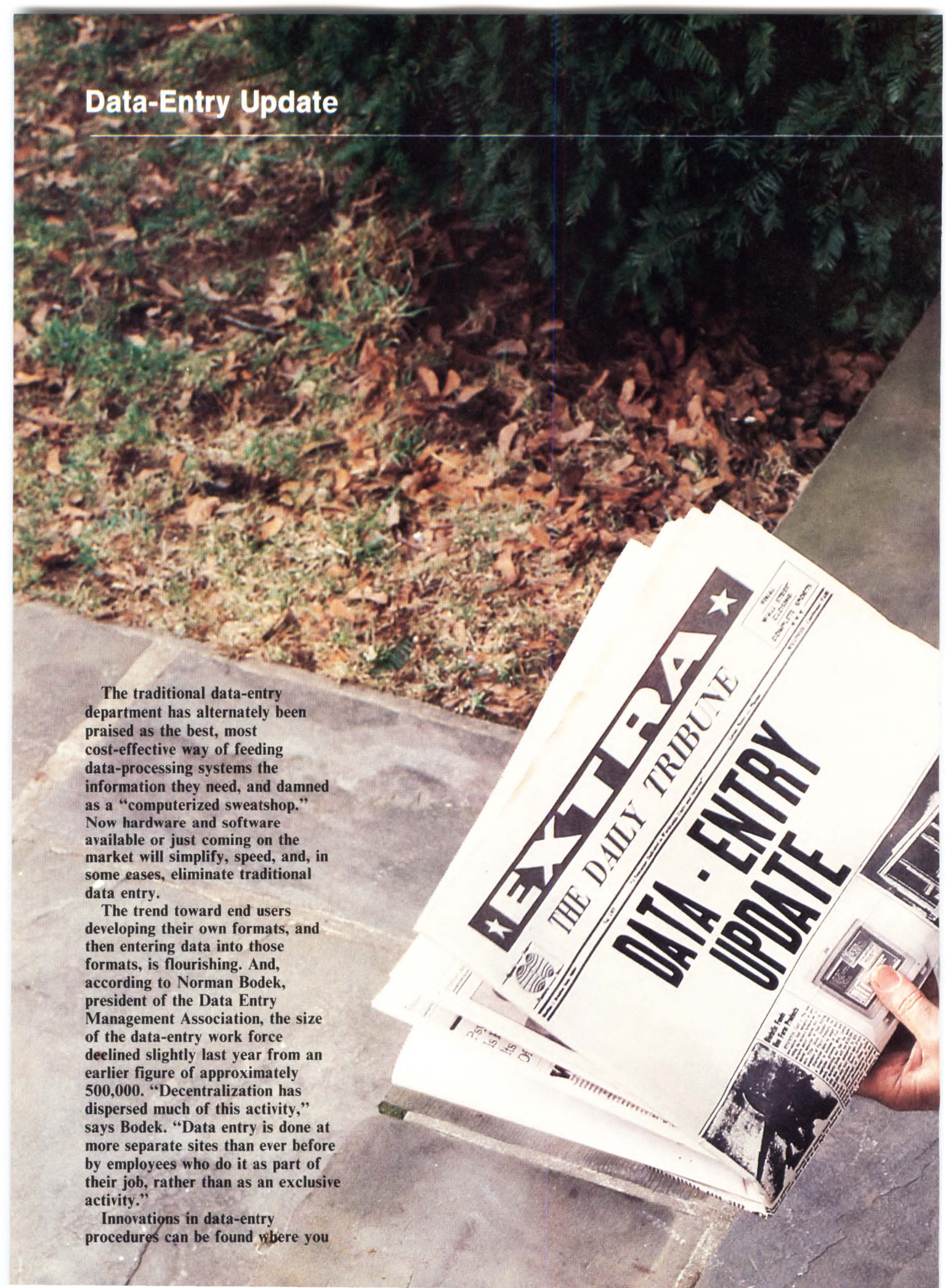
The challenges of data entry reflect challenges contemporary technology poses throughout the business world. Advanced technology has solved old problems only to create new ones. Computerized data entry has replaced legions of rote-work clericals with armies of keyboard operators. These operators work at a pace that can burn out even the hardiest, if not carefully monitored.

In an effort to eliminate problems caused by traditional data entry, alternative user-based methods were created. While the market for these methods continues to expand by large leaps and bounds, the traditional data-entry department is as strong as ever and appears to be here to stay. In response, many data-entry workers are organizing to press for improvements in labor practices and policies, as well as the basic safety of the video display terminal (VDT) work area.

The past year has seen anything but a cooling down of labor unrest among data-entry workers. In the past, complaints centered on unequal pay scales, substandard working conditions, and increasingly high productivity requirements. Now those grievances have been supplanted by charges of health threats from VDTs.

Photos by Rick Barrick

Data-Entry Update



The traditional data-entry department has alternately been praised as the best, most cost-effective way of feeding data-processing systems the information they need, and damned as a "computerized sweatshop." Now hardware and software available or just coming on the market will simplify, speed, and, in some cases, eliminate traditional data entry.

The trend toward end users developing their own formats, and then entering data into those formats, is flourishing. And, according to Norman Bodek, president of the Data Entry Management Association, the size of the data-entry work force declined slightly last year from an earlier figure of approximately 500,000. "Decentralization has dispersed much of this activity," says Bodek. "Data entry is done at more separate sites than ever before by employees who do it as part of their job, rather than as an exclusive activity."

Innovations in data-entry procedures can be found where you

Data-Entry Update

(Continued from page 129)

would least expect them. One of the oldest computerized data-entry tools is the optical character reader. The Smart Scanner from Westinghouse Information Services, a division of Westinghouse Learning Corp., Iowa City, IA, can read up to 170 sheets per minute, scanning both sides simultaneously, while covering as many as 7,000 response positions. To reduce errors, the Smart Scanner reads a given pencil mark up to 90 times, comparing it against 16 density values before deciding on the mark's meaning.

While systems such as the Smart Scanner are designed to feed large mainframes, many small operations want the convenience of optical character recognition (OCR) for their desk-top microcomputers. One answer is the OMR-2000 card reader from Chatsworth Data Systems. Using a card comparable in size to punched cards, the OMR-2000 enters data directly into Apple personal computers.

Sales of speech-synthesis and voice-recognition systems amounted to just $65 million in 1982. According to a study conducted by the Diebold Group Inc., industry observers predict 1990 sales of voice-recognition systems alone will hit $1.05 billion. The study forecasts a ninefold increase in speech-recognition system sales between 1985 and 1990.

Diebold researchers predict the consumer market will command the lion's share of this business by 1990 followed by military buyers and commercial customers. According to the New York-based firm's analysis of current technology, the market should see products by next year that will combine voice synthesis with recognition and natural-language programming. The result could be an artificially intelligent phone-answering machine capable of engaging callers in simple conversations and delivering specific messages to specific callers. Such a system could be used for order entry.

"Not even eight order-takers with computer terminals can match the speed and efficiency of the VCT

Series 2000's order-processing system," says Arthur Rodbell, VCT vice president for marketing and sales.

Systems now available are not far from the Diebold Group's prediction. Achievements in the speech-recognition capabilities of commercially available equipment have resulted in an impressive performance record. To date, such systems are useful in applications where operation of a computer keyboard could be troublesome or when personnel lack adequate training in computer operations.

New on the voice-input scene is the VCT Corp.'s VCT Series 2000, an online order-entry system with added useful functions. The Series 2000 handles transactions through any Touch-Tone telephone, responding to orders from a variety of voices. Data such as product codes and order numbers are entered, using the keys of the Touch-Tone system. Analog, hand-held "Order-Matic" terminals can also be accommodated by the system, allowing salespeople to store a day's worth of orders and then feed them through a modem into the remote Series 2000 when convenient.

> "However unpleasant the task might be, accurate, timely data entry is the food upon which your business feeds."

Designed to interface with a corporation's host computer and order-entry software, the Series 2000 verifies each order by repeating the order number and product description to the caller. Sales personnel can be brought online with a minimum of training through the Series 2000's teaching capability. "The first few times the system is used, the computer's voice guides callers through the process with step-by-step instructions on how to enter an order through the phone," says Rodbell. "Later they can bypass the prompts and just place the orders."

Up to four hours of inventory descriptions and customer names can be stored in the system. The Series 2000 can also serve as a bulletin board, storing information on price specials or management directives dictated into the system, then repeating the announcements to callers.

Voice-mail option

With an eye on the future, VCT is currently working on software to supplement the Series 2000's ordering capability. One software package will serve as a voice store-and-forward feature, accepting a message dictated by one caller and forwarding it to one or more callers. The system will then stand ready to accept responses to the outgoing message. The result will be a combination of voice mail and order entry, all on the same system. (See "Voice mail: Is anybody listening?")

The Pelorus 2000 from Pelorus Inc. offers a comparable performance. Using a standard Touch-Tone telephone keypad, users can enter data such as customer numbers and product codes. A built-in modem allows access from terminals or personal computers. The Pelorus 2000 can recognize a set of command words, permitting programming and control through a series of simple expressions such as dial, speak, and answer.

Teltone Corp.'s Teleport 300 is another interface device allowing data entry through Touch-Tone keypads. It is an intelligent modem, combined with a dual-tone multi-frequency-to-ASCII converter, and compatible with the Bell 103J. The user-programmable $400 device is capable of transmission speeds ranging from 75 baud to 9,600 baud. A software-security function allows the Teleport 300 to respond to preselected dual-

Your graphics problems are over, because your endless piles of printouts have been crumpled by the D-PICT family of integrated graphics software solutions! Now you can turn mountains of data into stunning graphic presentations, quickly and easily.

D-PICT is a powerful, integrated graphics system, featuring several modules to produce dozens of graph types, colors, patterns, line weights and lettering styles. In short, D-PICT puts a virtually unlimited palette of graphic possibilities right at your fingertips.

And D-PICT is so easy to use... even for people who've never used a computer terminal before. The system features simple "plain English" menus, with on-screen help to guide you through every step of the way.

D-PICT/B (Business Graphics System) gives the beginner even more help by providing a built-in graph library (D-PICT/AutoGraph) with predesigned graphic formats, so you can create high quality business charts and graphs, using your data, with just a few keystrokes!

But D-PICT doesn't stop with business graphs. There's much more... D-PICT/Layout quickly creates word charts, forms and diagrams. D-PICT/Mesh displays data in 3-D. D-PICT/Contour creates high quality contour maps. D-PICT/Meta combines graphic elements into a single display. And D-PICT/VGL provides a library of over 300 2-D and 3-D routines, enabling a programmer to create sophisticated graphic applications.

D-PICT graphics software is available for a variety of computers, including IBM, DEC and Prime, and can produce graphic displays on over 100 different types of output devices!

So no matter how far your graphics needs progress, D-PICT provides a solution. Call or write today for complete information.

D-PICT™

DataPlotting Services Inc.
225 Duncan Mill Road, Don Mills
Ontario, Canada M3B 3K9
(416) 441-4163/Telex 069-86540

Call toll free 1-800-268-7878

OEM inquiries invited.

Representatives in: **USA** Framington, MA., Orlando, FL., Springfield, VA., Chagrin Falls, OH., Northbrook, IL., Mission Viejo, CA.
CANADA Vancouver, B.C., Dartmouth, N.S. **AROUND THE WORLD** Sydney (Australia), Tampere (Finland), Cheshire (England)

CIRCLE 55

Data-Entry Update

(Continued from page 130)

tone multi-frequency signals—barring unauthorized callers from computer access.

Interfacing with the IBM 327X or other compatible systems, the VS1000 from Sphere Technology Inc. allows voice data entry and local screen formatting. Due to the VS1000's transparency, there is no need for program changes in the host computer.

According to Sphere Technology, the VS1000 features a 300-word vocabulary per local user screen with better than 99 percent accuracy for spoken-digit entry. Each host screen can be transformed into as many as eight local-user screens. The VS1000 communicates to 3247/6 controllers, allowing use of 3278/9, 3178, IBM Personal Computer, or DEC VT100 displays. The unit price is $7,500.

One of the most advanced voice data-entry systems available is Verbex' Model 3000 Spads terminal. It's a user-friendly input/output computer peripheral that integrates continuous-speech voice data entry while allowing users to custom-make con-

(Continued on page 136)

Are crts harmful?

In spite of many official studies indicating that emissions from cathode-ray tubes in visual displays are harmless, many who work long hours in front of them each day remain unconvinced.

Much concern was generated by publicity regarding VDT workers at United Airlines' San Francisco telephone-reservations office when pregnant VDT operators reported a 50 percent adverse-pregnancy-outcome rate.

UA employees have filed a Health Hazard Evaluation request with the National Institute for Occupational Safety and Health (NIOSH) calling for NIOSH epidemiologists to conduct a thorough, on-site study of VDTs. Researchers are the first to admit that such studies suffer from a lack of fundamental baseline data. "We have no way of knowing if these abnormal-pregnancy clusters which were reported in several areas of the country are coincidental," says one NIOSH researcher. "We don't know what the normal rate of pregnancy problems is among working women."

Environmental hazards not directly associated with VDTs—such as stress, possible contaminants in building materials, or factors as yet unknown—could be responsible, researchers concede.

"The whole issue is enormously complicated," says Janice Blood, spokeswoman for District 925, Service Employees International Union. The union has been calling for investigations of possible VDT health hazards. "We've tracked down eight confirmed adverse-pregnancy clusters at VDT worksites throughout the country," says Blood. "Epidemiologists have looked at these and called them legitimate, but they can't find what's causing them. So far they've looked at everything but VDTs."

As part of an effort to gather basic information in from the field, District 925 initiated a national hotline telephone number, asking VDT operators to report any health complaints they felt were work-related. In the six months following May 1983, the 925 hotline received over 6,000 calls. While the vast majority of calls were from VDT operators, 925 reported that more than 15 percent were from supervisors and employers.

Callers were sent a questionnaire asking them to describe their work experience with VDTs, as well as overall work conditions and any related health problems. Nearly 1,000 questionnaires were returned. Over 20 percent of these were from professionals, mainly supervisors and management. The top three health complaints were—in order—muscle pain, eyestrain, and exhaustion.

Eighty-three percent of the questionnaire respondents reported that aside from lunch and coffee breaks, there were no scheduled rest breaks. A controversial NIOSH recommendation has called for 15 minute rest breaks every two hours under moderate workloads and every hour for intense workloads.

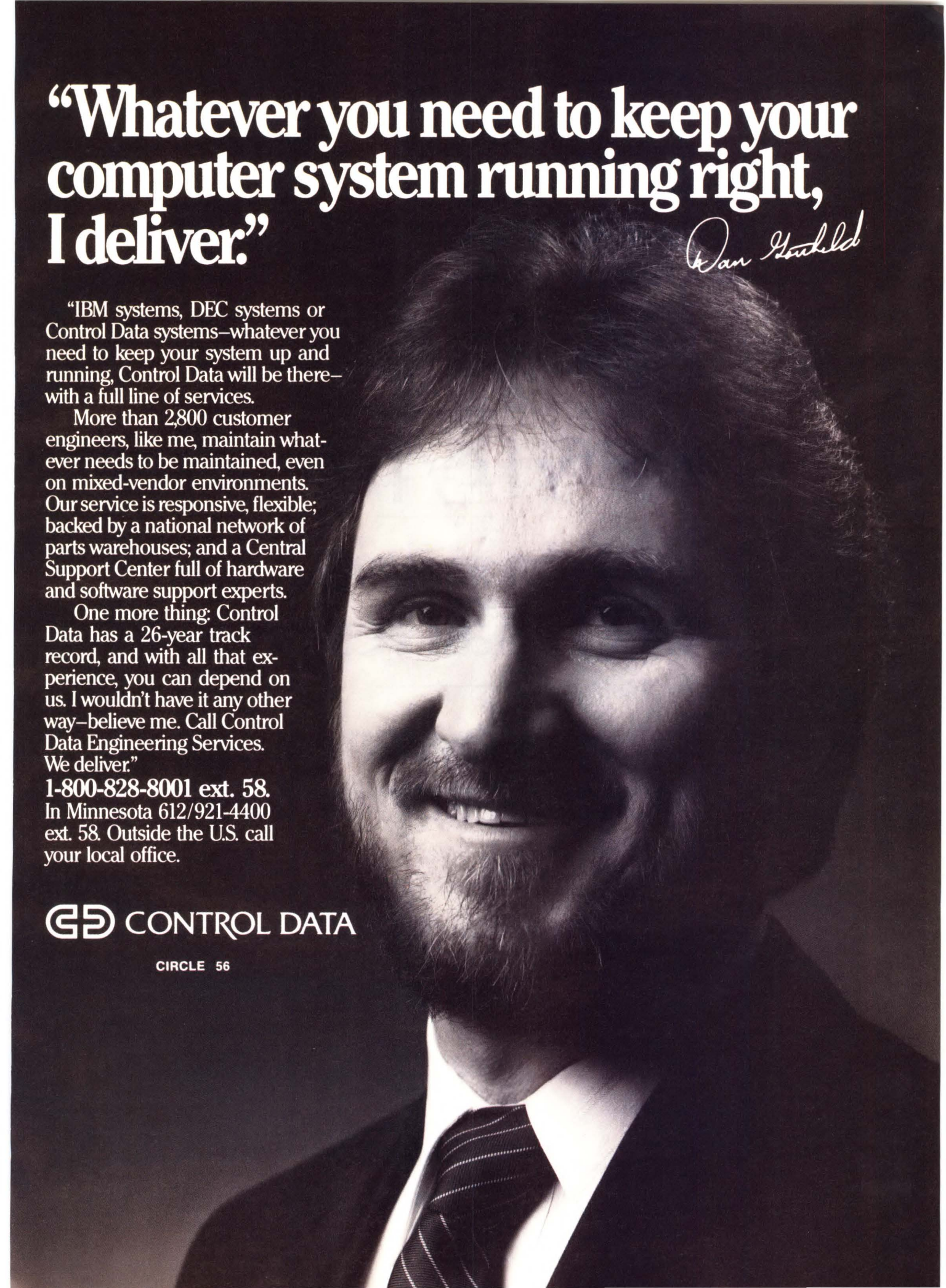
According to District 925 figures, a contributing factor to job stress is the practice of using the computer to measure or monitor work output. Thirty-five percent of the respondents reported that their work was monitored by computer, while 28 percent were required to meet a daily quota.

Legislation affecting the VDT workplace has been introduced in Connecticut, California, Maine, Massachusetts, Ohio, and Oregon. Some of these bills authorize funding for further research into possible health hazards. One such bill, introduced February 15 by California State Assemblyman Tom Hayden, attempts to set VDT work standards. Like a number of other bills under consideration, the Hayden bill calls for pregnant workers to be given a choice when it comes to working in front of a VDT.

"Building better terminals is part of the answer," says District 925 director Karen Nussbaum. "It looks like shielding against low-level radiation given off by VDTs is one of the solutions. What's needed now is more research. Part of the problem has been bias on the part of the federal government."

"I don't see the VDT as an issue," says Norman Bodek, president of the Data Entry Management's Association. "There's no evidence that working in front of one is detrimental. They're not much different from conventional television sets."

"Whatever you need to keep your computer system running right, I deliver."



"IBM systems, DEC systems or Control Data systems–whatever you need to keep your system up and running, Control Data will be there–with a full line of services.

More than 2,800 customer engineers, like me, maintain whatever needs to be maintained, even on mixed-vendor environments. Our service is responsive, flexible; backed by a national network of parts warehouses; and a Central Support Center full of hardware and software support experts.

One more thing: Control Data has a 26-year track record, and with all that experience, you can depend on us. I wouldn't have it any other way–believe me. Call Control Data Engineering Services. We deliver."

1-800-828-8001 ext. 58.
In Minnesota 612/921-4400 ext. 58. Outside the U.S. call your local office.

CONTROL DATA

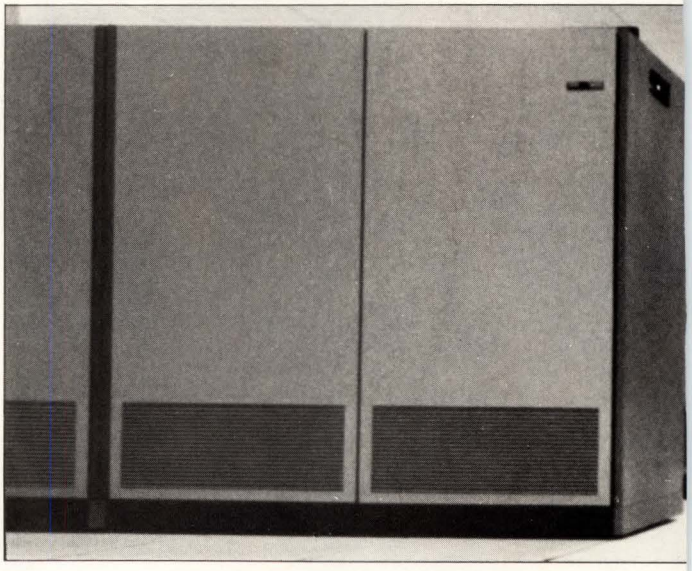
CIRCLE 56

Here's how you can:

Identify key prospects

Improve direct mail response

Lower your cost per sale



Take Advantage of Mailing Lists from Hayden

Hayden Direct Marketing Services offers you the most specialized, high quality, flexible lists you can buy in the computer industry—and they are proven responsive!

Now You Can Target Prospects By Manufacturer/Model# On Site

For a little more than 1¢ per name, you can have the option of selecting individual labels by manufacturer and model number. Zero in on only those you want to reach. For example . . . select labels for managers with IBM & Plug Compatibles such as . . .
IBM 3081/303X/4341/4331 • Amdahl 580/470
Or . . . with medium/large mainframes like these . . .
DEC VAX/10/20 series • H-P 3000 • Data General C/350-M/600/MV 8000
And these minicomputers . . . Data General Eclipse/Nova • DEC PDP 8/11 • H-P 250/300/1000 • IBM series 1/3/7/32/34/38
Or micro/personal computers like . . .
Apple II/III • Commodore • Radio Shack
PLUS . . . dozens of others.

Give Your Direct Mail High Impact At Low Cost

Hayden gives you 100% management lists from Computer Decisions subscribers. That means you reach the industry's prime decision makers . . . and the base cost is an amazingly low $55.00/M.

Select These Options Tailored To Your Needs

Job title/function	$5/M
Business/industry	$5/M
5-digit zip, SCF, or state	$5/M
Manufacturer/model number	$20/M
4-up Cheshire labels	no extra charge
Pressure-sensitive labels	$8/M
Total list	160,000 managers
Minimum order	$225.00

HAYDEN DIRECT MARKETING SERVICES

You can test these lists for as little as $225.00. All you have to do is call Hayden Direct Marketing today at (201) 393-6384 or fill out coupon. We'll tell you how you can

Zero in

on your best prospects.

Name _____ Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____

CD-5

Mail today to:
Hayden Direct Marketing Services
10 Mulholland Drive
Hasbrouck Heights, N.J. 07604

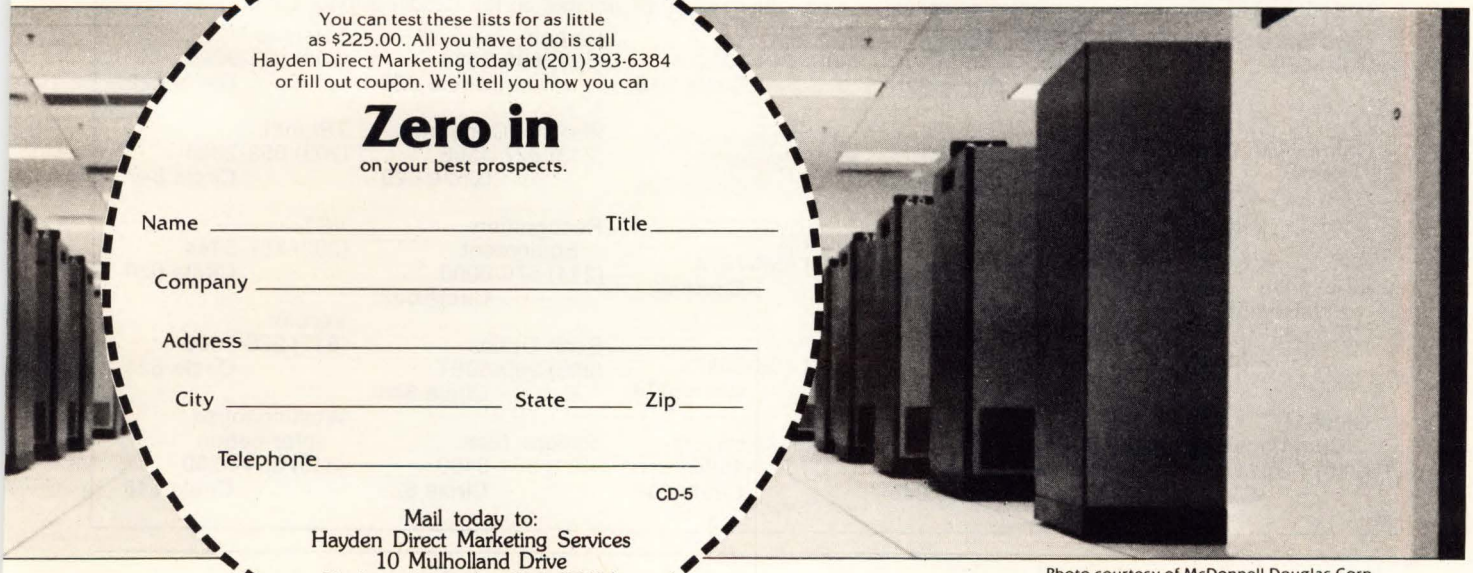


Photo courtesy of McDonnell Douglas Corp.

Data-Entry Update

(Continued from page 132)

tinuous voice data-entry applications. Application-specific vocabularies can contain up to 120 words. The Spads terminal also includes a digitized voice-response capability to verify data entry by repeating operator input in a natural-sounding voice.

When operated as a data-entry workstation, the Spads terminal performs as a speaker-dependent voice data-entry system, permitting data and command entry in a naturally spoken stream of words, numbers, or phrases without artificial pauses. Verbex claims its terminal operates with a 99 percent recognition accuracy, and can accommodate the various accents, dialects, and inflections in a user's voice.

Much like a faithful pet dog, most speech-entry systems will only respond to the user's voice they have been "trained" to respond to. The systems operate on a proven speaker-dependent voice algorithm, which recognizes the voice patterns of each user. With the Spads system, establishment of the user's voice pattern takes approximately three hours. Spoken data are digitized and compared with the speaker's stored word patterns.

While the barcode is not a new method of inputting data, it has become one of the most adaptable methods. The latest barcode readers are more reliable and much more portable than ever before. New hardware and software have eased the flow of barcode-derived data into the mainstream of corporate data flow.

Percon's new E-Z Reader is an inexpensive, hand-held barcode scanner selling for $395 and interfacing with two popular barcodes (39 and interleaved 205). The heart of the Percon system is a Hewlett-Packard digital wand. "Most customers wanted to read dot-matrix or medium-density labels and have operator feedback," says David Whitehill, head of the Percon design team. "Our basic reader was optimized for that. We chose to provide the Hewlett-Packard digital wand with our unit because it can read a wide variety of typical barcode densities, and it's rugged and reliable."

A beeper in the supporting hardware signifies a good read. Operator feedback is transmitted through a pair of light emitting diode (LED) host-controlled status indicators plus a low-frequency tone.

The Eugene, OR-based manufacturer expects the E-Z Reader to gain acceptance as an adjunct to some keyboard data entry. "In some key applications, such as work-in-progress tracking, inventory control, and rental management, E-Z Reader would be the primary data-entry device," says Whitehill.

Going one step further, Recognition Equipment Inc. is marketing an OCR wand barcode reader capable of reading both human-readable OCR fonts and barcodes while converting both into computer-compatible data. "The user can now have the best of both worlds for item marking and data capture using this combination of OCR and barcode marking," says Bob Drew, REI's OCR wand-division general manager.

Once you have entered the data from the barcode, the next question is what to do with it. Icot Corp. has developed the Icot Virtual Terminal System (VTS), a line of protocol converters that allow users to interface asynchronous ASCII barcode readers and printers (such as the Internec 9341) to standard IBM 3270 network and applications software. Icot's 35X and 36X terminal control-

For more information . . .

For additional information, contact the vendors or circle the appropriate number on the Reader-Service Card.

BMS Data Handling
(714) 359-8820
Circle 635

Chatsworth Data Syst.
(213) 341-9200
Circle 619

Innovative Electronics
(305) 624-1664
Circle 842

Gilbert/ Commonwealth
(215) 775-2600
Circle 631

Hewlett-Packard
(408) 257-7000
Circle 625

H & M Software
(201) 599-9111
Circle 630

ICOT
(415) 964-4635
Circle 628

Inforex
(617) 272-6470
Circle 632

Four-Phase Syst.
(408) 255-0900
Circle 845

Intermec
(206) 743-7036
Circle 636

Int'l. Software Tech.
(608) 328-8870
Circle 634

Pelores
(301) 557-7274
Circle 621

Pencept
(617) 893-6390
Circle 633

Pentek Products
(717) 724-1588
Circle 637

Percon
(503) 688-3374
Circle 626

Phoenix Computer
(213) 827-4500
Circle 629

Recognition Equipment
(214) 579-6000
Circle 627

Scan Optics
(203) 289-6001
Circle 846

Sphere Tech.
(401) 861-9400
Circle 623

Teletone
(206) 827-9626
Circle 622

TSI Int'l.
(203) 853-2884
Circle 847

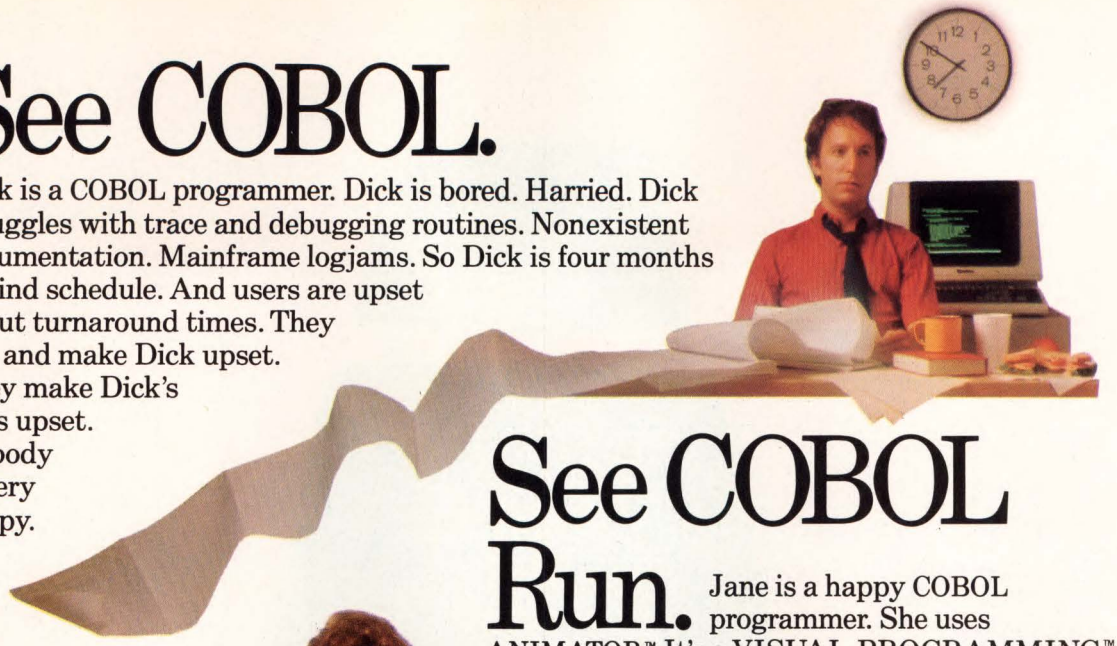
VCT
(202) 887-5144
Circle 620

Verbex
(617) 275-7000
Circle 624

Westinghouse Information
(319) 354-9200
Circle 618

See COBOL.

Dick is a COBOL programmer. Dick is bored. Harried. Dick struggles with trace and debugging routines. Nonexistent documentation. Mainframe logjams. So Dick is four months behind schedule. And users are upset about turnaround times. They yell and make Dick upset. They make Dick's boss upset. Nobody is very happy.



See COBOL Run.

Jane is a happy COBOL programmer. She uses ANIMATOR.™ It's a VISUAL PROGRAMMING™ aid for MICRO FOCUS™ LEVEL II COBOL.™ It runs on a micro. It makes child's play of mainframe test and maintenance chores.

With ANIMATOR Jane sees a picture of the program explaining itself. In live action. In real time. In COBOL source code. ANIMATOR tracks the program's exact execution path. Including subroutine branches.

Jane can have the program run fast. Or slow. Or stop. With one key. This makes it easy to spot problems. Insert fixes. Set breakpoints. Instantly.

Jane's programs sometimes win awards. Yet she always meets schedules. Jane's boss likes this about Jane. Because he doesn't like users to yell at him.

Run, COBOL, Run.

This DP manager got a bonus. Because he doubled productivity. Cleared backlogs. Cut costs. Boosted morale. Produced terrific applications. Quickly. Put control and prestige back into the central DP function. And nobody yells at him anymore. All thanks to ANIMATOR.

See ANIMATOR now.

Let Micro Focus put your DP shop on the fast track.

ANIMATOR runs with MICRO FOCUS LEVEL II COBOL for compatibility with ANSI '74 High Level COBOL implementations. A mainframe-micro communications link is recommended for downloading mainframe programs.

Write for more information.
Or call (415) 856-4161. Right now.

MICRO FOCUS™

2465 East Bayshore Rd., Suite 400, Palo Alto, CA 94303
I'd like more information CD 5/84

Name_____ Title_____
Company_____ Phone_____
Address_____
City_____ State____ Zip_____

Systems and Solutions

"Take the driver's seat."

NETCON® provides complete central network control.

Now you can take total control of your data communications network from a central site to gain maximum uptime. Our NETCON 6 is the only network management system providing non-interfering control of all your datacomm resources . . . not just analog modem networks but multiplexing systems, digital local area plus distributed and digital (DDS) networks as well . . . from 1200 bps to 1.544 Mbps.

Tie your network together. While NETCON 6 will tie your complete network together, it won't tie you down. Our hardware and software building block concept gives you ultimate flexibility in planning and integration. And NETCON's fully compatible features provide end-to-end surveillance, test and restoral at all points of your network, regardless of existing architecture.

Let NETCON 6 put you in the driver's seat. No other network management system offers the total support demanded by today's divested communications environment.

Send for free detailed literature.

General dataComm

Data-Entry Update

(Continued from page 136)

lers permit compatibility with IBM Binary Synchronous and SNA/SDLC networks.

Icot's terminal controller can accommodate up to 16 readers or printers. Several controllers can be multi-drop connected to a single host front-end port, conserving host ports while optimizing line utilization.

The VTS can also support the RS-422 interface standard used by many barcode devices for communication over four-wire facilities at a distance of up to 4,000 feet, obviating the need for modems and multiplexers. The VTX protocol converters can interface asynchronous ASCII terminals and personal computers with IBM-compatible host computers.

Let's not forget software

It's important to remember that data entry is not composed solely of hardware and entry operators. The overall success of the data-entry process also depends upon the quality and capability of software supporting the data-entry operation. Today, new software is giving end users more control over how data are presented, processed, and used.

Phoenix Computer Corp.'s Falcon is an ambitious online data-entry system allowing operators and management a large measure of freedom in formatting, entry, job accounting, and file maintenance. Falcon can operate as a stand-alone or as a task under Consumer Information Control System (CICS) and other monitors. It supports both DOS and OS operating systems and automatically converts Video/370 formats.

Falcon's major strength is that is allows end users to create their own formats. By working through the system's format generator, users can create, update, delete, and rename formats. A format can contain up to 20 output records varying in length from 20 to 486 characters. Falcon can lengthen formats by "chaining" one to another, permitting data entry on one, then continuing on to the next.

Falcon's data-entry functions are protected by the system's automatic restart/recovery and rescue functions, which ensure data survival in the event of system failure. Falcon can also create batches of data from any given format, validate those data, and then enter them into an edit queue where the data batch is maintained. Edit-queue functions give a Falcon operator freedom to scan records generically, blocking out all except the desired characters. Job-accounting functions let management obtain online reports displaying various statistics on individual data-entry operators, batches, and job-performance-time rates.

The version of the Falcon that runs under the DOS system is $19,500. The version that runs under the MVS system is $24,500. Various leasing options are also available from the manufacturer.

Pfizer, a New York-based manufacturer of chemicals, pharmaceuticals, and consumer products with 1983 sales of $3.2 billion, has used Keyfast, a data-entry program from H & M Systems Software Inc., since January 1982. It was first introduced at the chemical division's Groton, CT, dp center as a replacement for IBM's Video/370. Keyfast handles the division's accounting functions through an IBM 4341 computer. Data are entered through a network of IBM 3278 terminals.

Keyfast prices begin at $8,000 and the system can run on any IBM DOS or OS computer. Keyfast gave Pfizer a return on its investment within a year due to the software's ability to allow users to set up new applications without programmer intervention.

Service-bureau processing

A proven software system with five years' operational experience in the field, Gilbert/Commonwealth's Gilnet remote job-entry workstation system is now available to service-bureau users with a need for communications between computer systems. Gilnet allows data-processing professionals to use the in-house computer instead of remote terminals in the preparation and transmission of job

(Continued on page 140)

Data-Entry Update

(Continued from page 139)

information to service bureaus.

Gilnet runs IBM's MVS/OS, and can run as many as 99 simultaneous workstations in one MVS address space. Workstations consist of a card reader, printer, card punch, and console. Gilnet interfaces with IBM JE2, JE3, and compatible services. Users receive service-bureau data on their own local or remote printers, punch, or disk.

Gilnet's creator claims the system's real payoff falls into two major categories. First, dp managers found that the system simplified communications while increasing the ability to monitor and control information flow to service bureaus. Second, managers were able to keep outside processing costs down by using the in-house computer for more pre- and post-processing functions.

A major consideration in decentralizing data entry is how to place capable hardware where it is needed most while at the same time ensuring that the equipment is accessible to users with little previous data-entry experience. Inforex Inc., a division of Datapoint Corp., has moved further into the decentralization movement with its Gen-V. The heart of the Gen-V is a 32-bit microprocessor with 512 Kbytes of memory, expandable to 2 Mbytes. When more storage is required, the system can support 10 to 120 Mbytes of storage on Winchester disks. The Gen-V can handle centralized data entry and distribution of source data entry with a standard operating system capable of handling any professional software.

"Today's data-entry market is in transition," says Richard T. Newell, vice president of domestic operations at Inforex. "Customers need the functionality of high-volume, centralized data entry coupled with the ability to place terminals in the originating departments."

Gen-V software includes integrated data entry, file management, report writing, and communications protocols. A menu-driven system with on-screen help messages for beginners, Gen-V also allows experienced users to skip the menus through direct-access commands. ANSI 74 Cobol and Basic are available as well as user-friendly data-entry language. Gen-V's file-management package is fully menu-driven and data-dictionary-based. A Pathfinder utility highlights systems activities and statistics for systems management.

Gen-V can support up to 24 multifunctional terminals for data entry, data management, report generation, and applications programming. Remote terminals operate off a common database and programming with direct access through telephone lines. If direct cable communications are used, local terminals can be sited as far as 500 feet from the local cpu, and up to five miles away from the optional terminal-line driver.

> "The success of the data-entry process also depends upon the quality of software supporting the data-entry operation."

While prices vary with the sundry combinations of Gen-V hardware, a typical combination of processor with 512-Kbyte memory, 10-Mbyte floppy, communication, and 10 terminals is priced at less than $35,000.

While the word processor has largely reduced the tedium of retyping, a vendor called Pencept Inc. has a new device that nearly eliminates the task of keying in data. Pencept's Penpad uses "advanced character recognition" to accept handwriting for data entry either as is, or in cooperation with traditional keyboard entry.

Designed for input to the IBM Personal Computer and the Compaq portable, Penpad consists of a digitizer, a tablet, a stylus, and a connection to the computer. The digitizer tells the computer where the stylus is positioned on the tablet surface. With the help of appropriate software, Penpad can input anything that can be drawn by hand such as sketches and diagrams. It can also be used as a touch pad to input special commands or data or in a "mouse" mode to send cursor-movement commands and command triggers to the computer. This function has earned Pencept the title of "the mouse that writes."

Penpad can recognize capital letters A through Z, numerals 0 to 9, and 23 other symbols. Lower-case letters can be created by writing them at half the height of upper-case letters. An upside-down "U" used to signify deletions or material to be deleted can simply be overwritten.

Penpad works unmodified with Multiplan, Lotus 1-2-3, Visicalc, and Wordstar. The manufacturer has also included several software utilities to make Penpad usable with most commercially available software.

The interface card for the Penpad occupies a single slot inside the IBM Personal Computer. System intelligence comes from two microprocessors (a 68000 and 8048) with a special firmware algorithm, all packed in the circuit card.

The past year has been a busy one for data entry. The year to come will be no less challenging. New labor issues have the potential to effect data-entry operations nationwide. Environmental questions will have to be confronted and resolved. Hardware and software manufacturers are busy designing and marketing systems to smooth the flow of data into computers, among computers—and most importantly—between the systems and the users that depend upon them.

Between the technical developments in hardware and software, and the potential crises brewing in the VDT workplace, 1984 should prove to be a time of both growth and controversy. □

Need Extra Copies
of the
Corporate Executives' Guide To Personal Computing

Did you miss the Corporate Executives' Guide to Personal Computing? This special issue tells how to organize to make the most of personal computing in your organization. Subjects covered include:

- Introduction by Mel Mandell, editor of Computer Decisions and author of "1001 Ways to Operate Your Business More Profitably."
- "User automomy versus corporate authority"
- "Corporate policies and procedures"
- "Promoting personal computing"
- "Needs assessment and implementation"
- "Maximizing micros in user departments"
- "Managers rate the major micros"
- "Uses, misuses and mistakes"
- "The future of personal computing"

Here's how to order . . .

Fill out the coupon below and enclose check or money order for the correct amount. 1 to 10 copies $4 each plus $1 each for postage and handling $5 each

More than 10 copies $4 each plus $.50 each for postage and handling.

Send to: Box G, Computer Decisions,
10 Mulholland Dr.,
Hasbrouck Heights, NJ 07604

Please send me ____ copies of the Corporate Executives' Guide to Personal Computing. I'm enclosing $ _____ to cover costs.

Name _____

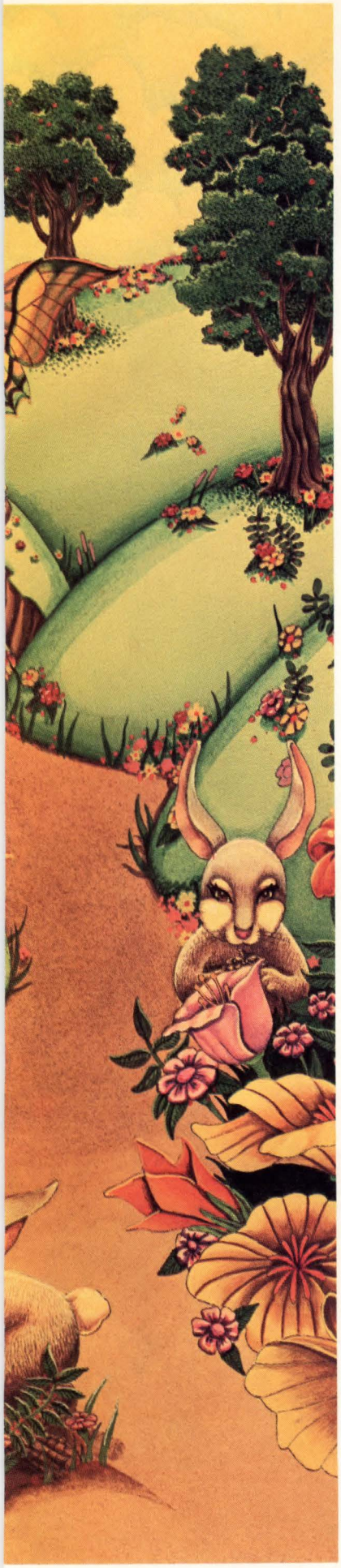
Title _____

Company _____

Street _____

City _____ State _____ Zip _____


TO OS
TO OS



Choose UCC-2 The Easy Path . . . IBM Did!

CALL US OR CALL IBM
We have always believed that the best way to change from DOS to MVS is with UCC-2 . . . and now we know that IBM agrees. UCC and IBM have recently signed an agreement allowing IBM to market UCC-2 on a non-exclusive basis.

NO PROGRAMS TO CONVERT
With UCC-2, you can run DOS programs under MVS without converting the programs.

SAVE MONTHS OF TIME
That means you can move your entire DOS workload to an MVS environment . . . without the awesome task and expense of converting your existing programs.

MVS FACILITIES RIGHT AWAY
It also means that you can start enjoying the benefits of MVS across-the-board . . . right away. You can be running a standard MVS data center months sooner.

CALL TODAY
Ask us about UCC-2 today. We can get you started on the right path. Purchase or lease terms available.Call 800-527-5012.

UCC

SYSTEMS SOFTWARE DIVISION
UCCEL TOWER, EXCHANGE PARK,
DALLAS, TX 75235

CIRCLE 61

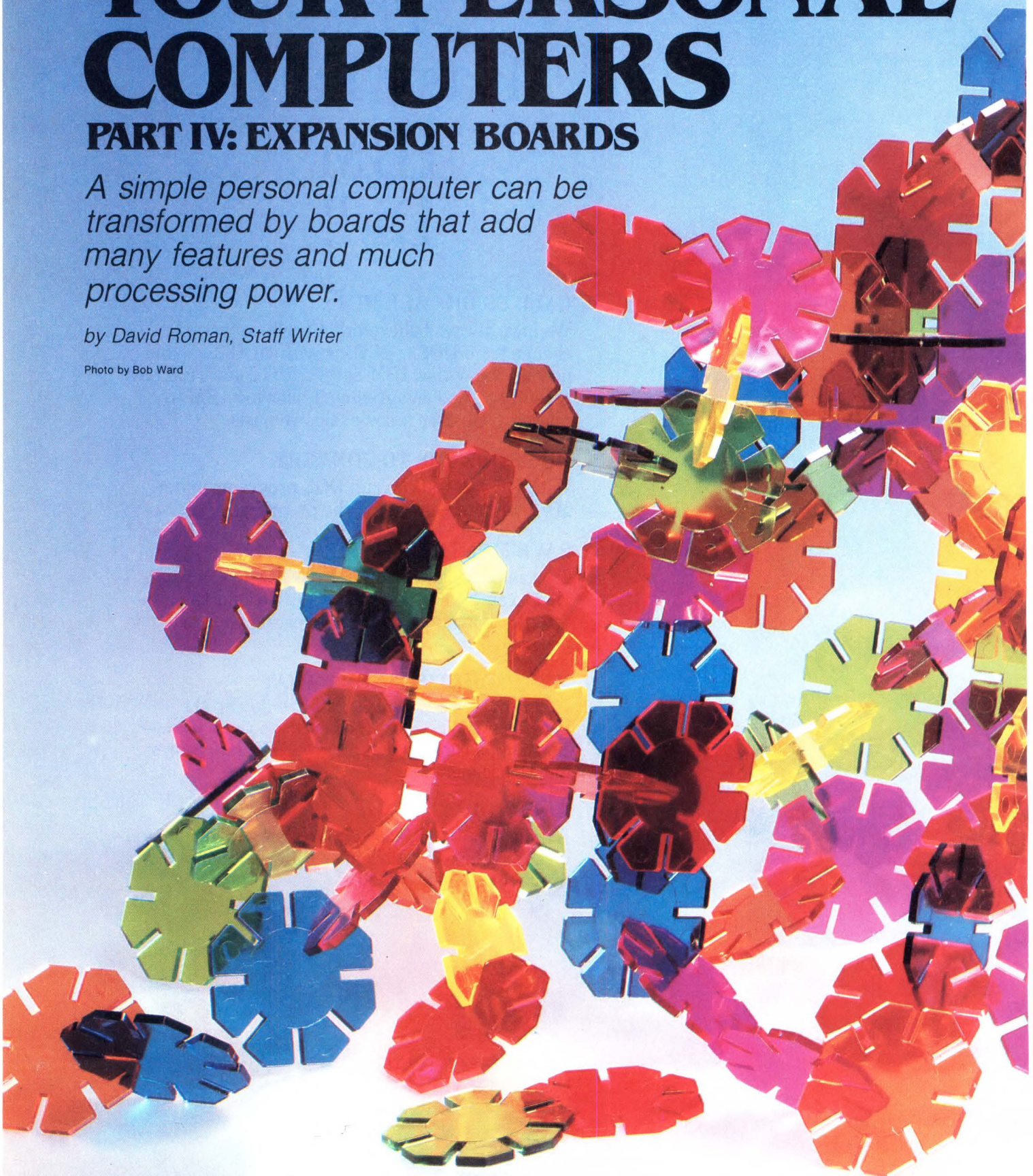
BUILDING UP YOUR PERSONAL COMPUTERS

PART IV: EXPANSION BOARDS

A simple personal computer can be transformed by boards that add many features and much processing power.

by David Roman, Staff Writer

Photo by Bob Ward



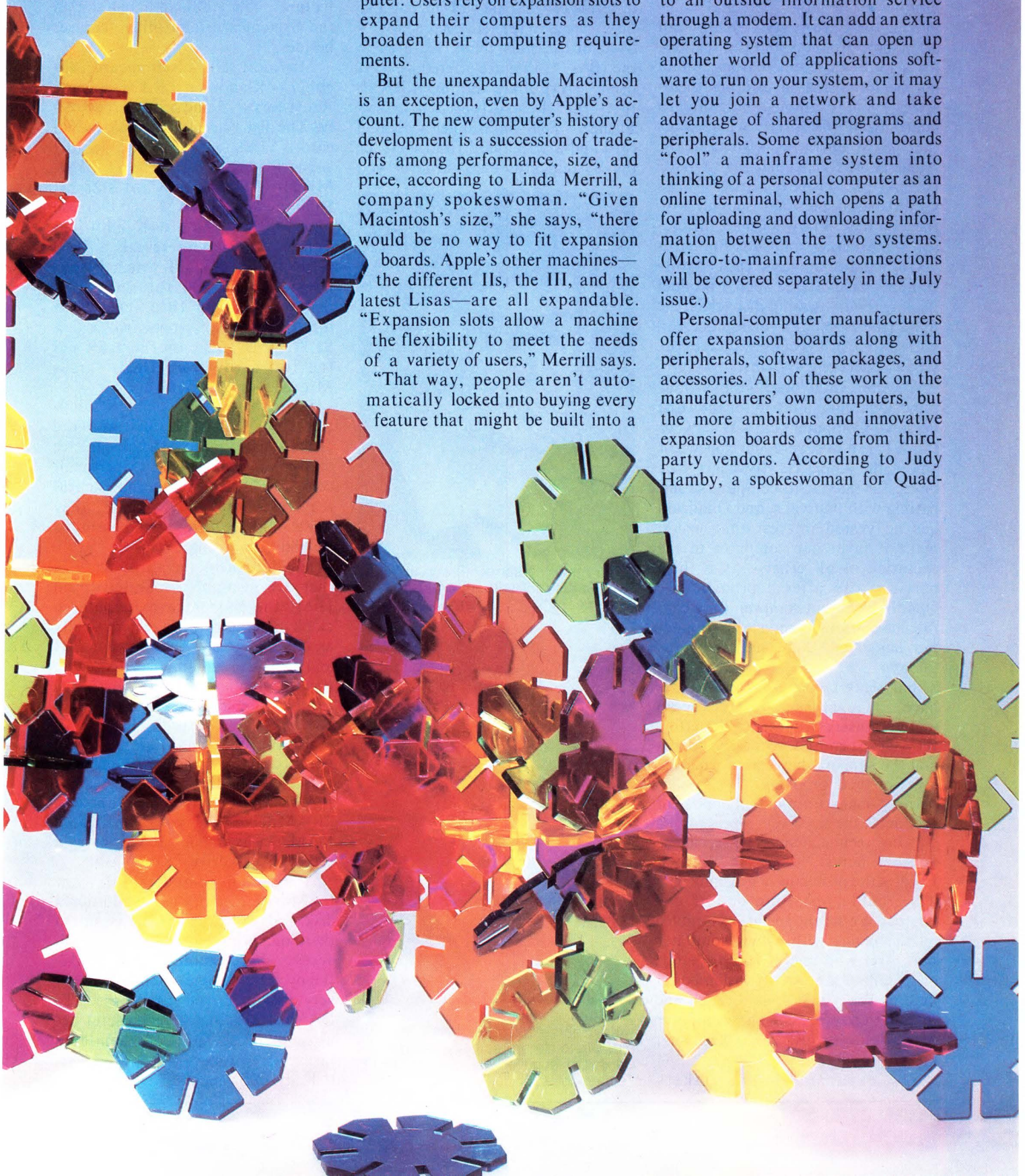
After a spectacular and tantalizing media campaign ballyhooed its introduction, Apple Computer's Macintosh appeared. Its unveiling was as startling as its promotion, but not because of its great powers or expansive capabilities. The surprise lay in the modesty of its size.

Compact, self-contained, and barely expandable, the Macintosh has no expansion slots to accommodate boards or give it more memory or features. These slots are standard on every other popular personal computer. Users rely on expansion slots to expand their computers as they broaden their computing requirements.

But the unexpandable Macintosh is an exception, even by Apple's account. The new computer's history of development is a succession of tradeoffs among performance, size, and price, according to Linda Merrill, a company spokeswoman. "Given Macintosh's size," she says, "there would be no way to fit expansion boards. Apple's other machines—the different IIs, the III, and the latest Lisas—are all expandable. "Expansion slots allow a machine the flexibility to meet the needs of a variety of users," Merrill says. "That way, people aren't automatically locked into buying every feature that might be built into a computer, and they aren't locked out of adding memory or other upgrades."

Expansion boards can add memory to increase a computer's processing power or a communications port that lets you hook up a printer or connect to an outside information service through a modem. It can add an extra operating system that can open up another world of applications software to run on your system, or it may let you join a network and take advantage of shared programs and peripherals. Some expansion boards "fool" a mainframe system into thinking of a personal computer as an online terminal, which opens a path for uploading and downloading information between the two systems. (Micro-to-mainframe connections will be covered separately in the July issue.)

Personal-computer manufacturers offer expansion boards along with peripherals, software packages, and accessories. All of these work on the manufacturers' own computers, but the more ambitious and innovative expansion boards come from third-party vendors. According to Judy Hamby, a spokeswoman for Quad-



Personal-Computer Add-Ons

(Continued from page 145)

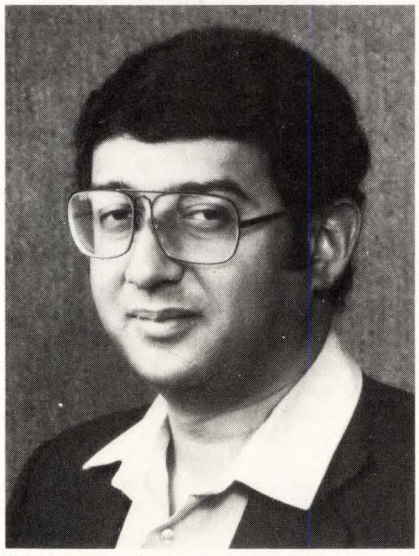
ram Corp., which develops peripherals and expansion boards for a number of popular personal computers, the third-party vendors "can offer some products that the vendors, for a lot of different reasons, would not be interested in offering themselves." For example, the Softcard board from Microsoft, which adds the CP/M operating system to the Apple II, was so popular that it made the Apple II the number one CP/M-based personal computer in the country. Vijay Vashee, Microsoft's marketing manager for hardware products, says that Apple couldn't have offered such a product itself without "turning its back on the 6502 [the Apple II's microprocessor, which doesn't accommodate the CP/M operating system]."

Another such product is Quadram's Quadlink, a board for the IBM Personal Computer that lets a PC or PC-XT run software developed for any of the Apple IIs. IBM has little interest in making its computers compatible with its rival's, and Quadram has no vested interest that would make it favor one computer to the exclusion of all others. As a third party, it can offer a product like Quadlink without compromising confidence in its own product line. Quadram has sold 12,000 Quadlink boards to date.

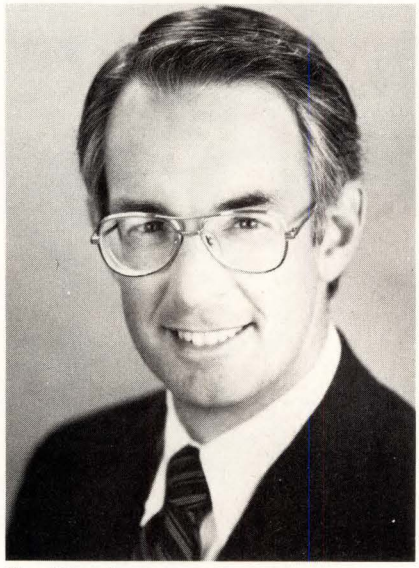
Judy Hamby believes third parties have an advantage over the micro manufacturers in terms of the effort they can spend on accessory boards and the support they can provide the users of their products. "We're constantly fine-tuning a specialized product," she says.

"Our technical-support service is another bonus," says Hamby. "It handles the problems of anybody who has trouble installing one of our boards. We might spend 30 minutes on the phone with a new computer purchaser who's never had his hands on a computer or an expansion board before. We'll talk him through the installation process. The computer manufacturers just can't offer that kind of support."

The expansion-board makers differentiate themselves from the personal-computer makers not only in terms of what they offer, but also how they offer it. Microsoft's Systemcard adds many features to the IBM PC that are offered by IBM itself. "IBM offers additional RAM, just like the Systemcard," says Vashee. "You can also get a parallel card and a serial card from IBM, or the Systemcard, but whenever you buy from IBM, you're going to take up three expansion slots to get those features. You get them in one slot on the Systemcard, and other features besides."



"IBM offers the same capabilities on three cards that you get on one Systemcard." *Vashee, Microsoft*



The Xtender expands a system without the expense of a network, plus offers file protection, says William Cassell, executive vice president of PC Technologies Inc.

Microsoft sells a Systemcard with either 64K additional RAM or 256K RAM for $475 and $995 respectively. The list price for an IBM serial card is $120, and $150 for a parallel card. Prices for IBM's 64/256K Memory Expansion Card start at $350 for 64K of RAM, and increase by $165 for every 64K addition. Totaling the figures reveals a $620 price tag for the 64K Memory Expansion Card and the serial and parallel cards from IBM, versus $475 for Microsoft's Systemcard, and a $1,115 price tag for the full 256K and the two cards from IBM, versus Microsoft's $995.

Board makers work on the assumption that expansion slots, and the growth opportunities they offer, are of primary importance to personal-computer users. By cramming several features onto a single board, they offer more features and continued flexibility in a single stroke.

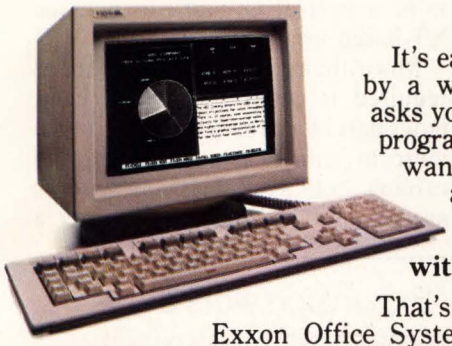
In addition to the three features that are available separately from IBM, the Systemcard includes a clock/calendar that automatically assigns a date and time to your files and lets you add time-related functions to applications programs. The card can be purchased with either 64K or 256K of additional RAM. With the disk-emulation software that accompanies the card, a user can allocate any portion of that extra RAM as RAMdrive memory. "RAMdrive lets your additional RAM act as regular RAM, or as a separate disk drive," says Vashee.

A personal computer will view RAMdrive memory as an additional disk and will access what is stored there much more readily than it will access what is stored on a regular floppy disk. "Some applications are very disk-intensive," says Vashee, "so RAMdrive becomes very useful because its access speed is magnitudes faster."

Kelly O'Brien, the MIS manager

"They told me integrating words and data would be cut-and-dried. But it's cut-and-paste."

Stop the shock...with the new EXXON 750 Professional Workstation.



It's easy to be shocked by a workstation that asks you to change your program every time you want to change your application.

Solutions without the shock

That's why the people at Exxon Office Systems offer a very practical solution: the new EXXON 750 Professional Workstation.

Its built-in, integrated software combines complete word processing, spread sheet, and business graphics in one easy-to-use package.

You can quickly retrieve the information you need, analyze it, organize it, and display it in any of several windows simultaneously. You can apply our built-in graphics to your information and preview the entire, integrated page.

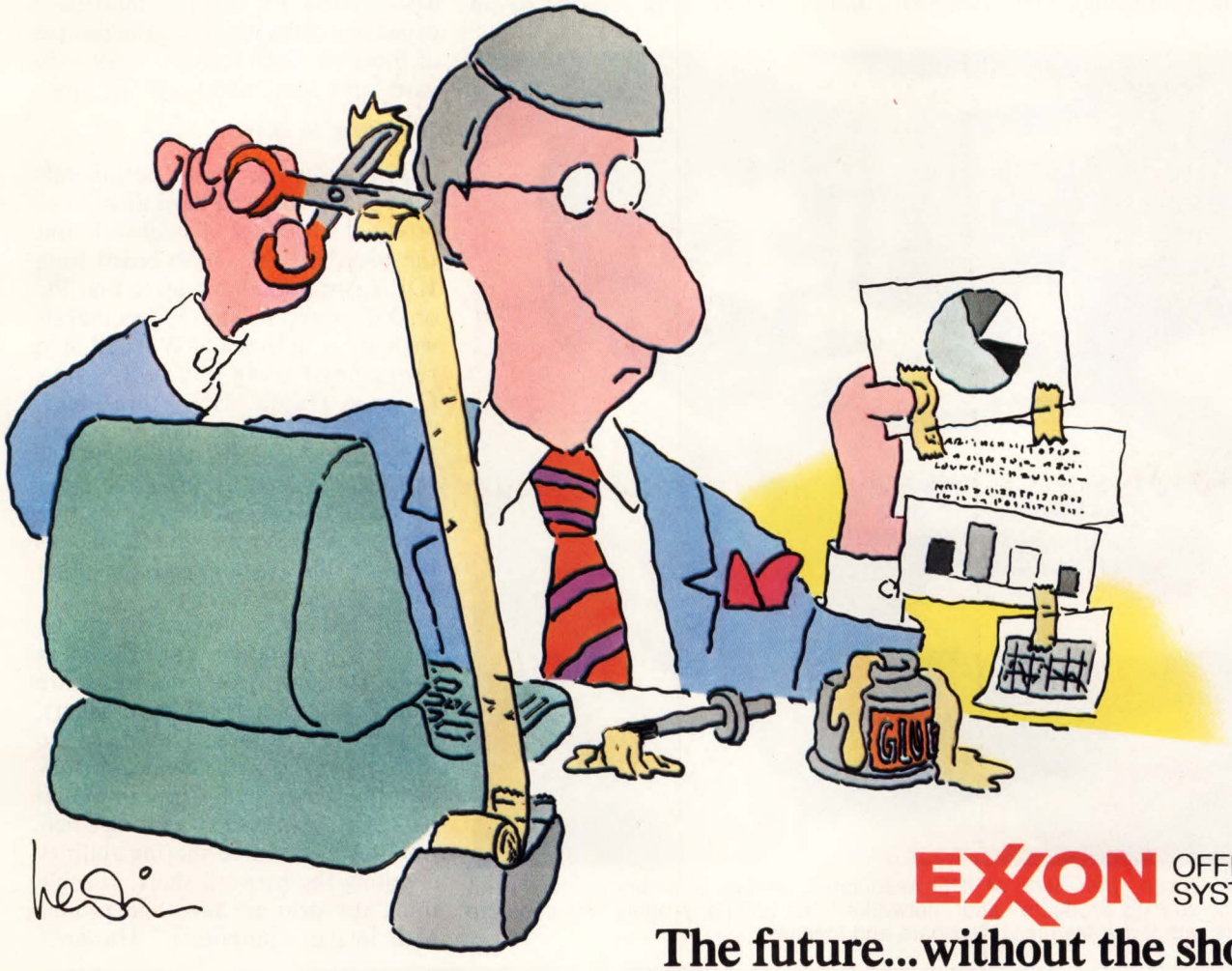
From input to print out

After you've organized and analyzed it, arrayed and displayed it, compiled and filed it, you can print out your fully integrated document on our remarkably quiet EXXON 965 Ink Jet Printer.

It's office automation with complete integration that makes Exxon a cut above.

For more information

Call 800-327-6666, or write Exxon Office Systems, P.O. Box 10184, Stamford, CT 06904-2184.



EXXON OFFICE SYSTEMS

The future...without the shock.

CIRCLE 62

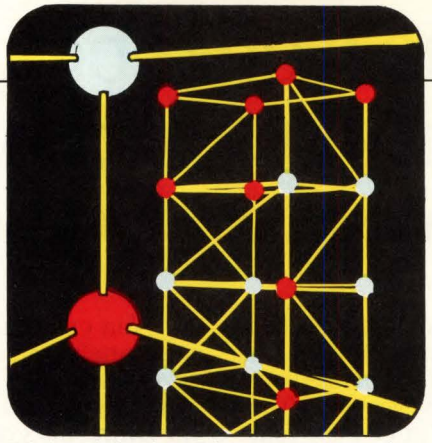
Add-Ons

(Continued from page 146)

for Data Encore Inc., a Sunnyvale, CA, company that duplicates floppy-disk software for microcomputers, likes the access speed offered by RAMdrive. "I'm a real speed nut," O'Brien says. "I like my access to be as fast as possible. So I copy my programs into the phantom drive—the RAMdrive memory. The operating system 'thinks' it's another drive. When I run the program, instead of having to start up a disk drive, load the program into memory, and go from there, the program is loaded and executed through RAM. The program runs the same, but the access time is cut in half."

Other versions of RAMdrive are available under different names from different vendors (they are sometimes called electronic disks), and many board makers are offering the feature along with their expansion products.

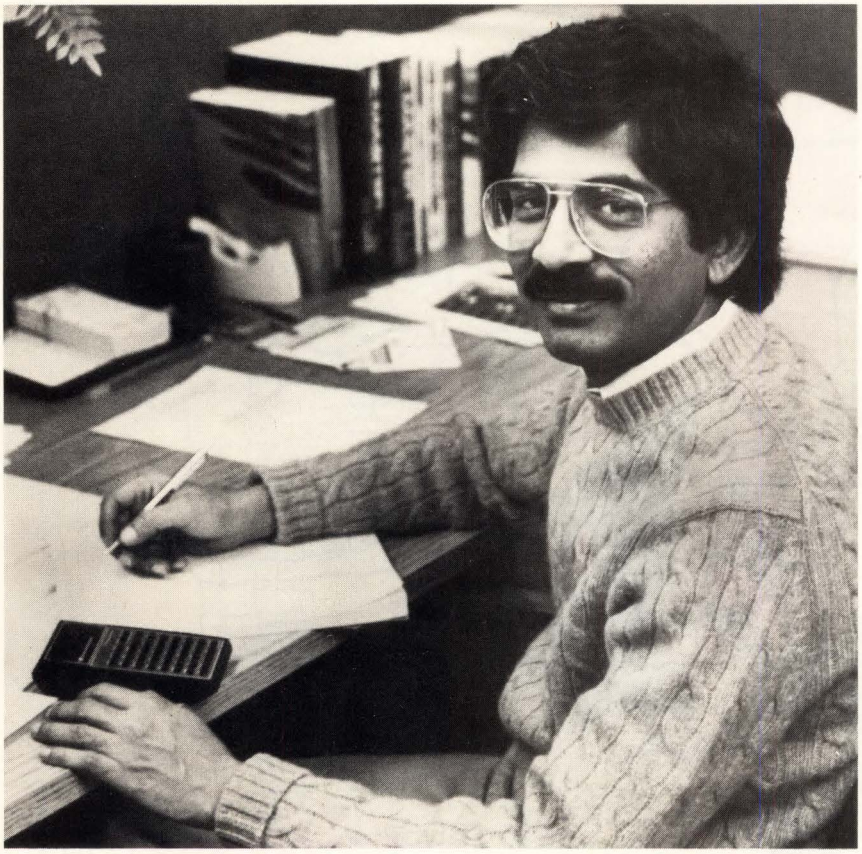
Orchid Technology offers its RAM



Disk with the Blossom expansion board for the IBM Personal Computer. Blossom carries with it many of the features that can be found on other multi-featured boards, including additional RAM, serial and parallel ports, and a clock/calendar. What makes Blossom exceptional is its expandable expansion board. Although the amount of RAM that fits on an expansion board can frequently be altered (the 64/256K Memory Expansion Card is a good example), Blossom's expansion capabilities are far more radical. As an option, Blossom will accommodate a daughter board that attaches to the original board, preparing its host PC to be a part of Orchid's PCnet, the XT-based local-area network.

More than an expansion board is required to make a personal computer part of a network, but not much more in many cases. Software and cabling, both available from Orchid, are all that are needed to ready a Blossom-furnished PC or PC-compatible computer for PCnet. Orchid also offers PCnetplus boards—expansion cards which are the reverse of Blossom. Each board is a network card with some additional features.

> "Expansion slots allow a machine the flexibility to meet the needs of a variety of users."
>
> *Merrill, Apple*



Gautam Gupta, president of IDE Associates, makes a distinction between "resource-sharing products" and "networks." His company offers two separate products with these features: Ideashare and Ideanet.

It's better to share

The ability to share peripherals such as printers and hard disks is an oft-cited advantage of a network. But the Ideashare expansion board from IDE Associates allows up to four PC or XT users to share peripherals without a network. "We call it a resource-sharing product," says Gautam Gupta, IDE's president. "The printer, or the files on a hard disk attached to the central PC or XT, can be used by the three other connected workstations. It's not a network because the central node is blind to the resources of the other PCs."

IDE has made a logical distinction between a resource-sharing system and a network by offering Ideashare and Ideanet (a networking product), respectively. Robert Hummer, the MIS manager for the connector subdivision of Raychem Corp. in Menlo Park, CA, believes that touting a network for its resource-sharing abilities is selling the network short. "People think it's neat to have one printer with lots of computers," Hummer

Now Local Multiplexing is as Easy as Plugging in a Lamp

Within minutes you can put Line Miser™ multiplexers to work handling your local data traffic. Line Misers allow you to network your terminals, word processors, PC's and other data terminal equipment with minimal cabling requirements. The line savings can be tremendous! And now there are three types to choose from.

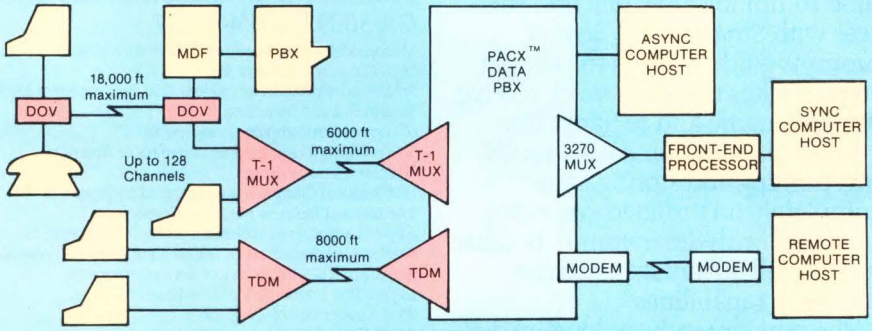
The popular Line Miser DOVs can turn your ordinary phone system into a versatile local area network supporting simultaneous data and voice communications. Everywhere you have a telephone you can quickly and easily add a terminal.

The new Line Miser GLM 528 combines T-1 speeds with large capacity. You get 128 async channels over a 1.544 Mbps T-1 link.

And for low cost local multiplexing you can't beat the new Line Miser GLM 510. In less than 3 minutes, you can add the GLM 510 to your private wire network to handle up to 8 async channels at 9600bps.

Bright ideas in local multiplexing. Three more reasons to switch to Gandalf. Ask your local Gandalf Sales representative for details today.

Line Misers™ make networks easier to build



gandalf™

Fully supported technology from concept to customer.

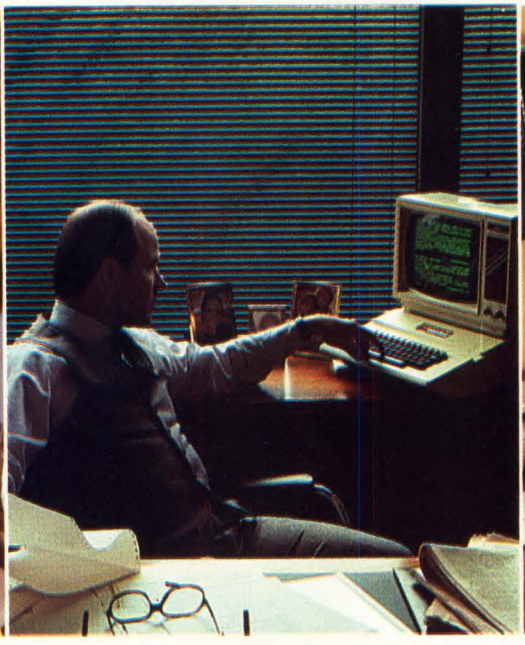
USA (312) 541-6060
Canada (613) 226-6500
U.K. Padgate (0925) 818484
Switzerland (022) 98-96-35

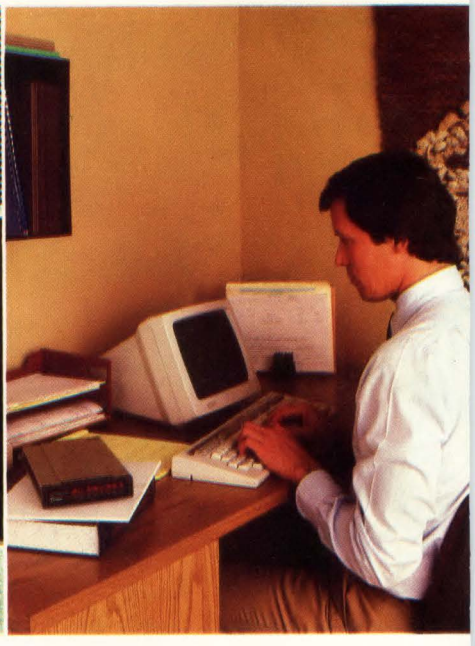
CIRCLE 63

To all reps: Price changes on following items effective immediately: No. 10-11A, 10-114A, 10-AL.

Chris: The latest offer looks better, although it's still not what we were hoping for. Try for another compromise.

Just got the word from Gary. Increased our share by 6%. If trend holds, we'll pass competition by third quarter!





Microcomputer communications? Get control of the situation with Hayes™

Microcomputer communications can present the DP/MIS staff with a tangle of mismatched hardware, user-hostile software, and a situation that can quickly get out of hand.

Hayes can help you avert that chaos, with a telecomputing system designed expressly for microcomputers.

A system so advanced, it's downright simple. Economical. And requires no handholding from you.

Hayes. The computer's telephone. Our Smartmodem 300™ and Smartmodem 1200™ connect to any desktop computer with an RS-232C port. They operate with rotary dial, Touch-Tone® and key-set telephone systems. At full or half duplex. And both feature self-test capabilities, as well as indicator lights and built-in speakers for monitoring calls.

The lower-priced Smartmodem 300 is ideal for local data swaps and communicates at 300 bps. A built-in speed selector on Smartmodem 1200 automatically detects transmission speeds (110, 300 or 1200 bps).

Smartmodem 1200B™ is also available as a plug-in board for IBM® Personal Computers. And Hayes manufactures the Micromodem IIe® for Apple® II, III, IIe and Apple Plus computers, as well. It comes packaged with Smartcom I™ communications software.

Speaking of software, more programs are written for Hayes modems than for any other. And that impressive list includes our own incomparable communications software.

Smartcom II.™ Complete, menu driven software for the IBM PC, DEC Rainbow™ 100, Xerox 820-II™ and Kaypro II.™ Even first-time communicators will find success with Smartcom II. Screen prompts guide users in the simple steps it takes to create, send, receive, list, edit, name and re-name files.

Tasks like simultaneously receiving, printing and storing data–completely unattended–are easily managed with Smartcom II, because it takes full advantage of Smartmodem's capabilities.

The program reduces lengthy dial-up and log-on sequences to a single keystroke. It stores communications parameters for 25 remote systems.

Plus, there's an on-line help feature that explains prompts, messages and parameters.

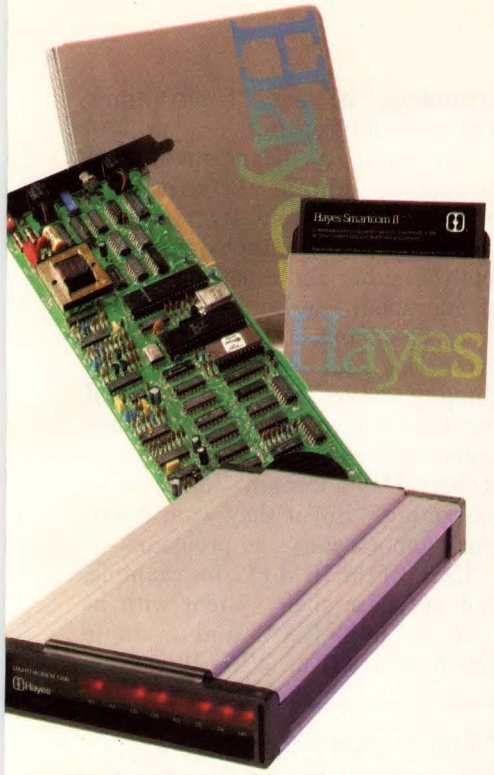
Our reputation speaks for itself. Hayes has five years of solid leadership in the microcomputer industry. Nationwide availability through retail computer stores. Trouble-free factory service and call-in assistance. A limited two-year warranty on all hardware. And the most efficient telecomputing system available. Anywhere.

If you're involved in linking micros or setting standards for configurations, remember this. Everything your people need to know about communications can be summed up in one word: Hayes.

Hayes®

Hayes Microcomputer Products, Inc., 5923 Peachtree Industrial Blvd., Norcross, GA 30092. 404/441-1617.

Smartcom II communications software, currently available for IBM PC, DEC Rainbow 100, Xerox 820-II and Kaypro II.



Smartmodem 1200 for all computers with an RS-232C interface; Smartmodem 1200B plug-in board for the IBM PC.

Smartmodem Specifications:
Low Speed Data Format: (Smartmodem 1200 and Smartmodem 300) Serial, binary, asynchronous; 7 or 8 data bits; 1 or 2 stop bits; odd, even or no parity (0-300 bps).
High Speed Data Format: (Smartmodem 1200) Serial, binary, asynchronous; 7 data bits; 1 or 2 stop bits; odd, even, or fixed parity or 8 data bits; 1 or 2 stop bits; no parity (1200 bps).
Dialing Capability: Touch-Tone® and rotary-dial pulse dialing.
Command Buffer: 40 characters.
Commands: (unnecessary with Smartcom II software) A: Immediate answer. A/: Repeat last command. C: Transmitter Carrier. D: Dial command, including simple dialing, waiting for second dial tone, auto-dialing and other features. E: Local echo. F: Full/half duplex. H: Switch hook. M: Audio monitor. O: On-Line. P: Pulse dialing. Q: Quiet mode. R: Reverse originate/answer mode. S: 17 "Set" commands speed, escape code character, number of rings to answer on, etc. S?: Checks operational parameters above. T: Touch-Tone dialing. V: Verbal result codes.
Result Codes: (can be numerical/verbal): 0/OK: Command line ok. 1/Connect: Carrier detected. 2/Ring: Phone is ringing. 3/No Carrier: Carrier lost or never heard. 4/Error: Error in command line. 5/Connect 1200: Carrier detected at 1200 bps. (Smartmodem 1200 only.)
Audio Monitor: Two-inch speaker with volume control.
Rear Panel: On-off switch, power jack, RS-232C connector, modular phone jack connector, volume control.
Operation: Full or half duplex.
Data Rate: 0-300 bps and 1200 bps for Smartmodem 1200; 0-300 bps for Smartmodem 300.
Interface: RS-232C.
Intelligence: Z8™ microprocessor with 4K byte control program for Smartmodem 1200; Z8 microprocessor with 2K byte control program for Smartmodem 300.
Modem Capability: Bell System 103 or 212A compatible originate or answer mode for Smartmodem 1200; Bell System 103 compatible originate or answer mode for Smartmodem 300.
Receive Sensitivity: -50dBm for Smartmodem 1200; -45dBm for Smartmodem 300.
Transmit Level: -10dBm.
Registration: FCC registered for direct-connect to the nationwide phone system. Connects with modular jacks RJ11W, RJ11C, RJ12W, RJ12C, RJ13W, RJ13C.
Power Pack: U.L. listed 120VAC, 60Hz. 13.5VAC output.
Size: 1.5" × 5.5" × 9.6"

CIRCLE 64

Personal-Computer Add-Ons

(Continued from page 148)

says, "but that's not much of an advantage, especially with the price of printers coming down. There are other advantages to a network. You have faster access to programs with the hard disk, the capacity to store larger files, and greater program safety. When you have diskette copies of programs, people tend to be sloppy with them. You don't have that problem with a hard disk."

Hummer has a couple of Apple II+s networked through Omninet from Corvus Systems. The network will accommodate IBM PCs and XTs, any of the Apple IIs or the Apple III, the DEC Rainbow, Texas Instruments Professional, or the Corvus Concept, in a single network. Hummer intends to add four IBM PCs to his Apple-only network shortly. "When we got our first personal computers," he recalls, "management thought we were going

For your information

For additional information on the products mentioned in this article, contact the following companies or circle the appropriate number on the Reader-Service Card.

Vendor	Product	Price	Circle
Apple Computer (408) 996-1010	Macintosh	$2,495	560
Corvus Syst. (408) 559-7000	Omninet	$6,455 for 8-user network sharing 10-Mbyte disk	561
IBM (contact local sales office)	64/256KB Memory Expansion Option	$350 to $845	562
	Serial card	$120	
	Parallel card	$150	
	PC Cluster Program	$2,540 for licenses, adaptors, and cables for five-machine cluster	
IDE Assoc. (617) 275-4430	Ideashare	$595	563
	Ideanet	$595 for hardware $795 for software	
Microsoft (206) 828-8080	IBM Systemcard	$475 (for 64-K version) $995 (for 256-K version)	564
	Softcard	$345	
Orchid Tech. (415) 490-8586	Blossom	$395 $795 w/network board	565
	PCnetplus Diskless	$100	
	PCnet	$695	
PC Tech. (313) 996-9690	XTender	$3,995 for .5 Mbyte of memory $4,995 for 1 Mbyte of memory $795 for software	566
Quadram (404) 923-6666	Quadlink	$680	567
Televideo Syst. (408) 745-7760	TS 800 Series	$1,795 and up	568
	TS 1603	$2,995	
	TS 806/20	$6,995	
	TS 816/40	$12,995	

Personal-Computer Add-Ons

(Continued from page 151)

to play games with them. I was trying to convince someone to put them all on a network. I know management's attitude has changed now, because I saw one of the most anti-computer managers carrying around a Compaq [portable computer] the other day. The demand for computers here will grow rapidly in the next year."

Jack Klug, president of Dependable Courier Service Inc. in Atlanta, and another Omninet user, extolls the network's expandability. "It will take up to 64 computers, so we can keep expanding," he says. "I don't think we'll ever outgrow it."

Expandability means investment protection—one of the expansion product's greatest offerings. A flexible product line such as Orchid's lets you either add a network on top of additional features, or additional features on top of a network. This preserves your existing personal-computer investment, regardless of the features you're adding. "Some users only need memory today," says Robert Davi, Orchid's director of marketing. "But if they want a network tomorrow, it's no problem."

Users of the IBM PC, for example, can purchase their system with as little as 64K RAM and a single 180-K disk drive. With IBM's expansion products alone, memory can be expanded to 640K. Storage can be stepped up to over 20 Mbytes with the help of an Expansion Unit, which also adds eight expansion slots to the PC's existing five. These additional powers can all be acquired without trading in a single piece of hardware or losing a single cent of your initial system investment. The new IBM Personal Computer Cluster Program can further extend the capabilities of a system by permitting the exchange of programs, files, and messages between connected PCs, XTs, Portable PCs, and PCjrs.

> "Third-party vendors can offer some products that other vendors wouldn't be interested in offering themselves." *Hamby, Quadram*

William Cassell doesn't question the investment protection offered by a network, but he does question the size of the investment. "It's very expensive to add a fourth and fifth workstation to a network," says Cassell, the executive vice president of PC Technologies Inc. "It wouldn't be as expensive on a cluster."

Cassell's company makes XTender, a multi-user system that

WORD STAR® AND SUPER CALC 3™ FREE WHEN YOU BUY THE CHAMELEON THROUGH JUNE, 1984.

PAYING $4000 FOR AN IBM® PC COULD MAKE A TRAMP OUT OF ANYONE.

PRESENTING THE IBM® COMPATIBLE CHAMELEON FOR JUST $1995.

The Chameleon by Seequa lets you run popular IBM software like Lotus® 1-2-3™ and dBASE II.® It gives you a keyboard just like the IBM. A disk drive like the IBM. And a bright 80x25 character screen just like you know who. And it all comes complete at a price that isn't at all like an IBM.

But the Chameleon's $1995 price tag isn't its only advantage over its famous competitor. The Chameleon also has an 8 bit microprocessor that lets you run any of the thousands of CP/M-80® programs available. It comes complete with two of the best programs around, Perfect Writer™ and Perfect Calc.™ It's portable. And you can plug it in and begin computing the moment you unwrap it.

So before you spend all your money on an IBM, consider the IBM compatible Chameleon by Seequa.

It's a tool for modern times that won't set you back a fortune.

The Chameleon by

SEEQUA COMPUTER CORPORATION
8305 Telegraph Road
Odenton, MD 21113

Chameleon shown with optional second disk drive.
To learn more about Seequa or for the location of the Seequa dealer nearest you, call (800) 638-6066 or (301) 672-3600.

CIRCLE 66

Personal-Computer Add-Ons

(Continued from page 152)

employs the IBM XT as its host. Up to four dumb terminals can attach to the XT and share its resources. The XTender board holds two powerful processors and a full Mbyte of memory, which is shared by the attached terminals. The processors, in conjunction with the XT's own 8088 processor, permit the stations on the system to run programs under PC-DOS, CP/M-86, or MP/M-86, the last being the only multi-tasking operating system of the group. The three operating systems can be used interchangeably on any attached terminal and simultaneously on different terminals.

Cassell says XTender expands a system without the expense of a network, but also cites another important advantage. "We offer file locking and file protection, whereas many networks don't," he says. "They can't prevent users from stepping on each other's files when more than one person is changing data in that file. File-protection technology isn't quite there for networks."

Few vendors offer everything from a single stand-alone personal computer to a fully-configured network or multi-user system, but third parties have managed to flesh out most of the major manufacturers' product lines. Televideo Systems is one of the rare manufacturers that provides a one-stop-shopping approach to system expansion. Any of the TS 800 8-bit or TS 1600 16-bit stand-alone personal computers can be added to the TS 806/20 six-user or TS 816/40 16-user multi-user systems. A company spokesman says that half of its 806s and 816s are sold to customers who are expanding their stand-alone systems. Since stand-alones also accept expansion boards, they can be individually enhanced.

"I'm a real speed nut. I like to access programs as fast as possible, so I copy them into RAMdrive memory." *O'Brien, Data Encore*

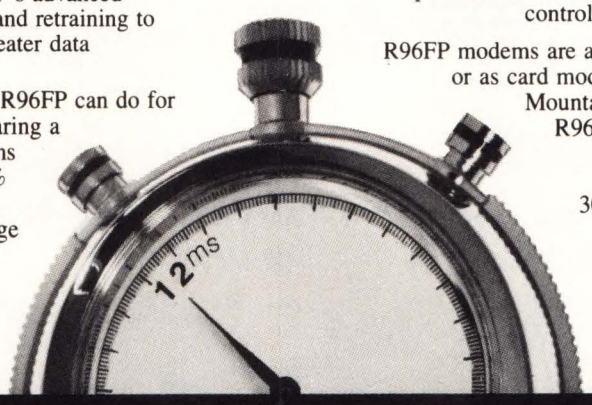
Expansion boards allow users to customize their machines safely, without fear of committing themselves to a rigid and inflexible computer, and without compromising past expenditures. A Televideo spokesman best characterizes the general benefits of expansion products while explaining the company's reason for offering expandable systems. "We want to provide end users with a distinctive growth path and investment protection." □

THE FASTEST POLLING 9600 BPS MODEM IN THE WORLD!

The Rixon R96FP Fast Polling Modem is living up to its name by being the fastest polling modem in the industry with a 12 ms turnaround time.

These 9600 bps modems are V.29-compatible and operate synchronously over four-wire unconditioned 3002-type private lines. Designed for point-to-point and multipoint (multidrop) polling networks, the R96FP's advanced technology provides rapid equalization and retraining to obtain the 12 ms RTS/CTS delay for greater data throughput in polling networks.

The following example shows what the R96FP can do for you. In a typical polling network comparing a competitor's fast polling modem at 30 ms with Rixon's R96FP, you will have 78% more polls and an 85% increase in data throughput with the R96FP. If you change your network, you can decrease the number of computer ports by 40%, decrease your backbone lines, or increase the number of drops by 80%. In the test mode, the hub modem can poll, address and perform tests on up to 100 tributary modems. In using the master/tributary configuration in high-speed, point-to-point applications, the modem operates at 9600 bps with fallback speeds of 7200 or 4800 bps. Fallback speed is enabled by a modem front-panel pushbutton. Tests of the modem, line and terminal are controlled by other front-panel pushbuttons.



R96FP modems are available as compact standalone units or as card models for mounting in the RM90 Rack Mountable Card Cage. The list price of the R96FP is $2995, and $2595 for the R96 point-to-point modem. For more information call Bob Sagolla at 301-622-2121 extension 327, or write to RIXON INC. at 2120 Industrial Parkway, Silver Spring, Maryland 20904.

RIXON INC.

Benchmarking

May The Best System Win

Benchmarking is one useful way to select the system that serves your purposes best, but it's not the only way.

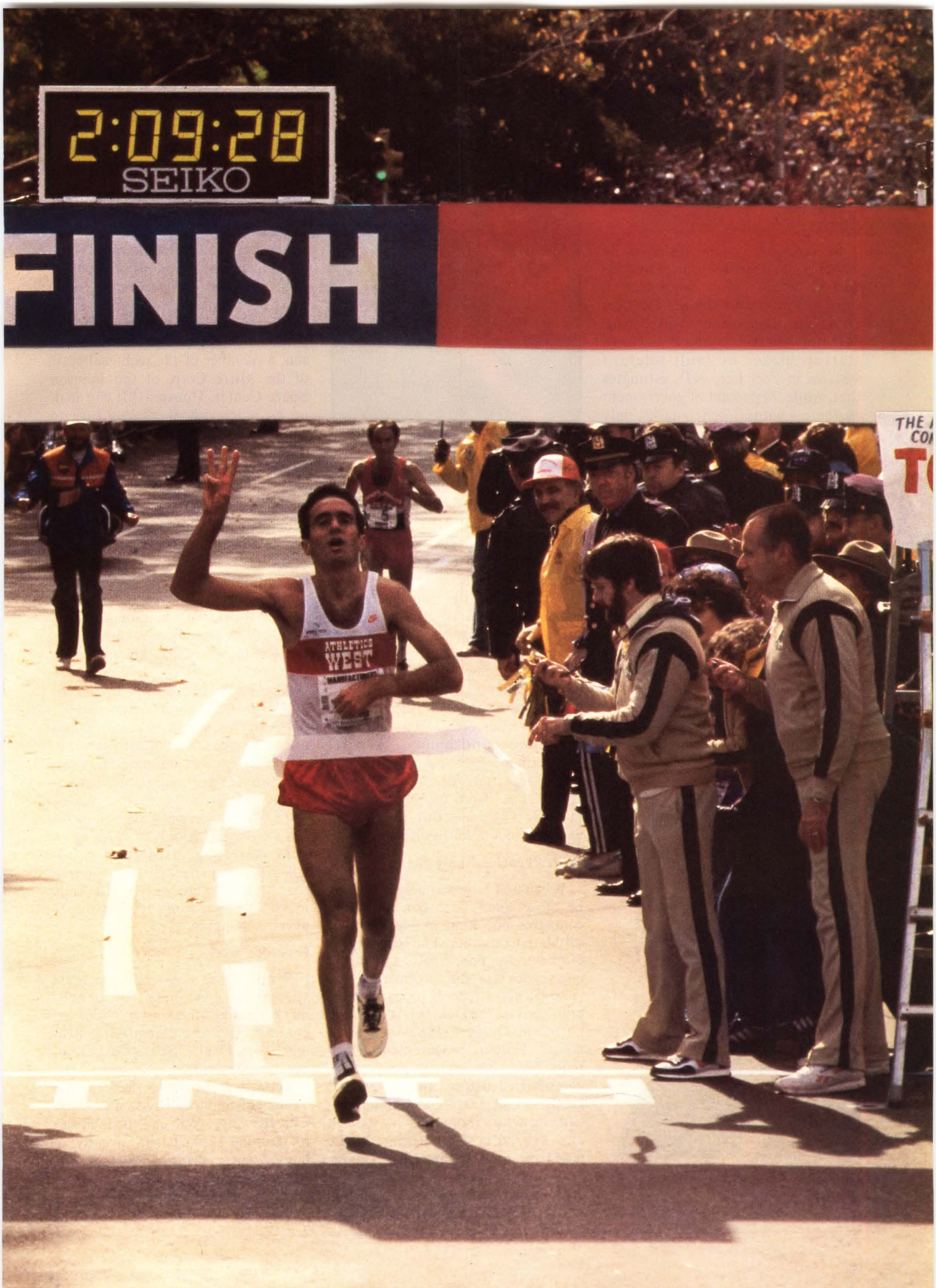
by David Whieldon, Senior Editor

Benchmarking, that solid old method of checking out the performance of equipment, was popular back in the 1960s, when a lot of dp shops operated largely in batch mode. Measuring hardware and software according to certain prescribed standards in specific, real-world, functional tests before purchase made a lot of sense. Managers could weigh results from competing products and then make informed choices—provided, of course, that the benchmarks were carried out properly.

But it's 1984, and a lot of new, exciting concepts have crowded in on managers. They go by names like computer-performance measurement, computer-performance evaluation, and, on an even headier level, computer-performance planning. Plain old capacity planning has become a familiar term.

Are the new procedures supplanting benchmarking? The old-style benchmark is thriving in government, where managers must satisfy rigid purchasing requirements—so much so, in fact, that a

Photo by Lane Stewart/Sports Illustrated


2:09:28
SEIKO
FINISH
ATHLETICS
WEST

Benchmarking

(Continued from page 157)

few federal employees earn their bread almost entirely by benchmarking.

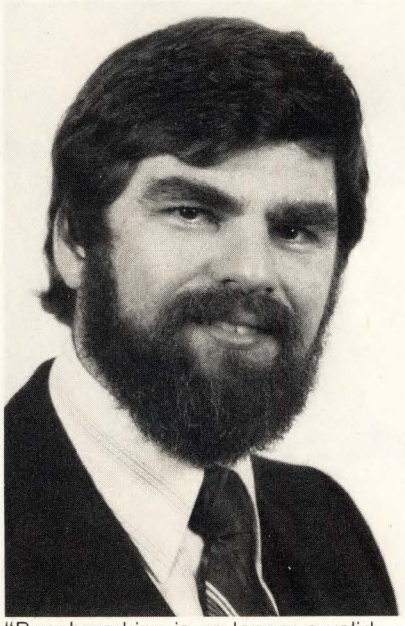
By contrast, benchmarking is no longer so popular in business and industry, because of its high cost in time, talents, and dollars. Robert Davis, district manager in Greenbelt, MD, for Auragen Systems Corp. (a startup maker of fault-tolerant systems in Fort Lee, NJ), estimates that, while 90 percent of government customers witness benchmarks, only 50 percent of commercial customers do the same.

Nonetheless, this tool for determining what to buy still occupies a special if narrow niche in the business world. When conditions are appropriate, benchmarking can pay real dividends.

Herb Schwetman, an associate professor in the Department of Computer Sciences at Purdue University (West Lafayette, IN), tells of one situation where that happened. "I worked with a European university, which developed a set of benchmarks for both computational and batch/interactive loads," he says. "Benchmarking narrowed the choices for an upgrade to three vendors, and a clear-cut winner emerged."

So then the choice was equally clear-cut, right? Well, no. As it turned out, the benchmark winner was not the same as the vendor of the incumbent system. Going with the winner would have meant a troublesome switching out of the old system.

But, hold on, the story has an unexpected and happy ending: Armed with facts and figures indicating that the incumbent supplier was not making a truly competitive bid, the university warned that the supplier would lose the account unless it made a better offer. "The user was rewarded handsomely," reports Schwetman, "getting essentially a larger machine for the price of a smaller one" from the vendor of the in-place system. "But the benchmarking took a lot of effort."



"Benchmarking is no longer a valid part of the decision-making process in a business cycle."
Epner, The User Group Inc.

Where benchmarking fits in

When and how can benchmarking be of service? True benchmarking compares one kind of hardware or software to another. The federal government, for one, insists on pitting one vendor's product against others'. A study of 73 federal procurements, published by the General Accounting Office in October 1982 (see box), notes, "Federal procurement policy requires, to the extent practicable, competitive acquisition of needed goods and services." Government justifies benchmarking, despite its cost and difficulty. According to the GAO report, few alternatives exist: "Benchmarking is needed for most competitive computer procurements . . . because (1) all responsible vendors are allowed to compete, (2) each vendor's computer system has unique features that make comparison with another system difficult, and (3) federal procurement actions are open to public scrutiny, so selection decisions must be defensible."

"Benchmarking can be very expensive," observes Robert M. Jackson, a member of the technical staff of the Mitre Corp. at the Johnson Space Center, Houston. "It can soak up as much money as you care to throw at it, and it will never exactly duplicate your real situation." Jackson doesn't knock benchmarking as a tool, though. Indeed, he and colleagues developed a special variant of benchmarking that he recommends for post-installation and acceptance procedures. Called the performance-evaluation system (PES), it's an almost exact method of determining current workload. Jackson reported on it at the December conference of the Computer Measurement Group (see box).

There are advantages to benchmarking for private-sector users—particularly those in large operations growing larger. A man with substantial experience in selling and in setting up vendor-sponsored benchmarks, James W. Cortada, attests: "The whole exercise is marvelous for the customer." Cortada, who is an IBM marketing manager in Nashville, TN, explains, "It gives you a snapshot of what your whole shop looks like, a snapshot that you'll never have again."

Everyday work

While some users find at least special-purpose uses for benchmarking, and others work under organizational requirements to benchmark, for Dahna Betts, it's part of her everyday work.

Betts is a systems officer for the Technical Services Division at First Chicago Corp. "We use our facilities for tuning applications already in house," she explains. "We test software programs and use output from benchmarks to determine where tuning would be most effective. My

You can count on 3M diskettes. Day after day.

Just like the sun, you can rely on 3M diskettes every day. At 3M, reliability is built into every diskette. We've been in the computer media business for over 30 years. And we've never settled in. We're constantly improving and perfecting our product line, from computer tape and data cartridges to floppy disks.

3M diskettes are made at 3M. That way, we have complete control over the entire manufacturing process. And you can have complete confidence in the reliability of every 3M diskette you buy.

Look in the Yellow Pages under Computer Supplies and Parts for the 3M distributor nearest you. In Canada, write 3M Canada, Inc., London, Ontario. If it's worth remembering, it's worth 3M diskettes.

3M hears you...

3M

CIRCLE 69

Benchmarking

(Continued from page 158)

"Benchmarking isn't so important anymore; it doesn't provide that much more return on investment."
Abernathy, Abernathy Business Syst.

department, which is an internal service facility, is responsible for all compilers and program products. Benchmarking is part of our product-evaluation process, and how intensively we benchmark depends on the cost of the products we look at. If the item represents a major expense, then what are a few resources compared to what the corporation is spending?"

On the other hand, Betts says the department has difficulty selling the idea of fine-tuning on the low end of the scale. Small-systems users tend to say, she reports, "Why fix it if it isn't broken?" They may have more reason than ever to balk: Since January 1, users have had to pay for benchmarking under a new chargeback system.

Test software, too

Benchmarks, as Betts notes, don't apply only to hardware. Software can also be benchmarked. "An investment in software testing can spell the difference between confidence and catastrophe," say Thomas H. Berliner and Terry J. DeGarmo, consultants based in Carrollton, TX. (See "Test-drive your software," September 1983.) Testing "provides a meaningful, quantitative basis for ensuring that desired features have been included, and that they will perform as required." Though Berliner and DeGarmo don't use the term benchmarking, their suggestions apply to this subject as well.

They point out, for instance, that the decision to test or not often hinges on the cost. One company, they say, might choose to bear the cost if the applications are critical, while another might take the rather modest risks of adopting software already in wide use. The authors also recommend that software testing be considered an integral step in systems development and that it includes planning, test designing, and preparation of test data.

Testing of software raises a related issue: Is there packaged software available to help you conduct testing? The consensus of experts we consulted is that it would not be prudent to use standard software packages, even if they were available—and they're generally not. Jim Foster, who's with the State Purchasing and General Services Commission in Austin, TX, sums it up: "To be effective, the benchmark should duplicate your projected workload. And that's an individual characteristic."

This magazine's software editor tends to agree. "Needs are different, and you benchmark for those needs," notes our expert. "For payroll, you're interested in how fast you can process checks, and for a database system, you want to know how fast the software can pull records out."

Best use of the tool

Naturally, not everyone devotes as much attention to benchmarking as, say, Dahna Betts does. Even so, there are good ways and not-so-good ways of using this method.

The General Accounting Office report's authors found that "private-sector benchmarks tend to be much simpler and shorter in duration, and they do not try to represent the entire workload and project it for five to 10 years. Second, benchmarking is a cooperative effort [with vendors] rather than a seemingly adversarial one. . . . Third, private-sector firms . . . grant leeway on noncritical specifications."

Some authorities might argue that though such a flexible approach can simplify the benchmarking process, users may miss out on benefits or be led astray by vendors. Still others argue that benchmarking isn't worth the time, trouble, and expense.

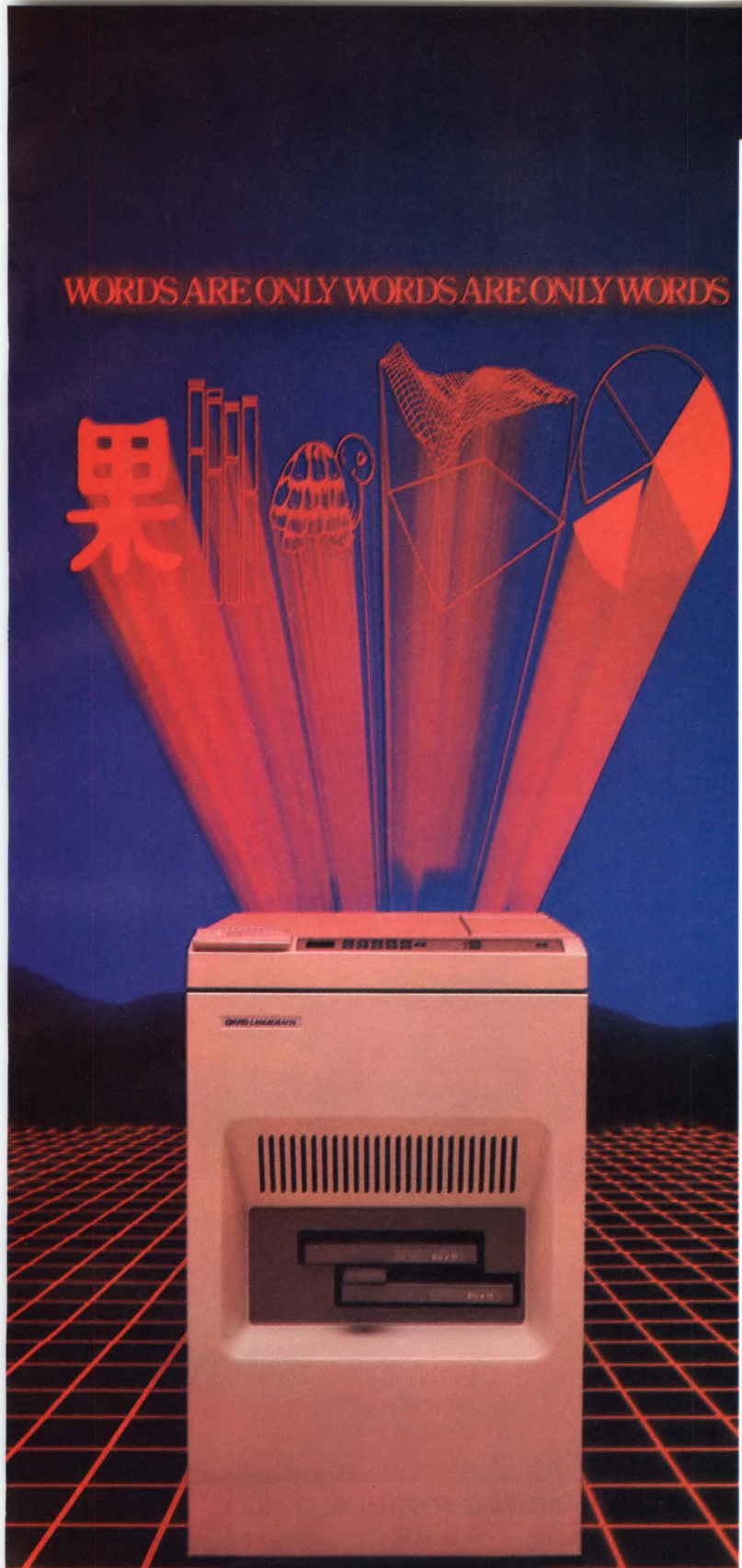
Benchmarking can indeed be costly—for both customer and vendor (if a vendor is involved, as is the case when large-scale testing must be done). On the subject of cost, the 1982 GAO report is eye-opening. Benchmarking a $43.7 million minicomputer system under Marine Corps consideration cost the Corps $47,120, and the vendors, including successful IBM, spent $1 million. A Goddard Space Flight Center benchmark cost the agency $24,162 and the vendors $75,000, on a contract of $7.2 million awarded to IBM. And the Internal Revenue Service spent $2,054,010 benchmarking a $102.6 million computer acquisition, while two vendors laid out more than $2.5 million; in this case, Sperry prevailed.

(Continued on page 164)

Benchmark defined

Though the term benchmark has common currency in MIS/dp, it originates in surveying. There, a benchmark is a standard—or reference—point, used to establish other points. It's carefully measured to provide longitudinal, latitudinal, and elevation data, and then permanently marked with an engraved brass disk.

In data processing, of course, benchmarking means a test program that exercises proposed equipment and software to determine their suitability in certain applications. Usually a benchmark measures performance in terms of speed, throughput, I/O activity, and the like.



Words Alone Don't Describe The Lasergrafix™ 1200 Printer.

The QMS Lasergrafix 1200 is a breakthrough in electronic page printing. But words alone just don't describe it. Because QMS designed the Lasergrafix 1200 to do so much more than words. With a built in intelligent controller that takes simple print commands through your normal data stream. Built-in applications firmware eliminates the need for additional software—and frees your computer's resources for other work.

The difference is graphic—for all your business, scientific and individual printing needs. Create forms that have multiple typefaces and letters up to ten inches high—all on the same line. CAD/CAM. Bit mapped and vector graphics. Pie charts. Bar charts. Even barcodes. At a crisp resolution of 90,000 dots per square inch. With a printing speed of 12 pages per minute.

And, of course, letter quality word processing.

The Lasergrafix 1200 interfaces with just about any computer system. With versatility that lets you take business graphics to the limits of your imagination. Ask for a demonstration. You'll discover that the whisper-quiet performance of the Lasergrafix 1200 speaks softer than words.

And says a whole lot more.

QMS®

QUALITY MICRO SYSTEMS, INC.

P.O. Box 81250 Mobile, AL 36689
Telephone (205)633-4300 Telex RCA 26 60 13

WHERE IMAGINATION LEADS

☐ Send me the Lasergrafix 1200 Information Packet, samples of mixed fonts, graphics and everything else it does.
☐ Please contact me to arrange a demonstration.

Name: _____ Title: _____

Company: _____

Address: _____

_____

Type of system you are now using: _____

Number of print workstations you are considering: _____

Prime applications for printer: _____

QUALITY MICRO SYSTEMS, INC.
P.O. Box 81250 · Mobile, AL 36689

CD

CIRCLE 70

The TeleVideo IBM PC
The best hardware for

TeleVideo versus IBM. Make a few simple comparisons and you'll find there is no comparison.

RUNS IBM SOFTWARE.

With the TeleVideo® IBM Compatible line—PC, XT and portable computers—you'll get the most out of all the most popular software written for the IBM® PC—more than 3,000 programs.

Because every TeleVideo Personal Computer offers the highest level of IBM compatibility on the market

THE BEST HARDWARE FOR THE BEST PRICE.

Features	Tele-PC	IBM PC	Tele-XT	IBM XT
Monitor	YES	OPTIONAL	YES	OPTIONAL
Screen Size	14"	12"	14"	12"
Tilt Screen	YES	NO	YES	NO
Quiet Operation	YES (NO FAN)	NO	YES	NO
Memory	128K	128K OPTION	256K	256K OPTION
Graphics Display (640 x 200 resolution)	YES	OPTIONAL	YES	OPTIONAL
Printer Port	YES	OPTIONAL	YES	OPTIONAL
Communication Port	YES	OPTIONAL	YES	YES
MS™-DOS/BASIC®	YES	OPTIONAL	YES	OPTIONAL
System Expansion Slot	YES	YES	YES	YES
RGB and Video Port	YES	OPTIONAL	YES	OPTIONAL
Typical System Price	**$2995**	**$3843**	**$4995**	**$5754**

compatibles. the best software.

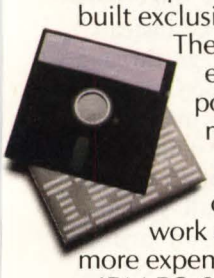
and has the standard—not optional—features you need to take full advantage of every job your software can do.

Study the chart at the left. It proves that TeleVideo—not IBM—offers the best hardware for the best price.

Note that TeleVideo's ergonomic superiority over IBM extends from fully sculpted keys and a comfortable palm rest to a 14-inch, no glare screen that tilts at a touch.

THE BEST MICROCHIPS.

What is perhaps most impressive about the TeleVideo IBM PC Compatible can be found deep within its circuitry. We use the same 8088 central processing unit that runs an IBM PC. But we also employ new VLSI (Very Large Scale Integration) microchips that are designed and built exclusively for TeleVideo. These interface more efficiently with the powerful 8088 and yield numerous benefits.



For example, our tiny custom chips do the work of many of the larger, more expensive circuit boards in an IBM PC. So we can offer a computer system that comes in one attractive, integrated case, is ready to run and occupies less desk space. A computer that edges out IBM's added-cost component system for reliability, ease of service and purchase simplicity.

Fewer circuit boards to cool also allowed us to eliminate the noisy, irritating fan IBM and most other PCs force you to put up with. And TeleVideo compatibles accept any IBM hardware options without modification.

THE BEST PORTABLE FOR THE BEST PRICE.

Features	TPC II	COMPAQ
High Capacity Storage	YES	NO
2nd Disk Drive	YES	OPTIONAL
Quiet Operation (No Fan)	YES	NO
Ergonomic Display	YES	NO
Communication Port	YES	OPTIONAL
International Power Supply	YES	NO
MS™-DOS 2.11	YES	NO
Graphics Display	YES	YES
Typical System Price	**$2995**	**$3710**

THE BEST LINE.

But the Tele-PC is only one element of the TeleVideo IBM PC Compatible line.

The TeleVideo XT is the best hardware for users of popular IBM XT software who would appreciate an extra 10 megabytes of storage capacity along with the advantages listed on the preceding chart.

As the chart above demonstrates, our portable IBM compatible computer, the TPC II, is far and away better hardware than COMPAQ.™ Better hardware—standard—at a better price.

THE BEST MANUFACTURER.

The TeleVideo IBM PC Compatible line is made by the world leader in multi-user computer systems and the number one independent manufacturer of terminals.

Our compatibles are available at participating ComputerLand and Entré (call 800-HI-ENTRE) dealers or you may call 800-538-8725 for the dealer nearest you. In California, call 800-345-8008.

Before you invest, make a few simple comparisons. You'll find that TeleVideo—not IBM or COMPAQ—has the best hardware for the best software. At the best price.

TeleVideo®
Personal Computers
TeleVideo Systems, Inc.

CIRCLE 40

Benchmarking

(Continued from page 160)

"If a system has a value of under $100,000, the vendor will do simple benchmarking, running a program and applying one or two days of analyst time," observes Auragen Systems' Robert Davis, who has written about benchmarking. "For a system worth $100,000 to $500,000, the vendor will work for a week or two. For more than $500,000, you can expect a lot of time and a couple of professionals working on the benchmarks."

Of greater interest to you, naturally, are the costs benchmarking exacts from the prospective customer. These are often difficult to quantify, so many estimates may be on the low side.

"Most everybody I know is getting away from benchmarking," testifies Steven A. Epner, who operates a consulting firm, The User Group Inc., and is founder and past president of the Independent Computer Consultants Assn. (ICCA), both in St. Louis. "It's no longer a valid part of the decision-making process in a business cycle."

Many skeptics agree, especially when hardware or software is modest in size and cost or when special conditions obtain. "Users don't usually benchmark *everything,* except in government," says a staff consultant in a conglomerate with annual revenues of more than $3 billion. John Landis, as we'll call him, adds, "We won't benchmark except for a special reason."

Sheer economics—and, specifically, changing economics—account for the decline of benchmarking, argues James Cortada. "The cost of personnel has risen, and the cost of hardware has fallen," he says. "Increasingly, buyers say, 'Let's go with the available data.' For many, it seems easier than going through time-consuming and technically difficult benchmarking."

The cost of equipment may generally be pushed higher, too, when the cost of benchmarking is added to vendor overhead, as the GAO study indicated it is. "If the government's benchmark requirements drive up prices," says Dennis Shaw, group director for planning at the GAO's Information Management and Technology Division, "they affect prices paid in the private sector or in government when it engages in sole-source buying. With competition, the government achieves substantial discounts on equipment."

Collective effort

For a time, the Association of Computer Users in Boulder, CO, commissioned benchmarking of small single-user systems and multi-user systems up through eight simultaneous terminals and published the results for members. But even among those subscribers, the interest wasn't so great as might be expected for such a useful service.

"We surveyed members to determine how our Benchmark Reports were being used," says Hillel Segal, president of ACU. "Among small users, we found that if there was a difference in run time of 20 percent or even 50 percent, it made almost no difference to them. They could live with response times within certain ranges if the programs were easy to use and users could interact with them well. The differences mattered to programmers, system developers, integrators, and dp managers buying massive computer systems, but not to the users."

That disturbs Segal, who maintains that the benchmarking done by vendors often doesn't reflect actual dp activities. "The vendors may not attack real-life problems; they may use synthetic benchmarks instead," he says. "A vendor may go through an exercise in finding the prime numbers, for example; how many programs in real life call for doing that? When the Association of Computer Users benchmarked small systems, we used accounting and order-entry programs and checked central processor utilization, input/output, response time, and the like."

"The reason benchmarking isn't so important anymore is that it doesn't provide that much more return on investment," says Frances Abernathy, who heads Abernathy Business Consultants Inc., Rockville, MD, and who frequently is hired as an expert witness when users and vendors go to court. "In government, the procurement process takes about three years, and buyers must go for a five- to eight-year buy. I don't know anyone who has a crystal ball accurate enough to project for eight to 11 years ahead. Instead of spending $100,000 to get a prediction of what the workload will be like, you might be able to buy two to four extra disk drives to handle some of that load."

(Continued on page 166)

GAO study available

A useful study of benchmarking in the federal government, published by the General Accounting Office in October 1982, is available at no cost in small quantities. The report contains figures on 73 computer procurements in the federal government and a rundown on the value of benchmarking and on the problems connected with it.

"Benchmarking: Costly and Difficult, But Often Necessary When Buying Computer Equipment or Services" was published under the name of the Comptroller General. Orders for up to five copies will be filled free; for larger orders, the price is $3.25 each. Contact the U.S. General Accounting Office, Document Handling and Information Services Facility, P.O. Box 6015, Gaithersburg, MD 20760, for information. The telephone number is (202) 275-6241.

NO DEC IS AN ISLAND.

Able's new Easyway/E Ethernet port controller makes tying together networks of UNIBUS PDP-11 and VAX computers easier than ever.

Easyway/E provides DEC systems with plug-in access to IEEE 802.3/Ethernet LAN's, with less CPU overhead and less network software than other Ethernet ports.

That's because Easyway/E implements ISO/OSI protocol layers 1 thru 4 on a single board occupying one UNIBUS backplane hex slot. Much of the potential LAN software you need is already in the firmware. So, your initial network development time and costs for DEC systems with VMS and RSX won't drag you under.

And this lifesaving implementation of protocol on-board also offloads the CPU, freeing up the processor to handle other tasks.

What's more, Easyway/E meets IEEE 802.2, 802.3 and NBS-4 standards for ISO/OSI layers 1 thru 4, so current and future communications with other DEC systems will be smooth sailing.

In fact, Easyway/E's architecture is designed to accommodate future networking needs. The single board is comprised of two modules, so tomorrow's protocols can be implemented quickly with less expense. Additional protocol support including X.25, SNA and TCP/IP will soon be available, as will software support for DECnet and UNIX.

Able offers a broad range of devices for DEC computers providing communications, memory expansion and interprocessor connectivity. All complying with FCC regulations.

So, to keep from getting stranded, pick your port carefully. Easyway/E. The standardized IEEE 802.3/Ethernet port for today and tomorrow.

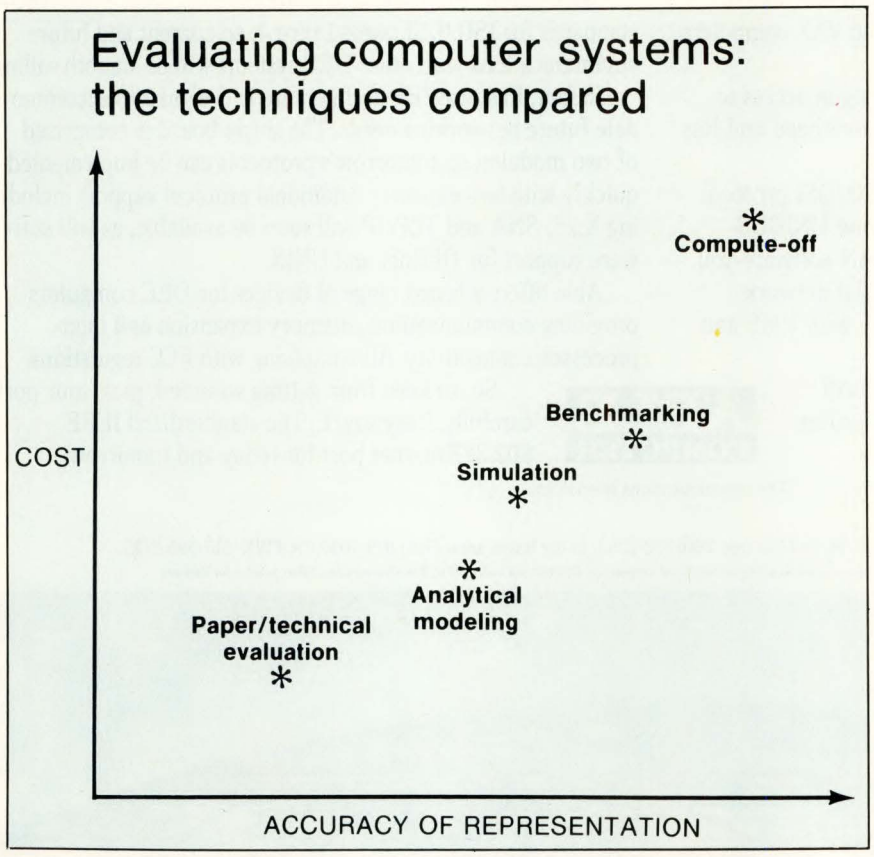
ABLE COMPUTER

The communications specialists.

1732 Reynolds Avenue, Irvine, California 92714. Call toll free: 800-332-2253. In the Irvine area: (714) 979-7030. Or, TWX: 910-595-1729.

Benchmarking

(Continued from page 164)



Accuracy of evaluation rises from paper/technical evaluation, which is the simplest to undertake, to the compute-off, the most complex. But so does the cost of the different kinds of evaluation, as this graph, from a benchmarking report published by the U.S. General Accounting Office, shows.

Cortada sees plenty of liabilities in benchmarking for the vendor, too, even beyond the high cost. "What a hassle!" he exclaims. "I've been appalled at the resources customers and I have had to pour into the projects. We—I, the customer, systems engineers, staff—went to a huge IBM facility and lived there a couple of weeks each time. Customers sent questionnaires weeks in advance to find out what our inventory of files was like, what programs—software, operating systems, languages—we had, what access methods were used, what job streams there were, how many terminals and how much disk space were on the system, and how many tape, disk, batch, and online jobs, etc. In my opinion, we haven't produced a product yet that justifies going through such a hassle again. The benchmarks worked out for me, but it's inefficient marketing."

What is a better way? In his book, *Managing Dp Hardware: Capacity Planning, Cost Justification, Availability, and Energy Management* (Prentice-Hall), Cortada opts for a heart-to-heart talk with a customer. They might come up with better specifications without a benchmark. "It's only one aspect of the decision process, after all the presentations and proposal writing," he maintains.

Another reason for dispensing with benchmarks is that many users are heavily committed to one vendor's products. That's the case even in certain government agencies, especially below the federal level. "I see a lot of sole-source buying, largely because a user is committed to a certain architecture," says Charles K. Winston Jr., executive director of the Automated Information Systems Advisory Council for the State of Texas, Austin. "There's not that much benchmarking at the mainframe level, because of the cost of wholesale conversion. IBM shops are the most venturesome; plug-compatible vendors can supply them."

At an eastern pharmaceutical plant, the manager of systems engineering and database adds: "We're pretty much standard with IBM and don't have much opportunity for benchmarking hardware. We look for functionality rather than whether one machine processes documents faster than another." He recalls that his company used tryouts as an alternative to benchmarking in settling on a word-processing vendor. "Initially IBM was picked without benchmarking," he says. "The company tried IBM's equipment but didn't keep it because it lacked functionality. So Wang word processors were brought in instead." Nonetheless, he says, there are some occasions for evaluating performance in advance. "We'll measure to make sure we're gaining something when we bring in a software package that's supposed to make things go faster," he points out, "as when we want to increase the speed of sorts or improve response time. But we don't run one product against another."

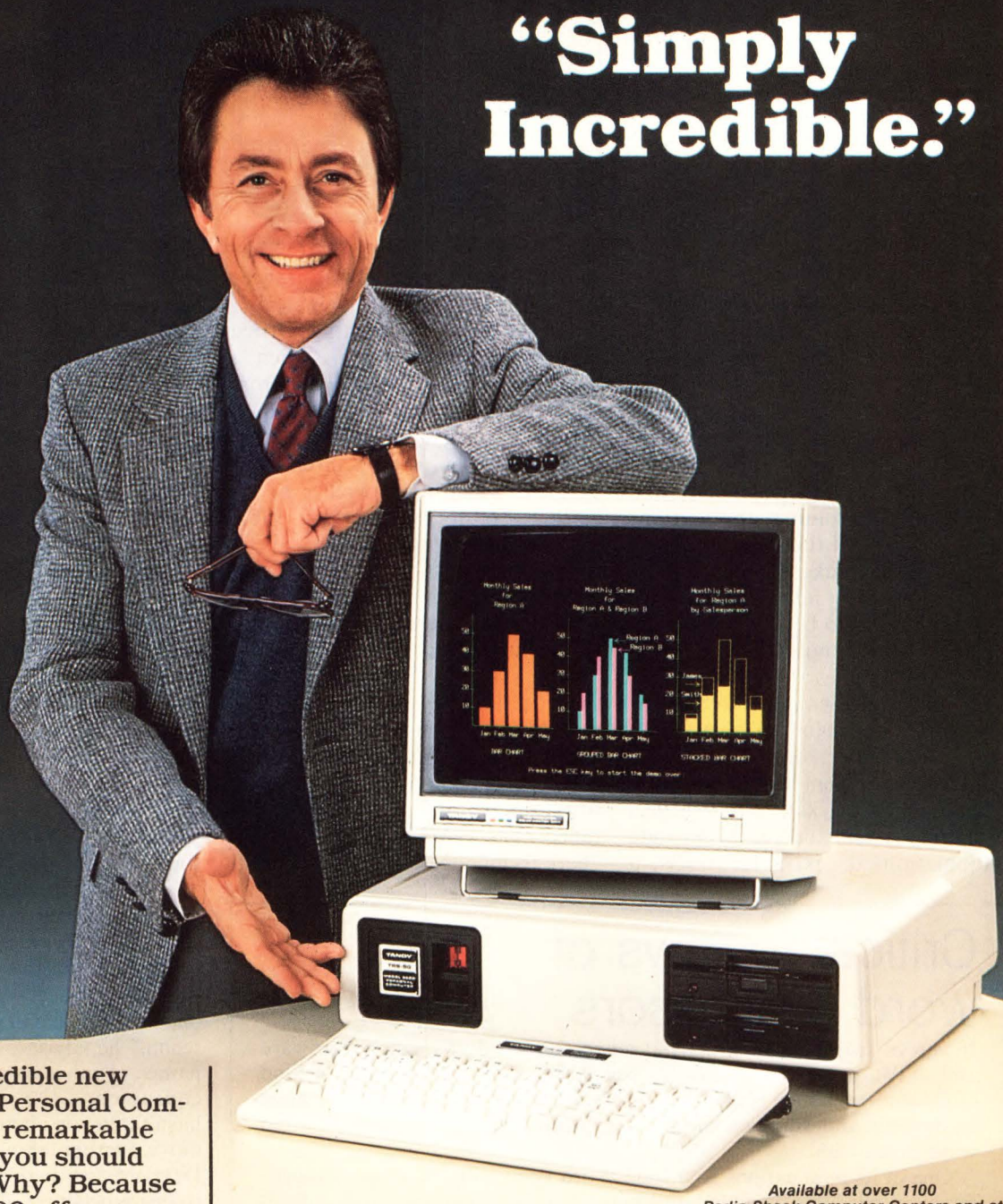
"If you're using an HP 3000, you're not likely to benchmark Prime or Data General equipment." *Segal, ACU*

Hillel Segal agrees. "If you're using a Hewlett-Packard HP 3000, you're not likely to benchmark Prime or Data General equipment," he says. "You don't generally look around much, because you bought what you thought was the best going. What you *are* interested in is upgrading to HP's higher-level machines in the 3000 line. That makes good sense."

Of course, there's nothing in a benchmark to *guarantee* that it's accurate and will produce savings over time. Though the federal govern-

The New Tandy 2000

"Simply Incredible."



Meet the incredible new Tandy® 2000 Personal Computer. A truly remarkable machine that you should get to know. Why? Because the Tandy 2000 offers more than other MS-DOS computers on the market. For instance, it's faster than the others. It offers more disk storage, and more detailed graphics. Expansion couldn't be easier. Even the IBM PC can't compare. With the Tandy 2000, you get to choose from the most popular and advanced MS-DOS software around, from word processing to electronic filing to spreadsheet analysis. The beautiful, ergonomic design makes the Tandy 2000 a wonder to look at and a breeze to use. And don't forget Radio Shack's extensive service network. Tandy TRS-80® Model 2000 systems start at $2999. Incredible? You bet!

Available at over 1100 Radio Shack Computer Centers and at participating Radio Shack stores and dealers

Radio Shack®
COMPUTER CENTERS
A DIVISION OF TANDY CORPORATION

Send me a free Tandy 2000 brochure.
Mail To: Radio Shack, Dept. 84-A-556
300 One Tandy Center, Fort Worth, TX 76102

NAME _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____
TELEPHONE _____

Prices apply at Radio Shack Computer Centers and participating stores and dealers. MS is a registered trademark of Microsoft. IBM is a registered trademark of International Business Machines Corp.

CIRCLE 73

Benchmarking

(Continued from page 166)

ment's benchmarks tended to produce desired results, there are notable exceptions. In one case, the U.S. Army projected a cost of $8.5 million over 60 months for teleprocessing support from Boeing Computer Services Co. Now the Army expects to pay $120 million instead.

When not to benchmark

For those and other reasons, many MIS/dp managers choose not to do conventional benchmarking. And for them, less demanding alternatives are available. One strategy is simply not to benchmark processing that doesn't use up a lot of resources. "You may have to benchmark the critical, high-volume applications with hundreds of thousands of transactions a day, like airline reservations," concedes John Landis. "But you don't have to benchmark for occasional equal-opportunity employment reporting."

Another alternative to benchmarking, a paper (or technical) analysis, depends on data from other sources' equipment evaluations (including benchmarks). "If you have a workable system and you wish to add applications or extra terminals, a paper analysis may cost you but $5,000 in staff time," advises Frances Abernathy.

The General Accounting Office suggests a paper analysis when a large volume of data is available from tests of equipment, as reported to professional organizations or in journals, and from manufacturers. For example, when the Lawrence Livermore Laboratory acquired a $36.7 million supercomputer, the experience of the staff in previous large-scale procurements made benchmarking unnecessary, even under governmental restrictions.

One step up from a paper or technical analysis is analytical modeling and simulation. Both these approaches use mathematics to represent a computer system and the workload, with the latter more detailed. The GAO report notes that "both techniques can be highly accurate, within a vendor's product line, for predicting equipment performance. . . . [They] can also be sufficiently accurate for compatible computers, . . . [but] may not be as accurate across vendor [product] lines."

Finally, in what may well be the most costly and time-consuming approach—more so, even, than benchmarking itself—a buyer may hold a compute-off. This calls for vendors to develop prototype systems. Naturally, a compute-off is practical only for a large buy and only when the stakes and risks are high.

But take the case of a user who simply doesn't have the sophistication or resources to do conventional benchmarking—let alone a compute-off. That's the problem that Robert Davis, at Auragen Systems Corp., addresses. Drawing from his own experience, Davis suggests a low-cost alternative: "Ask the vendor to show you an up-and-running system very similar to the one you want to buy, with the same number of terminals and files of similar size, running applications related to yours. That lets you see a real business running software like that you'll be using."

That's a reasonable strategy—and useful; but Davis adds a twist to the scenario. "Remembering that the sales representative will take you to a 'star account,' you should afterward phone the customer to get the real scoop," he advises. "And ask for the names of other users with the same equipment—the ones the vendor hasn't told you about—so you can inquire further about performance." Davis admits there's one shortcoming to this procedure; it favors large, successful vendors to the detriment of small, startup vendors with limited customer bases. Nonetheless, it's a sound, conservative way of getting answers, he contends.

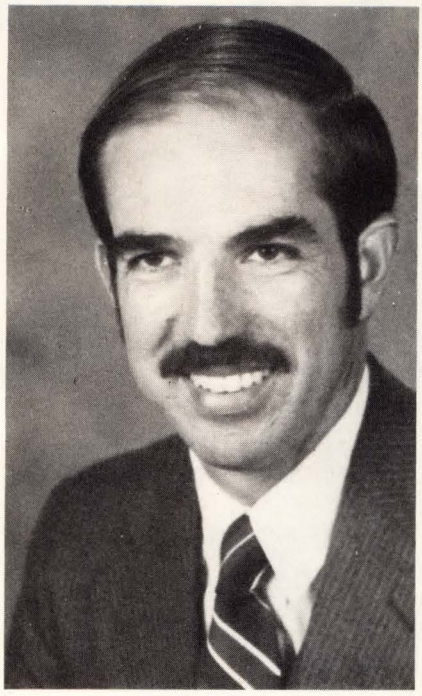
Consultant Steve Epner takes much the same tack as Davis. "Once you've located the software you need, say, for corporate general-ledger accounting," he advises, "look for a company site that's similar to yours and operating at close to the max-

Critical reviews of word processors

If you've searched for impartial advice on word-processing hardware and software, Buyers Laboratory Inc. stands ready to furnish it. A kind of Consumers Union for business users, BLI reviews and evaluates office equipment and supplies, such as furniture, copiers, typewriters, and word processors.

One of its publications is "Inside Word Processing," a monthly newsletter on products, vendors, and buying advice from users and consultants. Part of the subscription package is "The BLI Handbook of Word Processing Systems," which includes specifications and "candid user comments on competing systems—the good, the bad, and the awful." (The company, which derives all revenues from subscriptions, depends on subscribers for experience data.) Also supplied with a subscription are "Application Analysis Reports," rating available systems on 11 crucial tasks from long-document processing to forms generation.

More information can be obtained from Buyers Laboratory Inc., 20 Railroad Ave., Hackensack, NJ 07601. A subscription to "Inside Word Processing" comes to $175 the first year and $135 thereafter. BLI also publishes laboratory test results on office machines and furniture.



"The key in all selection processes—measurement, modeling, evalution—is understanding the workload." *Schwetman, Purdue Univ.*

imum the equipment and software can provide. Look at samples of output to check for a good fit and growth potential. This is a lot more cost-effective than benchmarking."

"Live-test demonstrations may be substitutes for benchmarks, even in government," says consultant Abernathy. "A couple of demonstrations, plus commitments by vendors to handle the workload on the machines, could save $250,000 in staff work devising benchmarks for big systems." But Abernathy takes a dim view of demonstrations under some circumstances: "In the small-business arena, live demos encourage sleight of hand. They're not performance measurements; they're functional measurements." She tells of a court case in which the buyer bought a system on the strength of a demonstration. But after two years, the vendor still hadn't delivered the software. "What in the world was demonstrated?" she asks. "If you can't get a disk with software on it right away, you haven't seen a legitimate demonstration of the software you're buying."

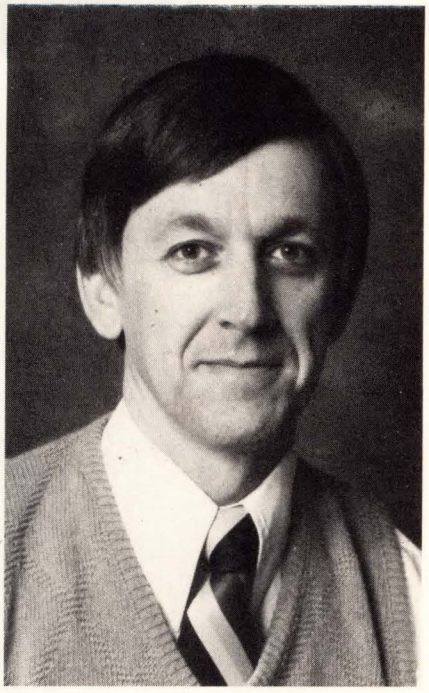
John Landis tells how his colleagues took yet another route when the question of benchmarking a software package came up. Landis explains that his company's principals felt benchmarking, for all its expense, wouldn't provide that much additional value. So they decided to obtain information on the software, which had been around for quite a while, from others who had installed it in similar settings.

"We have a lot of contacts in this city, with major corporations within half a dozen blocks," Landis notes. "Our company is big enough that our employees belong to all kinds of professional organizations, where more information is available."

Cortada suggests several more alternatives. One of them resembles Frances Abernathy's suggestion: "If you're installing a large system, spend half a million more for a better box [processor], and, in effect, you have purchased cost avoidance. You can do many things, such as increasing the size of memory, boosting internal speed, adding more disk space, redistributing disks across multiple channels, offloading channels if they're too crowded, and shifting workloads so your response time changes."

"Ninety percent of government customers witness benchmarks; only 50 percent of commercial customers do." *Davis, Auragen*

Cortada admits many managers are afraid to try another of his recommendations: "Change the operating system," he proposes. "If you put an old operating system on a new machine, total capacity drops," Cortada says. "To utilize a machine to its maximum capacity, the operating system should match the processor. For example, some users go to IBM's top-of-the-line 3081 but put in an old release of MVS like 3.8—now four or five years old—instead of what IBM recommends, MVS/XA. The same



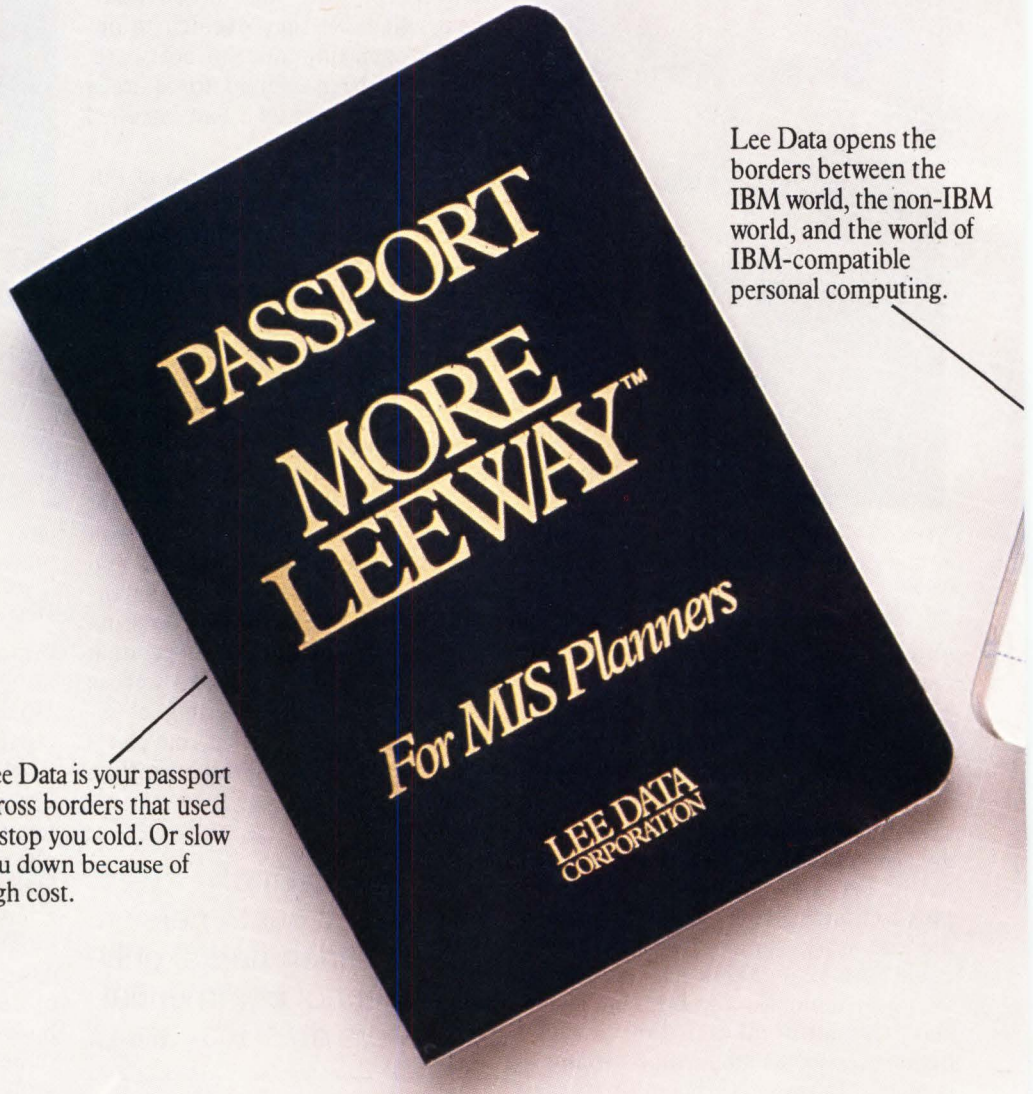
"Benchmarking can soak up as much money as you care to throw at it, and it will never exactly duplicate your real situation." *Jackson, Mitre Corp.*

principle of using an up-to-date operating system is just as applicable to Honeywell, Burroughs, DEC, and other machines."

When offered this choice, says Cortada, many a customer objects, for reasons that go beyond making a change. "The customer may say, 'This operating system is free, while a new one will cost me $1,500 a month.' But is it really free? In many cases, it isn't. And you can do a sort of benchmark, as customers of mine have done over the years. Call up someone who's using the new operating system and ask how the machine's performing."

Whether you opt for true benchmark tests or one of the lower-cost, less-hassle alternative procedures, "the key in all selection processes—measurement, modeling, evaluation—is understanding the workload," reminds Herb Schwetman of Purdue University. "If you've gone to the effort of collecting a set of benchmarks, then you've really learned what you're doing with a system. It has a way of firming up fuzzy ideas and making the selection process

MORE IN CROSSING THE IBM



Lee Data opens the borders between the IBM world, the non-IBM world, and the world of IBM-compatible personal computing.

Lee Data is your passport across borders that used to stop you cold. Or slow you down because of high cost.

Lee Data is your passport to MORE LEEWAY™ in planning the growth of your information system.

The Lee Data family of displays, controllers, printers, IBM-compatible personal computers, and Coax Eliminators gets you across borders that used to stop you cold. Or slow you down because of high cost.

And when you travel with Lee Data, you're in good company. Many of our customers are in the *Fortune* 1000, a fact that speaks for the quality of our service as well as the quality of our products.

But, perhaps most importantly, the design of every Lee Data product starts with you. With the

LEEWAY™ /NON-IBM BORDERS.

Add concurrent local processing, plus host/PC file transfer, to any Lee Data monochrome display by simply plugging in the Personal Workstation (PWS) module.

The Lee Data station printer enables any Lee Data display to generate hard copy locally. Controller-level printers include dot-matrix, letter quality, and line printers.

Travel freely across the IBM, non-IBM, and IBM PC borders on a single display, with high-resolution presentations in up to 4 different screen sizes.

BSC or SNA. Dual IBM host capability (local/remote or remote/remote). 3270+Async!

Save up to 87% in cabling costs. Provide remote clusters of up to 8 displays with channel response time. Bridge distances of more than 5,000 feet using coax or existing twisted-pair wiring.

real-world wants and needs of MIS people, management, and end users.

At Lee Data, our job is to give you MORE LEEWAY in crossing the borders you face today. And the new borders you'll face tomorrow.

CIRCLE 136

Call 1-800-LEE-DATA for our FREE booklet, **MORE LEEWAY: Passport for MIS Planners.** Or write to Lee Data Marketing Services, 7075 Flying Cloud Drive, Eden Prairie, Minnesota 55344.

Name _____

Title _____ Company _____

Address _____

Phone _____

LEE DATA CORPORATION

1100-501

Benchmarking

(Continued from page 169)

more straightforward. It's essential for any technique to develop a description of the workload, whether that turns out to be a set of programs you transport to other systems or something else."

Abernathy hammers, too, on the point that benchmarks should always represent the workload, present and future. "Be sure you're not benchmarking the past," she warns. She admits that it may be difficult to predict what's ahead. What's more, if you truly buy for growth expected in eight years, your machine may run at only 20 to 30 percent of capacity for the first five years. That, of course, invites charges of overbuying from the executives who review purchases.

Another important item to consider is how the vendor handles the data you proffer. Don't give in to vendor ploys, however attractive or convenient, suggests Robert Davis: "A vendor may say, 'Oh, your I/O is different from my mainframe's; just annul those instructions.' The vendor likes it when a customer allows such license, and the customer may believe that they're still comparing apples and apples when the results on response time come in. Many times I've seen a customer buy a computer, install it, and put a working application load on it, only to bring the computer to its knees. The machine completely failed to deal with I/O, because the benchmarks focused on how fast the cpu can take instructions."

Vendors ordinarily have the upper hand for another reason, says Davis. The MIS/dp manager, after all, gets into benchmarking only once in a long while; the vendor does it much more often and has experience to draw on. "A vendor knows how the competition will perform," says Davis. "If the ABC Corp. is in the running, then the XYZ Co. knows roughly—depending on the language to be used—how it stands. Thus XYZ can form a strategy, accepting the benchmark if it has a faster box that can beat the competition, or dancing around the benchmark if it can't win. Some vendors in a strong position *want* benchmarks and even push their prospects in that direction. A senior sales representative who's well trained is a master at controlling the situation."

Davis points to another pitfall in the benchmark process. "Ninety-nine percent of vendors are honest, but sales representatives are under intense pressure," he says. "The customer may tell a vendor rep to run a program and then walk away. The rep thinks: 'I have an optimizing code here and a special memory configuration. I'll put them in even though the customer won't have them on his machine.' He doesn't want to lose out on a $200,000 order because his machine runs the job in 10 seconds and someone else's runs it in eight seconds."

"In many cases, users don't attend benchmarks," Abernathy adds. "And if the protocols aren't clear, the vendors can do anything they want."

Precautions to observe

To protect your interests in situations like this, Abernathy recommends taking specific steps. Here are some of them:

- Specify the protocol to be run—whether or not the programs can be changed, whether the operating system can be modified so it runs faster under a particular load, whether nonstandard compilers can be used, whether disks faster than those proposed can be used.
- Make sure the benchmark takes into account the workload that the system will have to bear, especially if you're upgrading to a larger database or adding on more terminals and other features.
- Try to arrange for the vendor to run the benchmark or demonstration at a site where you can talk to an independent user, a site with a con-

Organized to evaluate computer performance

Though it has but a modest interest in benchmarking, the Computer Measurement Group (CMG) deals with the subject from time to time. And, despite its name, it's graduated to computer-performance evaluation (CPE).

Members include "CPE analysts and computer professionals" who contribute to regional groups, an annual international conference, a quarterly newsletter, and a vendor-liaison program. Dues are $20 a year.

Evolving from a Boole & Babbage user group started in 1971, CMG has grown rapidly. More than 1,000 professionals attended its December 1983 conference. The organization is administered by Applied Computer Research (ACR); the address is Computer Measurement Group, P.O. Box 26063, Phoenix, AZ 85068.

And that's not all: There's still another group devoted to evaluating computer performance. It's called SIGmetrics, SIG standing for Special Interest Group and metrics for measurement, sponsored by the Association for Computing Machinery (ACM). The organization holds an annual symposium (this year's scheduled for August 22 through 24 in Cambridge, MA), publishes articles and proceedings in its newsletter, and cosponsors conferences with other organizations.

You can learn more about SIGmetrics by writing to its chairman, Herb Schwetman. He's an associate professor in the Department of Computer Sciences, Purdue University, West Lafayette, IN 47907.

figuration similar to yours.

- If you benchmark at a vendor site, grab all the copies of all the output and ask for copies of screens you saw used; take notes and consider tape-recording conversations.
- If you witness a demonstration, make sure that the product version you see is the same as the one being offered to you.
- For a multiterminal system, check to see that the file sizes being used are roughly the same as yours and that the complexity of inquiries and updates is realistic.
- If you can sell the vendor on doing it, rerun the benchmark as an acceptance test after installation, checking to see that it runs as fast as before.

Benchmarks, if they're to be used effectively, should figure in dealings with vendors at an even earlier stage, according to Joseph Auer and Charles Edison Harris of Computer Negotiations Inc. In their book, *Computer Contract Negotiations* (Van Nostrand Reinhold, 1981), they list benchmarking paragraphs that should be part of the request for proposal sent to vendors. In those paragraphs are the conditions under which the benchmarks must be run, such as a performance requirement of "10 transactions per second with a response time not to exceed five seconds" for a specific software package. And each bidder is called on to submit the benchmark equipment-configuration for approval, in Harris and Auer's model request for proposal.

Preparing worthwhile benchmarks requires managers to do a thoughtful, thorough job, designing benchmarks specific for both present and future workloads. Moreover, managers must keep their eyes peeled when the benchmarks are run, to ensure against the potential excesses of eager sales representatives.

If you keep these qualifications in mind, you may find good use for benchmarks, even if they're only part of a grander scheme for evaluating computer-system performance. Despite their limitations today, benchmarks can still be useful tools. □

Coming next month

The Top 100 in data processing: The fifth edition of the Gartner Group's listing of dp's top vendors.

When you have to play the S.O.B.: When top management makes unpopular decisions, you end up playing the bad guy.

Presto! Mainframe computing gets personal: A host of new software packages turn dumb terminals hooked to big machines into personal computers.

Micro modems let you reach out to the world: Modems are the essential connection between your personal computers and a world of resources.

Prototyping—Shortcut to applications: Prototypes let you try out new concepts before committing expensive resources to them.

In pursuit of WP software: A compendium of software that turns micros and minis into word processors.

Information-centers roundtable: Users discuss the many ways to implement an effective information center.

The care and feeding of disks: Eight guidelines to better diskette maintenance.

Outstanding data center: A photographic tour of Toyota Motor Corp.'s Torrance, CA, data center.

In June *Computer Decisions*

VOICE MAIL: IS ANYBODY

Are managers taking notice of voice mail's promise to make business communications more efficient?

by John Seaman,
Data Communications Editor

Voice mail is the bridesmaid of office automation: Always on the fringes of the celebration, but never the center of attention. Despite a lot of admiring talk about the promise of the technology, corporations have not rushed to install "voice mailboxes" for executives, managers, and professionals. Moreover, some pilot voice-mail systems are actually being dismantled in favor of text-based electronic-mail systems.

However, many experts believe voice mail has an important role in the automated office, even if it isn't the leading one. Voice mail, they say, will be part of message systems that integrate text *and* voice. Such systems are just beginning to appear, and are expected to become practical options for managers by about 1987, according to some estimates. Some venturesome MIS/dp managers are installing voice-mail systems now to position their organizations to take advantage of the integrated future. These managers say they're also achieving immediate benefits.

Are these managers intrepid pioneers or shrewd system-shoppers who have recognized a practical method of improving communications? The next two years should answer that query, but in the meantime, there's some evidence that interest in voice mail is picking up, despite the pilot-project disappointments. Probe Research, a Morristown, NJ, consultancy, reports that about 500 voice-message systems have been installed to date—350 of them during the last year.

Some observers argue that voice mail is finally taking off as a practical technology, offering lots of possibilities to large and small users alike.

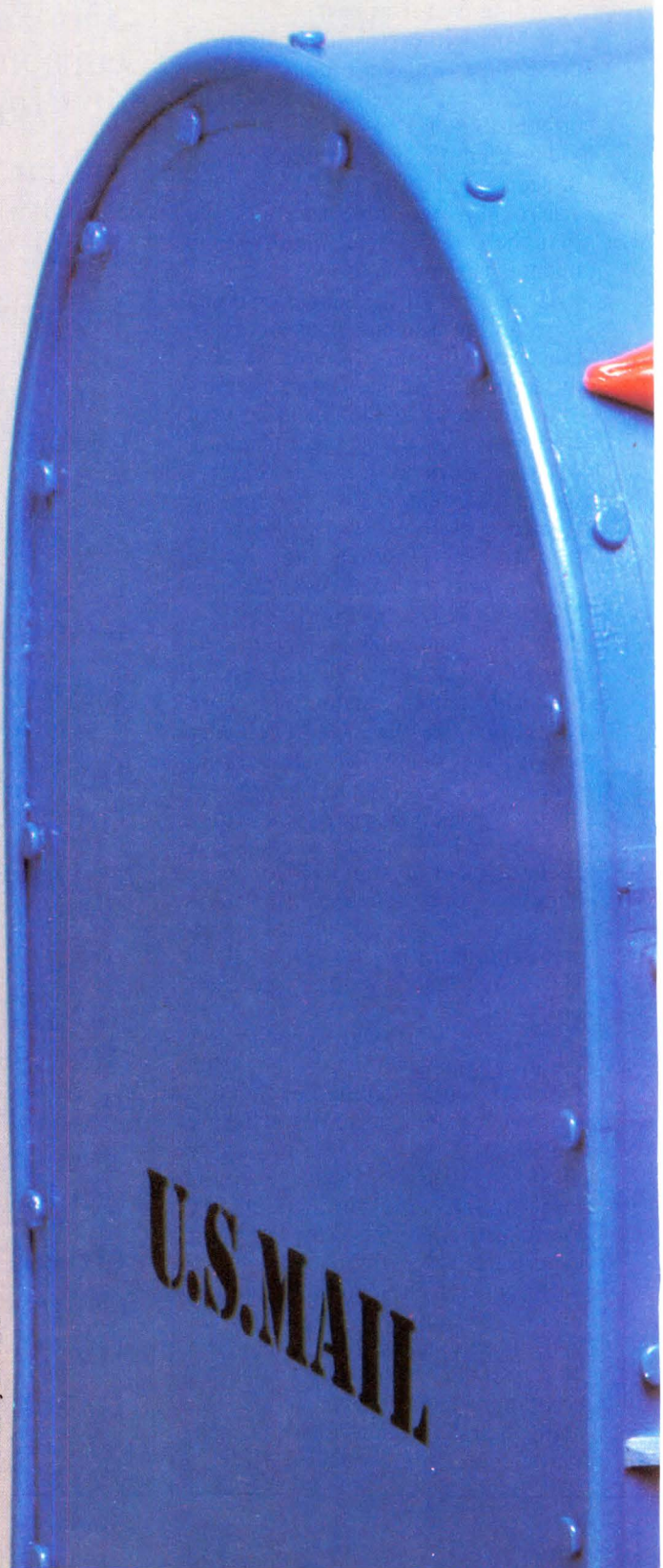


Photo by Bill Oliwa

LISTENING ?

Venture Development Corp., a Wellesley, MA, market-research house, predicts a compounded annual growth rate for voice mail of 185 percent between this year and 1987. Three years hence, industry revenues should total $2.3 billion, of which the lion's share, $1.9 billion, will come from voice-mail hardware integrated with private automatic branch exchanges (PABXs).

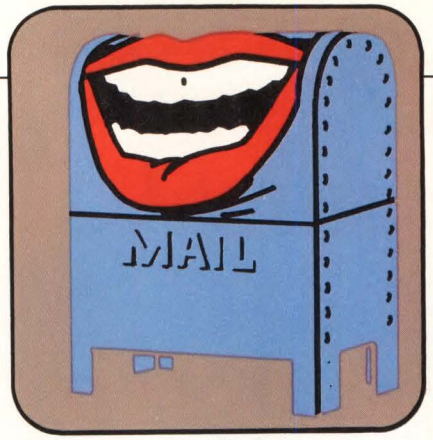
How does voice mail make communications more efficient and effective? You can broadcast the kind of messages that might ordinarily be typed in memo form and photocopied for distribution to all of your subordinates—without the paper. It lets you deliver a message at a specific time even if neither you nor the person you call is near a phone. The promise is simple: the end of the all-too-ubiquitous pink message slip and telephone tag.

Despite these potential benefits, however, corporate managers have been turning a deaf ear to voice mail. The reasons are complex. Voice mail has suffered—possibly unfairly—from a reputation for klutziness earned during its early years. Those early systems had many deficiencies. They were very large, expensive, computer-based systems that could not answer telephones automatically. The reason: Poor interfaces between the computer and the telephone system.

Quite a few of the early systems (as well as some

Voice Mail

(Continued from page 175)



that are still being offered today) were difficult for first-time users to learn. They also lacked key convenience features, such as automatic answering, "message-waiting" lights and signals, and nondelivery notification. Finally, many were difficult to install and manage. IBM's Audio Distribution System (ADS), an early voice-mail offering, has been plagued with user problems. The Morton Chemical division of Morton Thiokol, the large Chicago-based chemical producer, discarded a large ADS system after it failed to work properly. Du Pont, another chemical giant (Wilmington, DE), tried and rejected systems from both IBM and VMX Inc. before settling on DVX from Wang Laboratories.

Not all the first efforts ended in frustration, failure, or both. Corning (NY) Glass, for instance, acknowledges that its implementation of voice mail more than three years ago was speculative. Three users were given voice mailboxes in a service bureau in September 1980, and they caught on so well that in December of the following year, a $500,000 voice-message system from VMX was brought in-house to serve 200 employees. Now, says John Parker, director of the information-services division, Corning has 2,500 users, representing 56 percent of its white-collar workforce.

Until recently, voice mail also suffered from an identity problem. From its inception, voice mail has been considered an alternative to electronic mail, a more popular text-message technology. Of course, there is an important distinction between the two systems. To use electronic mail, the sender and the receiver must have compatible devices with keyboards.

To many, that's electronic mail's big drawback—you have to type to use it. But the conduit of the voice-mail message is the telephone. Telephones are everywhere and all of us have used them since we were children. Thus, voice mail is open to a far larger community of users than is electronic mail. Voice mail's big drawback, as far as users are concerned, has been its reliance on speech—many users are more comfortable with written messages.

For many of the corporations and other organizations installing voice mail, voice messages are a logical extension of text-based systems. These users don't view electronic mail and voice mail as irreconcilable alternatives, but as members of the same technological family. Cigna Corp., the big Philadelphia-based insurance carrier, installed a VMX system with this in mind, says Arthur Alleva, director of office systems. "Not everyone is a member of the 'keyboard community,'" he says. "For those who are not, we offer voice mail."

Executives find the Voice Message Exchange from VMX convenient for storing and forwarding messages, and that cuts down on the amount of telephone tag they play each day.

Additional voices

Cigna is one of the organizations that have implemented voice mail during the last six months. Zondervan Corp., a big Grand Rapids, MI-headquartered religious publisher, is another, and both report good results. The Cigna and Zondervan systems serve at least 200 station users, a number that some experts believe is a "critical mass" for success. However, some smaller users have reported good results, as well. Contract Freighters Inc., a Joplin, MO, trucking company, and TFB Public Relations, Palo Alto, CA, are two such organizations.

It used to be that only Fortune 500 corporations could afford to install voice mail. But the number of ways for an organization to install voice mailboxes has expanded since then,

Higher Tech

Lower Cost

CompuPro 10™

The Multi-User Business Computer

Increased productivity. It's one of the most important reasons why you want a business computer. *And* it's the most important reason you should choose a CompuPro 10 when it's time to buy that computer for your business.

The CompuPro 10 is the perfect example of a computer that's appropriate for business. Unlike personal computers, the CompuPro 10 is designed to be operated by as many as four people at the same time. So it at least *quadruples* the output of any personal computer. Even a whole network of personal systems can't compare. In price, performance, or productivity.

Power Tool

Personal computers don't come close to the capacity of the CompuPro 10, either. It's like comparing a manual tool to a power tool. Because the CompuPro 10 has the power to keep far ahead of the busiest workers. So it leaves personal computers far behind.

You can expect this power tool to answer your needs tomorrow as easily as it does today. Because the CompuPro 10 has the flexibility to run over 3,000 CP/M® programs. It even comes with a library of the most popular software programs, including word processing, database management, financial analysis, typing tutorial and executive record-keeping.

What makes the CompuPro 10 even more amazing is you get so much for so little. It has one of the lowest cost per user ratios of any high-performance multi-user microcomputer on the market.

One of the Longest Warranties

To make this entire package almost too good to be true, we back the CompuPro 10 with a full 12-month warranty—generally nine months longer than the competition. In fact, we're the first to include nationwide, on-site service through Xerox Americare™ under the warranty.

With any other personal or multi-user computer, you're paying too much for too little productivity. There's only one way to get higher technology at a lower cost: The CompuPro 10. It's the essential multi-user computer for business.

CompuPro®

A *GODBOUT* COMPANY

3506 Breakwater Court, Hayward, CA 94545

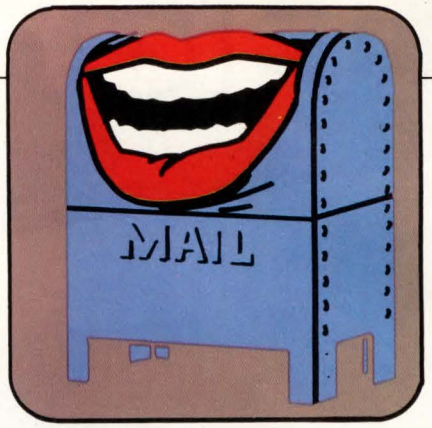
For a free copy of our business computer buyer's primer and the location of the **Full Service CompuPro System Center** nearest you, call **(415) 786-0909** ext. 206.

CP/M is a registered trademark of Digital Research Inc. CompuPro 10 is a trademark of **CompuPro**. Americare is a trademark of Xerox Corporation.

CIRCLE 74

Voice Mail

(Continued from page 176)



giving managers more options. With recent breakthroughs in performance and price, small systems (under 100 stations) have become cost-effective for corporations with less than $50 million in annual revenues. *Very* small organizations can ease into voice messaging by renting mailboxes from central service bureaus, such as those operated by National Phone Centers Inc., Voicemail International, and GTE.

There's even a voice-mail service bureau exclusively for truckers, says Keith McCoy, traffic director for Contract Freighters. Reachnet is operated from Lincoln, NE, by American Truckers Inc. for individual truckers. Independents and drivers working for larger carriers like Contract Freighters can subscribe for a $5 initial fee, a $5-per-month access charge, and 75 cents per message. "It can be rather costly," says McCoy, "but the truckers love it because it saves them a lot of time."

More options and technological improvements are always attractive to managers. But voice mail may work for your organization now because it can save money. In the wake of the AT&T breakup, any communications technology that can save money has attracted notice. Experts and users alike expect communications costs to rise, although the increase won't be known until rate increases and charges for access to the local phone loop are settled. The cost of local phone calls is the subject of particular concern among executives. For decades, the cost of local service has been held artificially low by subsidies from long-distance revenues; in the wake of divestiture, it is free to float up to its real level. Those possibilities have been enough to prompt some corporate executives and managers to give voice mail a second listen.

Voice mail can save money in several ways. Most important, it can cut telephone bills by reducing the number of calls necessary to deliver messages to busy employees and executives. Voice-mail systems allow callers to leave detailed messages and wait for a return call to discuss the issues involved. Voice messages tend to be shorter in duration than normal phone calls, and that also shaves telephone bills. For large organizations, another possible saving is the elimination of message centers.

For example, Corning Glass has cut the communications costs incurred by employees who support sales reps in the field, says John Parker. "It used to be that salespeople

The integrated future of "messaging"

The new DECtalk system from Digital Equipment Corp. (DEC), Maynard, MA, offers a look at the future of so-called messaging systems. DECtalk converts the electronic output of a word-processing terminal into a synthetic re-creation of the voice of a man, woman, or child.

DECtalk can read anything fed to it by almost any computer or terminal, and it has a virtually unlimited vocabulary. It speaks through a built-in speaker, another speaker system, or, most significantly, through a telephone. DECtalk makes a Touch-Tone phone a computer terminal, giving employees access to information never before available.

Businesses can put DECtalk to work in very practical applications. For example, the system might be used to impart electronic-mail messages to executives at any time, day or night. Also, sales representatives in the field might call DECtalk during a sales call to discern whether certain products are in stock and when they can be shipped. Customers can also call in to arrange for service and get information 24 hours a day.

DECtalk compares "text" words to a combination of dictionaries and sophisticated sound rules. In many ways, DECtalk is more sophisticated than earlier synthetic-speech systems. For instance, it won't garble words or babble unintelligibly when it doesn't understand what it's reading. The system interprets the context of words within sentences. For example, when reading *$125.25,* DECtalk will say, *One hundred twenty-five dollars and twenty-five cents,* rather than *Dollars one two five point two five.* Also, DECtalk knows enough to say *Saint Francis Street* when it sees *St. Francis St.*

DECtalk is already being piloted by MCI Telecommunications Inc., which uses it to answer customer questions. Also, Shawmut Bank of Boston is using DECtalk for account-status and -balance reporting to corporate customers.

Further refinements of DECtalk can be expected, according to the vendor. For example, DECtalk could perhaps be tied in with optical-character recognition (OCR) devices, enabling printed or typed messages, mail, or even books to be converted into voice output. At present, DECtalk can convert *only* the electronic output of a terminal or computer. The Kurzweil Reading Machine (the rights to which are owned by Xerox Corp., Stamford, CT), a device used to convert printed text into speech for the blind, is a possible partner in future versions of DECtalk.

Further down the road, DECtalk could be tied to voice and electronic mail in voice-recognition systems.

called in frequently using credit cards," he says. "Now, they need to make only one call. Sales groups of 20 to 30 employees report savings on the order of $60,000 a year using voice mail. If you multiply that throughout the company, it adds up to quite a lot."

Voice mail can also help to cut In-WATS, or 800-number, bills, as Contract Freighters discovered. The trucking company has a new CBX II PABX with the Phonemail voice-mail feature from Rolm Corp. Contract Freighters previously employed eight clerks to field 1,700 calls a day, mainly from drivers and customers, says Keith McCoy, traffic director. Calls averaged between three and four minutes each, as customers relayed orders and drivers called in to get directions for deliveries and pickups.

The Phonemail system will cut 25 percent of the daily load of calls to less than 30 seconds in duration, McCoy estimates. Another 25 percent will be reduced to between 30 seconds and one minute, and the total number of calls will be reduced as drivers learn to pick up messages left in their voice mailboxes. A side benefit, says McCoy, is that the business communications of executives are more effective and immediate. In-WATS savings are projected to reach about $12,000 a month when the system is fully functional.

Intangible advantages

In addition to these "hard-dollar" savings, voice-mail systems can save a lot of time. Not only is less time spent in wasteful rounds of telephone tag, but managers and secretaries also no longer have to jockey with pink message slips. The *effectiveness* of employees is thus enhanced. Such intangibles are difficult to quantify, but they're significant nonetheless. They may show up when a large sale is saved or an economy realized. Similarly, since a large percentage of a manager's workday is spent on the phone, even a small percentage reduction of this time can contribute to better overall organizational effectiveness.

Cigna set out to capitalize on some pretty tangible intangibles right from the start, says Arthur Alleva. "We try to use the VMX system to help us get new business," he says. "We use it to provide timely quotes and rate information to support our independent agents. The marketing, policy-underwriting, and claims groups will all eventually be tied into the system. And finally, we use it to make the decision whether we should offer a particular coverage." The sum of cost savings and operational efficiencies pays for many voice-mail systems in less than a year, some organizations have found.

Of course, the AT&T breakup also gives managers more responsibility for setting up communications

Current voice-recognition systems, such as those developed by Votan, "hear" limited vocabularies of spoken words and translate them into printed or crt output. In these systems, the host computer can make certain decisions about each caller, according to his or her voice. For instance, when a caller wants to check on inventory and enter an order, the computer can determine if he or she is an authorized sales rep, manager, or executive before processing the request.

DECtalk costs $4,000 per module, including one incoming phone line and one line to the host computer. Most business applications will require more than one module. Shawmut Bank, for example, has four.

DECtalk from Digital Equipment Corp. transforms output from personal computers or terminals into synthetic speech. A variety of voice "personalities" is available.

Voice Mail

(Continued from page 179)

systems. Ma Bell is no longer around to provide systems on a turnkey basis. Even large corporations are perplexed about the best way to proceed. Although AT&T Communications is expected to introduce a voice-mail system eventually as an adjunct to its System 85 digital PABX, managers will have to look elsewhere for voice-mail systems in the meantime.

The regional operating companies should soon become a new, possibly attractive, single source of systems. Some of the independent telephone common carriers already offer voice mail. Southern New England Telephone, New Haven, CT, is selling and leasing NEAX 2400 PABXs from NEC with a voice-mail option.

Some organizations prefer systems that deploy more than one vendor's products because they can meet special needs more effectively than general-purpose systems. TFB Public Relations has just completed one such setup; it deploys a Voicememo system from Centigram and small Amtel printers on each user's desk. "Information and speed are our most important requirements," explains Ford Kanzler, account manager, "but we also have a need for documentation." Of course, this approach requires that you operate more independently than before and make more purchasing decisions on your own.

Voicememo uses existing telephone wiring and is easy to install. It can be used with or without a PABX. TFB's installation costs were $75 and $150 per station, depending on the number of special features.

Voice mail isn't an automatic way to cut communications costs, as many early users discovered. The technology won't work its magic if users don't accept it and get into the act in a big way. How can you ensure they will? Recent user experiences suggest that focusing on who will use the system is one of the secrets of success.

Most corporations start out offering voice mail to managers who travel extensively or who are responsible for far-flung field offices. These employees make good "guinea pigs" in a successful implementation strategy. Not only can they make immediate and productive use of the system, but also they will encourage others in the organization to accept it. At Cigna's Special Risk Department, for instance, Dan Katz, assistant vice president, uses the system to stay in touch with 10 office managers in cities across the country. "I no longer have to dispatch written memos to office managers," says Katz. "It's much faster to use the 'all points' [broadcast] feature of our system. The system does away with the 'ping-pong' calling back and forth that we once couldn't avoid."

Cigna's strategy was to sell voice

Sampler of voice-mail suppliers

Stand-alone systems

Applied Voice Tech.
(206) 754-9177
Circle 401

BBL Industries
(404) 449-7740
Circle 402

Centigram
(408) 734-3222
Circle 403

Commterm
(617) 663-4442
Circle 404

Computalker Consultants
(213) 828-6546
Circle 405

Comtel Broadcasting
(317) 877-6050
Circle 844

CXC
(714) 660-1801
Circle 406

Digital Sound
(805) 963-8951
Circle 407

IBM
Contact local sales office
Circle 408

Lanier Business Products
(404) 329-8000
Circle 409

Sperry
(215) 542-4011
Circle 410

Sudbury Syst.
(617) 443-8966
Circle 411

Sydis
(408) 945-1100
Circle 412

VMX
(214) 699-1461
Circle 413

Voicemail Int'l.
(408) 496-6555
Circle 414

Voicetek
(617) 964-8820
Circle 415

Votan
(415) 490-7600
Circle 416

Wang Labs.
(617) 459-5000
Circle 417

Service bureaus

GTE
(203) 965-2000
Circle 418

National Phone Centers
(312) 559-1122
Circle 419

Voice & Data Syst.
(312) 559-1122
Circle 420

Voicemail Int'l.
(408) 496-6555
Circle 421

PABX-based systems

AT&T Information Syst.
Contact local sales office
Circle 422

Digital Sound
(805) 963-8951
Circle 423

Ericsson
(714) 895-3962
Circle 424

Genesis Electronics
(916) 781-3250
Circle 425

Intecom
(214) 727-9141
Circle 426

NEC America
(516) 752-9700
Circle 427

Northern Telecom
(214) 234-5300
Circle 428

Octel
(408) 947-4500
Circle 430

Rolm
(408) 988-2900
Circle 431

Computer Interruptus

Midnight. And you wish you would be left in the dark. But miles away in the DP Department, a misplaced DD override, an invalid concatenation, or some other equally obscure JCL error brought production to a standstill.

And when the system breaks down, it's you or your staff they call up.Which usually means getting up and getting down there. And after a night like that, how productive will the morning be?

What a waste. If you had the JCLCHECK™ program, you wouldn't have JCL errors, period. None. Zilch. Zero.

Because the JCLCHECK program can catch any and all JCL errors and give you complete, on-line JCL validation and concise error diagnostics. Plus complete documentation on a job stream or entire production system suitable for insertion in the run book. And it can operate under TSO, TONE, ROSCOE or CMS.

Imagine, with no more JCL errors, your programmers can finally concentrate on what you hired them for: writing programs.

So what are you waiting for? Send the coupon or call us at (408) 554-8121 for details. We'll show you how the JCLCHECK program can bring your error detection out of the dark ages, increase production, and eliminate applications backlog. And that'll put you in the spotlight.

I'm frustrated and tired of JCL errors.

☐ Send me details on the JCLCHECK program.

☐ Have a representative call me.

NAME_____

TITLE_____

COMPANY_____

ADDRESS_____

CITY, STATE, ZIP_____

PHONE_____

OPERATING SYSTEM_____

Triangle Software Company

4340 Stevens Creek Blvd., Suite 108
San Jose, CA 95129

(Continued from page 180)

mail to "middle managers," says Arthur Alleva. "Most communications on our VMX system are between middle managers," he says. "In selecting the approximately 800 users of our system from among our 40,000 employees, we chose managers in 'affinity groups'—those with a need for regular business communications among themselves." The brass at Cigna has not been given voice mailboxes—for reasons of political reality, says Alleva. "They don't need it," he says. "When a corporate officer makes an internal call, you can be sure he or she gets through to the intended recipient."

Cigna tested the waters in November 1982 with a pilot system from VMX for 195 users. The insurer took the plunge with a full-production system last July. "It wasn't difficult getting staff to use the system," says Alleva. "We encouraged employees to make a few subtle changes in their work habits, such as checking their voice mailboxes three times a day." Alleva declines to reveal how much Cigna spent on its 16-port VMX 16. But the vendor lists the product at $195,000.

At TFB, Ford Kanzler used a similar strategy. He targeted an "affinity group" of users who required constant communication with each other but were in constant motion. "For employees who are at their desks all the time, the utility of Voicememo is not as obvious," he says. Neither will the value to a promotional strategy be.

How to nurture acceptance

Once voice mail has been sold to the brass, use of voice mailboxes tends to spread quickly throughout an organization. A junior purchasing agent, for example, could find voice mail invaluable for speeding the flow of information from suppliers and getting information to internal contacts who are hard to reach by telephone.

However, don't take anything for granted. You can help ensure that interest will spread throughout the organization. Ford Kanzler's implementation team, for example, encouraged social use of the Voicememo system as a way of encouraging new users to try it. "We play creative, humorous games with it," he says. "And the copy department began putting out a 'Make your day' message." Also, the office receptionist rewrote the Centigram user manual in a less-technical language. "The result was a much more user-friendly manual that played a big role in gaining acceptance for the system," says the account executive.

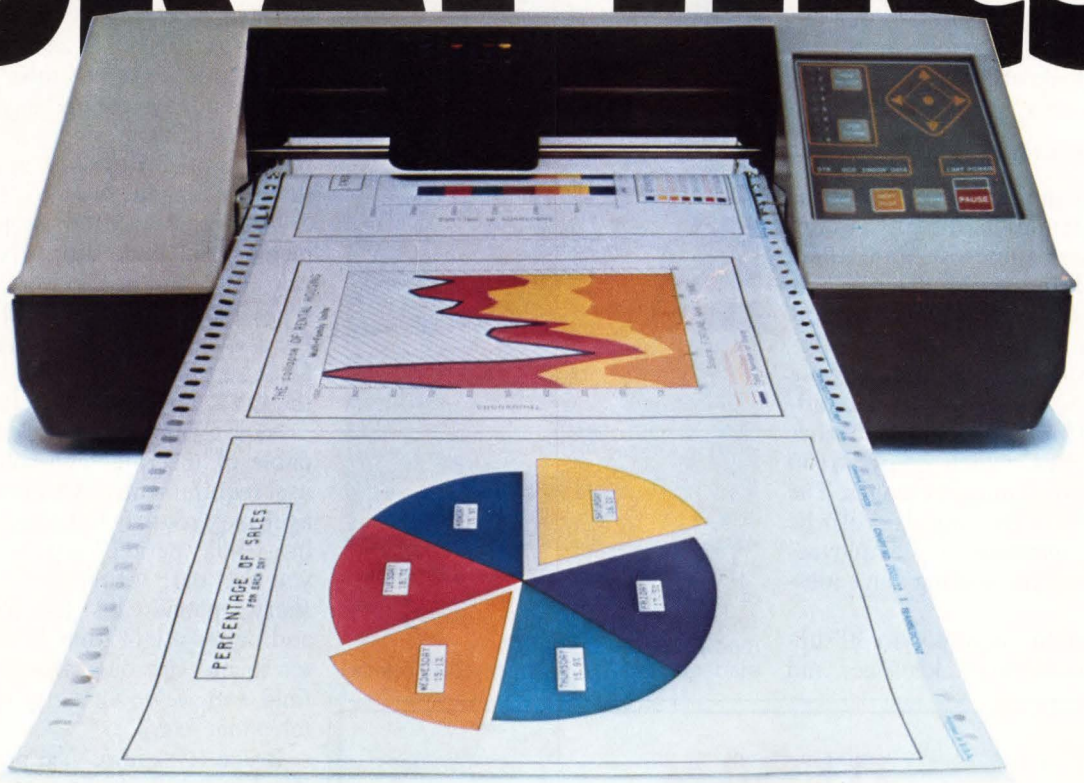
At Cigna, Alleva's office-systems group prepared an internal booklet based on the manual provided by VMX. The difference between the two documents is simple, he says. "Our booklet is a little more user-friendly than the VMX manual. It gives particularly clear instructions on how to access the system."

By and large, Alleva believes his group went about its voice-mail installation the right way. With hindsight, however, he wonders if he was a little too lenient with Cigna's users. "If I could do it all over again, I'd keep a tighter rein up front," he says. "We'd have more directory updates, monitor usage more carefully, and most important, we'd include an interface between the VMX 16 computer and our IBM mainframe, especially to generate reports on usage." Alleva says he is starting to take all these steps now, but he would rather have done so from the beginning.

Corporations with diverse divisions and subsidiaries should also consider applications in specific industries and job functions that naturally benefit from voice mail. Sales reps in the field have been prominent among the early users. Professional partnerships, banks, insurance carriers, engineering and construction firms, and airlines are among the businesses that can use voice mail to solve special communication problems. Keith

IBM PC COMPATIBLE

FRESH EIGHT COLOR GRAPHICS



(Now you can put an entire graphics department on your desktop.)

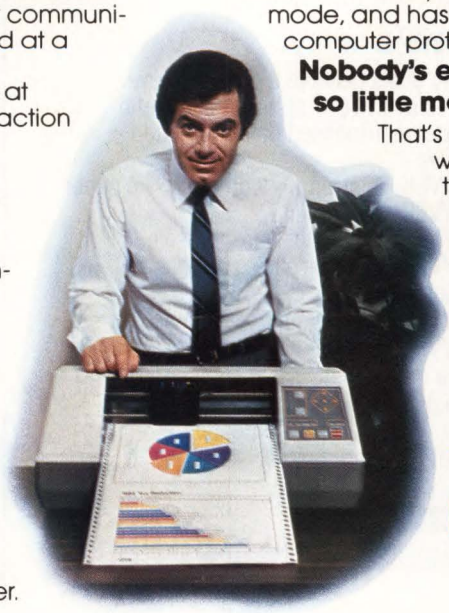
Getting ahead often depends upon getting your ideas across forcefully. That's what the ZETA 8 does best. By creating vivid color pictures that communicate with power. Whole ideas transmitted at a glance. Trends made clear.

Try eye-stopping graphics like these at your next presentation and watch the reaction you get.

Introducing the ZETA 8, our new 8 color desktop plotter that never stops to change pens.

Let's face it, most reports and presentations get done in a rush. That's why we've designed a system that goes at high speed (20 inches per second). But here's the kicker. Other plotters keep their pens off to one side so every time there's a color change the plotter grinds to a halt. Top speed drops to zero. We've put all eight pens on one carriage so the plotter never has to stop.

In fact, the ZETA 8 can be preprogrammed to create plots without operator intervention over 120 feet of paper.



Plot on acetate for overhead projection too. The ZETA 8 features a handy automatic paper load, a metric mode, and has been designed to support most computer protocols.

Nobody's ever made so much plotter for so little money.

That's right. A lightweight, portable plotter with eight different colors (and no time out for changing pens), a top speed of 20 i.p.s. and accuracy to within one one-thousandths of an inch. All for under $6K.

Call (415) 372-7568. Nicolet Computer Graphics Division, 777 Arnold Drive, Martinez, CA 94553 TWX 910-481-5951

Nicolet

Computer Graphics Division

CIRCLE 76

Voice Mail

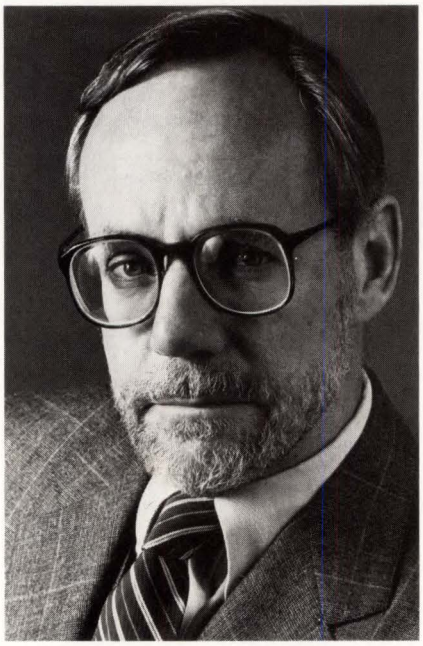
(Continued from page 182)

McCoy of Contract Freighters adds that the trucking industry is a prime candidate for voice messaging. So many individuals in so many remote and changing locations must be reached to keep orders and deliveries flowing, he says.

Planning pays off

Careful planning is the hallmark of any implementation strategy. Many organizations underestimate their users' need for training on a new system. Training was an important part of Zondervan Corp.'s introduction of a DVX system from Wang Labs., says Steve Nelson, a senior administrator for the religious publisher and bookseller, which enjoys $100 million in gross annual revenues. The commitment to training paid off, he notes. Two hundred fifty employees at Zondervan are sending voice messages.

"We brought in more than 30 support employees from field offices, and trained them at our headquarters. We 'trained the trainers,' using our own materials adapted from those supplied by Wang. After these individuals returned to their offices, we had no trouble last October when we brought our system up," says Nelson.



"The future voice-mail user will see his or her message combined with supporting material in a variety of media, facilitating better management." *Myer, GTE Telenet*

Zondervan's president helped with the send-off for the new system, and that helped, adds Nelson. "He simply ordered employees to stop sending memos and pink slips," Nelson recalls. "He said people were just 'covering their backsides' with memos. He also made us aware that it costs $8 or $9 to put out a memo. So he got the DVX off to a flying start."

As a technology, voice mail is capable of meeting high-volume end-user requirements. "A high-level manager may receive 260 voice messages in a 10-day period," says Nelson. "So, you see that we're saving a lot in shorter phone calls, less paperwork, and better use of time. We're in better touch with our sales reps in the field and we've virtually eliminated telephone tag."

Bruce Ryskamp, vice president of Zondervan's Bible division, says voice mail has introduced a previously unimaginable efficiency to internal communications. "I can reach all of my staff members at the same time with a direct message using the broadcast feature," he says. "And the system gives them an opportunity to consider their responses before replying to my message."

As far as Ryskamp is concerned, the system's small capacity is its only drawback. At four ports, the system is too small, he says. The 20 or so users in his division sometimes have to wait to get on the system. "We've remedied this, for the most part, by asking our staff—particularly the sales reps in the field—to call their mailboxes after 11 a.m. or in the evening," he says. "The system does take a little getting used to, but once you've made the adjustment, it works very well."

Nelson is aware that Zondervan's DVX is being operated at capacity. And if he could do it all over again, he'd get more ports. Two of Zonder-

Mom files best.

Introducing PC/COM.™ Truly, the fastest, easiest way to manage information today.

When MOM™ says she has a software system that can manage information faster than anything else on the market, believe it.

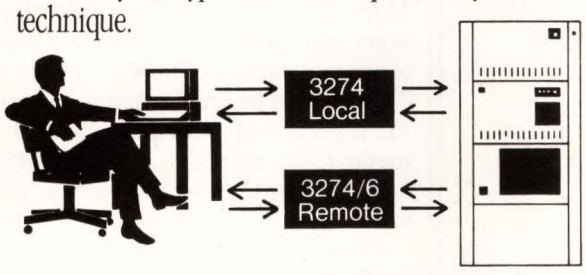
It's called PC/COM. A revolutionary automatic file transfer and management system that opens up a whole new realm of opportunities to PCs and PC-users.

Your mainframe works faster with PC/COM. Your PC gets more file management features.

If you are a mainframe user of TSO, CMS, or CICS, PC/COM will prove invaluable.

MOM says any job worth doing is worth doing fast.

MOM's PC/COM manages information at an incredible speed. And PC/COM will handle just about any file type with its unique binary transfer technique.

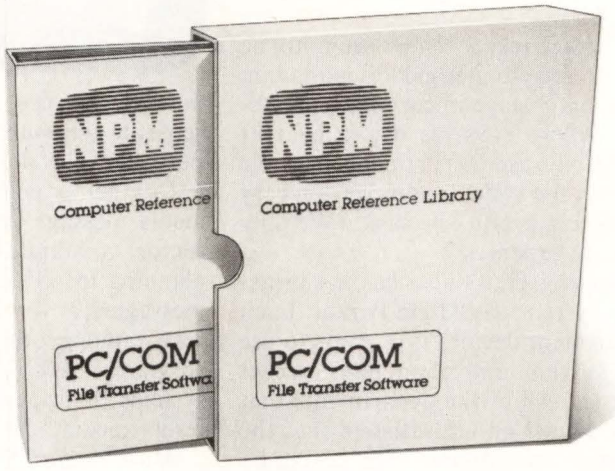


You can even back-up your hard disk on the mainframe. Leave it parked there until you need it. All it takes is the press of a key to get it moving again.

PC/COM is bi-directional, to save time getting information out of the mainframe onto your desk. And vice versa.

Security conscious, private and flexible — that's MOM.

The PC/COM has file access control and security built right in. So only those parts of the mainframe that should be accessed, are.



PC/COM is user-friendly and menu-driven so it's easy to understand. And simple to operate. All the features (and believe you, MOM, there are plenty) are initiated by a single function key.

Call MOM. 1-800-241-1170.

Talk to MOM. Tell her what you have and what you need. Ask her any questions about PC/COM and get good, clear answers.

MOM wants you to understand what you're getting into with PC/COM — and how much you can get out of owning the best, and fastest, file transfer and management system on the market.

The revolutionary PC/COM. Of course, from MOM. Phone 1-800-241-1170 or 404-351-2902.

MOM™

Specialists in Marketing of Micros to Mainframes.
Two Northside 75, Atlanta, Georgia 30318
A division of NPM, Inc.

CIRCLE 78

Voice Mail

(Continued from page 184)

van's ports are dedicated to toll-free In-WATS calls and two are for local calls. "That's not enough to accommodate all our traffic," says Nelson. "Our reports tell me the only slack time on the DVX is between 2 a.m. and 3 a.m."

Chargeback schemes seem to be the preferred method of managing voice-mail usage in corporations. Arthur Alleva says his department at Cigna bills user departments for their time on the system. "But we don't try to make a profit," he says. "We only allocate expenses."

Corning Glass also has a chargeback system, says John Parker. Each department decides if it wants to use the system and then pays preset charges. All of the departments that have signed up are satisfied that the savings far outstrip the costs, he says. "The system has proved its worth," he asserts.

TFB's installation points to the probable future of voice mail in corporations. Voice mail will not be a separate communications system, experts like Theodore H. Myer believe, but rather a component in mixed-media message systems. Myer is director of standards and technical planning for GTE, operator of Telemessager, a voice-mail service bureau, among other communications services. "We're working toward systems that couple messages in different media," he asserts.

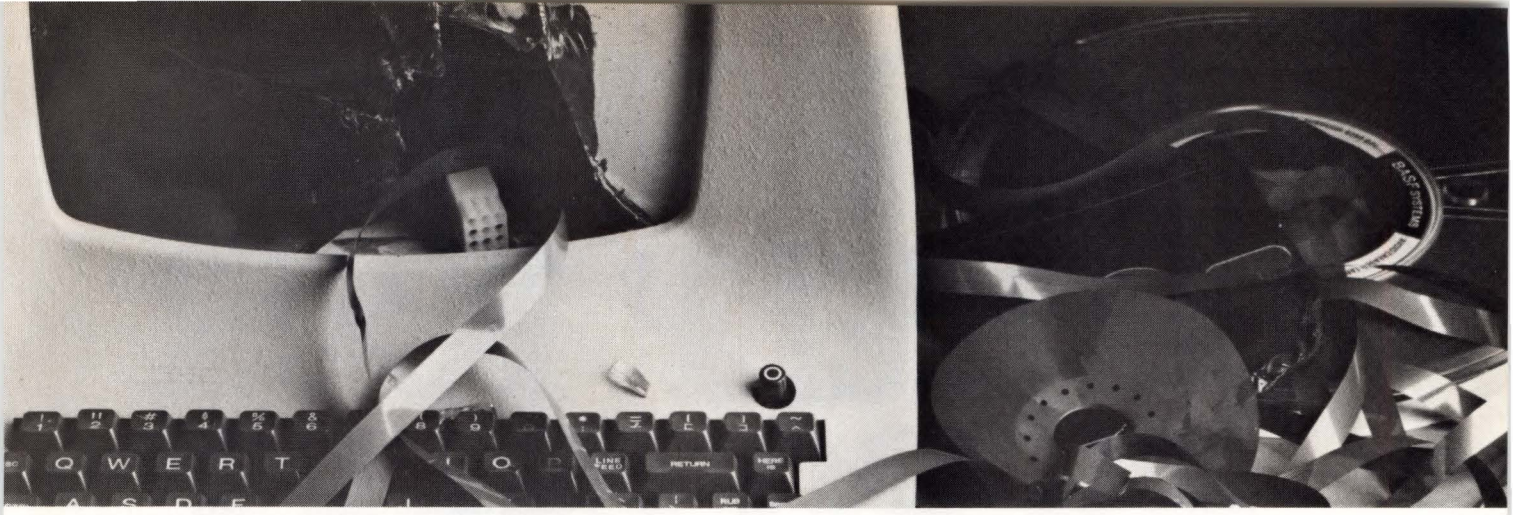
Multimedia, in this context, has several meanings. For example, at TFB Public Relations, incoming calls are fielded by a receptionist, an important human contact for many callers, says Ford Kanzler. Only after the receptionist intervenes is a call routed into the Voicememo system. The receptionist sends printed messages to station users' desks if Voicememo calls go unanswered.

In the very near future, multimedia systems will offer *integrated* message services, says Myer. DECtalk, the new Digital Equipment Corp. (DEC) offering that converts digital text into synthetic voice, and products like it, might also be deployed in integrated message systems, says Myer (see box). "A simple version of an integrated-media message would be a written statement annotated by a voice message," he says. "Another might be a written outline for a long voice message. You might have an 'animated' voice-and-graphics message. All these are possibilities that await only corporate acceptance."

Integrated media can improve the impact and clarity of a message, says Myer. "Users will see their voice messages combined with supporting material in a variety of media," he says. "Impact will be greatly enhanced and managers and executives will be made more effective in their jobs. Communications will never be the same."

Cigna is looking ahead to these kinds of developments, says Arthur Alleva. The insurance carrier has realized immediate benefits from its voice-mail system, but Alleva doesn't view the system as a static entity. Cigna is committed to taking advantage of advances in voice synthesis and voice recognition, he says, as soon as they become workable applications. "We try to stay on the leading edge of technology. We'll be ready to take advantage of new developments as soon as they are translated into systems that save dollars and cents."

When voice mail is integrated with other message systems, it will no longer be a bridesmaid, but a member of a tightly knit family. At that point, more managers might start listening to the technology's promise. □



"Oh no! Somebody got into the computer room last night."

"I don't know who was maddest - our data processing manager, our controller or our auditors. But they all came into my office and complained that anyone could get into the computer room - at any time. So, we installed an RES CARDENTRY® system, and now we control who uses the computer room. And our smart machines are protected by some other pretty smart machines.

As well they should be.

Without an RES CARDENTRY system to protect your data processing facility, it can be subject to information security breaches, as well as damage to your expensive computers.

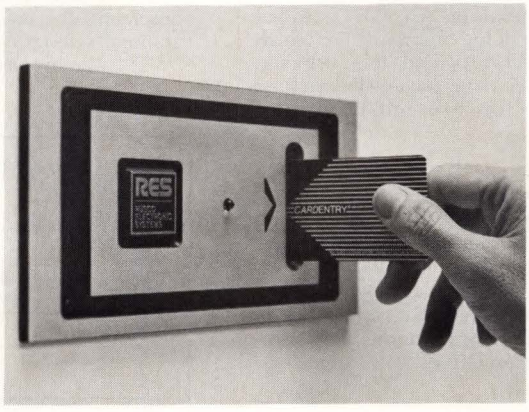
An RES CARDENTRY system solves the problem of securing your data processing equipment. It also does away with employee keys (and the possiblitiy of duplicating them), and lack of personnel accountability.

When we install a CARDENTRY system, we give each employee a RUSCARD™ with a personalized code. The cards are virtually impossible to duplicate. Your computer center utilizes compact CARDENTRY readers. You tell your system who's allowed in and when. Then, if an unauthorized person tries to enter the facility the door won't open.

What's more, the RES CARDENTRY system tells your security guard where and when an unauthorized entry has been attempted - in easy-to-read English text.

It's that easy to account for (and control) unauthorized access and activities. And it's that easy to save money.

Your RES CARDENTRY system can even turn utilities on and off at pre-determined times, streamline your data collection activities and provide real-time monitoring, pre-defined, and user-defined historical reports. Small wonder we're the world leader in access control & monitoring systems.



So if your computer isn't already protected by our system, it should be. After all, do you know who's using it right now?

For more information, contact: Rusco Electronic Systems, 1840 Victory Blvd., Glendale, CA 91201. Telephone: (818) 240-2540. Or, call toll free: (48 states, except CA) 1-800-556-1234, Ex. 67; (CA only) 1-800-441-2345, Ext. 67. Telex 696318.

RES® RUSCO ELECTRONIC SYSTEMS

A FIGGIE INTERNATIONAL COMPANY

CIRCLE 80

FIVE WAYS TO HELP YOUR MICRO USERS PLUG INTO YOUR NETWORK...

1. Mastering WordStar®
(Alfieri) Introduces the most powerful features of WordStar and MailMerge only as you need them, then places each within a real-life context. Includes all the tricks-of-the-trade used by experienced word processors... as well as countless others that save time, effort, and needless frustration. Covers both IBM PC and CP/M versions.
#6305, $19.95

2. Working Smart with Electronic Spreadsheets: Models for Managers
(Berry) Helps users think in terms of "what to" instead of "how to." Uses a learn-by-doing approach in which readers analyze sample models provided, then use then as guidelines for building their own. Includes more than 75 complete templates for the most popular spreadsheets. **#6203, $18.95**

3. Getting Started with CP/M®
(Patten & Calandrino) Focuses on those subjects most useful to beginners: handling and caring of disks, creating and naming files, storing and transferring information, and detailing command structures and functions. Includes a handy detachable command/function reference card, a glossary of important terms, and additional sources of information on CP/M.
#5208, $12.95

CP/M is a registered trademark of Digital Research, Inc. WordStar and MailMerge are registered trademarks of MicroPro International Corp. None is affiliated with Hayden Book Company.

HAYDEN **Order by Phone**
1-800-631-0856
In NJ (201) 393-6315

4. The Microcomputer User's Guide to Information Online
(Hansen) More than 100 detailed sources of information. Key data bases. Search strategies. And just about everything else one needs to know about using communication hardware and software. **#6204, $18.95**

5. Local Area Networks in Large Organizations
(Madron) Covers both the organizational issues *and* technical how-to's in designing a local area network. Discusses what's available in terms of systems and equipment; the mechanics of getting a system up and running; "selling" a network; competing network media; CATV; and more. **#6205, $16.95**

Mail to: Hayden Book Company • Dept. CD54
10 Mulholland Dr. • Hasbrouck Heights, NJ 07604

Please send me the book(s) indicated below by code number. If I am not completely satisfied I may return the book(s) undamaged, within 10 days for a complete refund. I am enclosing $2.00 to cover postage & handling. Residents of NJ and CA must add sales tax.
☐ Enclosed is my check or money order
☐ Bill my ☐ Visa ☐ MasterCard

Name

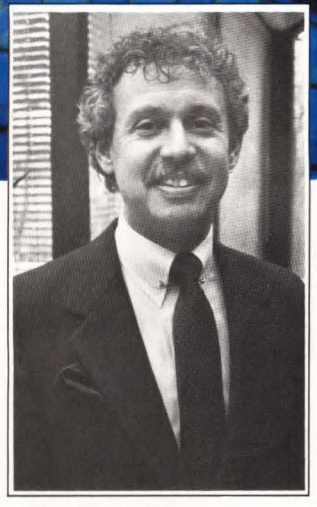
Address

City/State/Zip

Visa/MasterCard # Exp.

Signature Prices subject to change.

Man Bytes Dog



Steven Swartz, CEO,
Drumbeater Corporation:
Advertising, Marketing,
Public Relations, Corporate Design.
(617) 246-0782

Now *that's* news.

Drumbeater Corporation has been helping companies across the country make news and create sales for more than a decade.

We do it with high-impact, convincing advertising, marketing and public relations programs that put hardware, software, and other highly technical products in the public eye. And keep them there.

We back it all up with knowledgeable, effective media plans, targeted to decision-makers, so that good news develops into outstanding response.

That's why Computer Decisions is included in our media planning process. With 100% management circulation, it's the publication read by the people our clients need to talk to. People respond to what they see in Computer Decisions.

That means results . . . good news in any business.

COMPUTER
DECISIONS
THE MANAGEMENT MAGAZINE OF COMPUTING

EMPLOYEE APPRAISAL:

WHEN YOU'RE THE JUDGE

At review time, you are the sole judge of your subordinates' work. But you must not only assess their performance, you must also motivate them to improve.

by Andrew S. Grove

Why are performance reviews a vital part of the management system of most organizations? And why do we review the performance of our subordinates? I posed both questions to a group of middle managers and got the following responses:

- To assess the subordinate's work
- To improve performance
- To reward performance
- To motivate subordinates
- To provide feedback
- To provide discipline
- To provide direction
- To justify raises
- To reinforce the company culture.

Next, I asked the group to imagine themselves as supervisors giving a review to a subordinate, and asked what their feelings were. Some of the answers: pride, anger, anxiety, discomfort, guilt, empathy/concern, embarrassment, frustration.

Finally, I asked the group to think back to some of the performance reviews they had received and asked what, if anything, was wrong with them. Their answers were quick and many:

Photo by Dario Perla


3

Employee Appraisal

(Continued from page 191)

- Review comments too general
- Mixed messages (inconsistent with rating or dollar raise)
- No indication of how to improve
- Negatives avoided
- Supervisor didn't know my work
- Only recent performance considered
- Surprises.

This should tell you that conducting performance reviews is a very complicated and difficult business, and that we managers don't do an especially good job at it.

The fact is that giving such reviews is the *single most important form of task-relevant feedback* supervisors can provide. It is how we assess our subordinates' level of performance and how we deliver that assessment to them individually. It is also how we allocate the rewards—promotions, dollars, stock options, or whatever we may use. The review will influence a subordinate's performance—positively or negatively—for a long time, and that makes the appraisal one of the manager's highest-leverage activities. In short, the review is an extremely powerful mechanism, and it is little wonder that opinions and feelings about it are strong.

"Most jobs involve activities that are not reflected by output in the period covered by the review."

But what is its fundamental purpose? Though all the responses given to my questions are correct, there is one that is more important than any of the others: *to improve the subordinate's performance*.

The review is usually dedicated to two factors: first, the *skill level* of the subordinate, to determine what skills are missing and to find ways to remedy that lack; and second, to intensify the subordinate's *motivation* in order to get him or her on a higher performance curve for the same skill level.

The review process also represents the most formal type of institutionalized leadership. It is the only time a manager is mandated to act as judge and jury: We managers are required by the organization that employs us to make a judgment regarding a worker and then to deliver that judgment to him, face to face.

A supervisor's responsibility here is obviously very significant. What preparation have we had to do the job properly? About the only experience I can think of is that, as subordinates, we've been on the receiving end. But, in general, our society values avoiding confrontation. Even the word "argument" is frowned upon, something I learned many years ago when I first came to this country from Hungary.

In Hungarian, the word "argument" is frequently used to describe a difference of opinion. When I began to learn English and used the word "argument," I would be corrected. People would say, "Oh no, you don't mean 'argument,' you mean 'debate,'" or "You mean 'discussion.'"

Among friends and peers you are not supposed to discuss politics, religion, or anything that might possibly produce a difference of opinion and a conflict. Football scores, gardening, and the weather are okay. But we are taught that well-mannered individuals skirt potentially emotional issues. The point is that delivering a good performance review is really a unique act, given both our cultural background and our professional training.

Don't think for a moment that performance reviews should be confined to large organizations. They should be part of managerial practice in organizations of any size and kind. If performance matters in your operation, performance reviews are absolutely necessary.

Two aspects of the review—assessing performance and delivering the assessment—are equally difficult. Let's look at each in a little more detail.

Assessing performance

Assessing the performance of professional employees objectively is very difficult because there is no cut-and-dried way to measure and characterize a professional's work completely. Most jobs involve activities that are not reflected by output in the period covered by the review. Yet we have to give such activities appropriate weight as we assess a person's performance. Anybody who supervises professionals, therefore, walks a tightrope: He or she must be objective, but must not be afraid of using judgment, even though a judgment is, by definition, subjective.

To make an assessment less difficult, a supervisor should decide what it is he or she expects from a subordinate and then attempt to judge whether the subordinate performed to expectations. The biggest problem with most reviews is that we don't usually define what it is we want from our subordinates, and, as noted, if we don't know what we want, we are surely not going to get it.

Let's consider the concept of the managerial "black box." With this concept, we can characterize performance by *output measures* and *internal measures*. The first represent the output of the black box, and include such tangibles as completing designs, meeting sales quotas, or increasing the yield in a production process—factors we can, and should, plot on charts. The internal measures take into account activities that go on inside the black box: Whatever is being done to create output for the period under review as well as that

Employee Appraisal

(Continued from page 192)

which sets the stage for the output of future periods. Are we reaching our current processing goals in such a way that two months from now we are likely to face a group of disgruntled data-center employees? Are we positioning and developing people in the organization in such a way that our business can handle its tasks in the future? Are we doing all the things that add up to a well-run department?

There is no strict formula by which we can compare the relative significance of output measures and internal measures. In a given situation, the proper weighting could be 50/50, 90/10, or 10/90, and could even shift from one month to the next. But at least we should know which variables are being traded off.

Another kind of trade-off has to be considered: weighing long-term-oriented against short-term-oriented performance. A programmer needs to complete a project on a strict schedule to meet some vital organizational requirement. He or she may also be working on a design method that will make it easier for others to design similar programs in the future. The professional obviously needs both activities evaluated and reviewed. But which is more significant?

A way to help weigh questions like this is the idea of "present value," used in finance: How much will the future-oriented activity pay back over time? And how much is that worth today?

There is also a time factor to consider. The subordinate's output during the review period may have all, some, or nothing to do with his or her activities during the same period. Accordingly, the supervisor should look at the time offset between the activity of the subordinate and the output that results from that activity.

This is one lesson I learned the hard way. The organization of one of the managers reporting to me had had a superb year. All output measures were excellent: Sales increased, profit margins were good, the products worked—you could hardly even think of giving anything but a superior review to the person in charge. Yet I had some misgivings. Turnover in his group was higher than it should have been, and his people were grumbling too much. There were other such straws in the wind, but who could give credence to elusive signs when tangible, measurable performance was so outstanding? So the manager got a very positive review.

The next year, his organization took a nose dive. Sales flattened, profits declined, product development was delayed, and the turmoil among his subordinates deepened. As I prepared the next review of this manager, I struggled to sort out what had happened. Did the manager's performance deteriorate as suddenly as his organization's output measures indicated? What was going on? I concluded that the manager's performance was improving in the second year, even as things seemed to go to hell. The problem was that his performance had not been good a year earlier. The output indicators merely represented work done years ago—the light from distant stars, as it were—which was still holding

Performance-appraisal sample

NAME John Doe **JOB TITLE** Materials Support Supervisor
REVIEW PERIOD 2/82 **TO** 8/82

Description of job assignment:
Responsible for managing the production-planning process and the manufacturing-specifications process, including maintenance and development.

Accomplishments during this review period:
The production-planning process was significantly changed this year [Output measure: good]. Sites were well coordinated and all administrative activities were done efficiently.

Evaluation (Areas of strengths, areas for improvements):
John transferred to Materials Support in early February. The production-planning process was having some difficulties at the time. John got up to speed very quickly and was able to take over the job from his predecessor very effectively.

In the manufacturing-specifications area, John's efforts have been far less successful. He puts extra effort into his work, but the results have not been satisfactory. I think the problem has two causes:

1. John has a hard time defining clear, concise, and specific goals. An example of this is the difficulty he has in setting good objectives and getting key results [Internal measure: lacking; activity vs. output]. Another example is the mushy conclusion of the manufacturing-specification system review in March. We still don't have a clear definitive statement of where the spec system is heading and how it's going to get there. Without specific goals, one can very easily fall into the trap of "working on" something without reaching the objective.

2. John seems easily satisfied that having a meeting on a subject constitutes progress. This happened in the area of training associated with manufacturing specs [Note: statement supported by example]. John should spend more effort prior to each meeting defining what specific

up. The time offset between the manager's work and the output of his organization was just about a year.

Greatly embarrassed, I regretfully concluded that the superior rating I had given him was totally wrong. Trusting the internal measures, I should have had the judgment and courage to give the manager a much lower rating than I did in spite of the excellent output indicators, which did not reflect the year under review.

The time offset between activity and output can also work the other way around. In the early years of Intel, I was called upon to review the performance of a subordinate who was setting up a production facility from scratch. It had not manufactured anything as yet, but, of course, the review could not wait for tangible output. I had had no prior experience supervising someone who did not have a record of concrete output. I gave my subordinate credit for doing well, even though output remained uncertain. As managers, we are really called upon to *judge* performance, not just to see and record it when it's in plain sight.

Finally, as you review managers, should you be judging their performance or the performance of the group under their supervision? You should be doing both.

Ultimately, you are after the performance of the group, but the manager is there to *add value* in some way. You need to determine what that is, so you must ask yourself: Is the manager doing anything with his group? Is he hiring new employees? Is he training the people he has, and doing other things that are likely to raise the output of the team in the future? The most difficult issues in determining a professional's performance will be based on asking questions and making judgments of this sort.

One big pitfall to avoid is the "potential trap." At all times you should force yourself to assess performance, not potential. By "potential" I mean form rather than substance.

I was once asked to approve the performance review of a general manager whose supervisor rated him highly for the year. The manager was responsible for a business unit that lost money, missed its revenue forecast month after month, slipped engineering schedules, and in general showed poor output and internal measures over the year. I could not approve the review. Subsequently, his supervisor said, "But he is an outstanding general manager. He is knowledgeable and handles himself well. It's his organization that did not do well, not the manager himself!"

This explanation cut no ice with me because *the performance rating of a manager cannot be higher than the one we would accord to his organization!* It is very important to assess actual performance, not appearances; real output, not good form. Had the manager been given a high rating, Intel would have

results he wants to accomplish.

John's prior finance background has really helped in a variety of work areas. For example, John voluntarily helped the purchasing group sort out some of its finance problems—an effort above and beyond the call of duty. [Compliments need examples, too!]

John would like to be promoted to the next management level. This will not happen at this time, but I am satisfied that his capabilities will allow him to be promoted eventually. Before that happens, however, John must be able to take complex projects, like the manufacturing-spec system, and show results. This requires a clear and concise breakdown of problems, identification of goals, and establishment of the way to achieve those goals. [Attempt to show how to improve performance.] John, for the most part, will have to achieve this on his own. While I will help when needed, John has to be the primary driver. Only when he shows that he is capable of independent work along these lines can he be promoted.

In summary, John is capable of doing his current job. I realize that John has had difficulty in changing from a finance to a manufacturing environment. I will continue to try to help him—particularly in setting goals and defining ways of accomplishing his tasks. John's performance in Materials Support is rated as "meets requirements"—a rating he should definitely be able to improve.

RATING: ☐ Does not meet requirements
☑ Meets requirements
☐ Exceeds requirements
☐ Superior

***Immediate supervisor:**	CAV	**Date:**	8/10/82
***Approving supervisor:**	[illegible]	**Date:**	8/15/82
****Matrix manager:**	[illegible]	**Date:**	8/10/82
Personnel Administrator:	[illegible]	**Date:**	8/18/82
*****Employee:**	John Doe	**Date:**	8/22/82

**Two levels of management plus personnel required for checks and balances.*
***Review was prepared jointly with head of the Material Manager's Council: an example of dual reporting.*
****Employee signature shows that he has been given the review; does not necessarily mean that he agrees with it.*

Employee Appraisal

(Continued from page 195)

signaled to all at the company that to do well, you must "act" like a good manager—talk like one and emulate one—but you don't need to perform like one.

A decision to promote is often linked, as it should be, to the performance review. We must recognize that no action communicates our manager values to an organization more clearly and loudly than whom we promote. By elevating someone we are, in effect, creating role models for others in our organization.

There is an old saying that when we promote our best sales representative, we ruin a good sales rep and get a bad manager. But if we think about it, we have no other choice. When we promote our best, we are saying to our subordinates that performance is what counts.

It is hard enough to assess our subordinates' performance, but we must also try to *improve* it. No matter how well a subordinate has done, we can always suggest ways to improve, something about which a manager need not feel embarrassed. Blessed with 20/20 hindsight, we can compare what the subordinate did against what he or she might have done, and the variance can tell both of us how to do things better.

There are three L's to keep in mind when delivering a review: level, listen, and leave yourself out.

You must level with your subordinate—the credibility and integrity of the entire system depend on your being totally frank. And don't be surprised to find that praising someone in a straightforward fashion can be just as hard as criticizing without embarrassment.

"Giving reviews is the single most important form of task-relevant feedback supervisors can provide."

The word "listen" has special meaning here. The aim of communication is to transmit thoughts from the brain of person A to the brain of person B. Thoughts in the head of A are first converted into words, which are enunciated and, via sound waves, reach the ear of B; as nerve impulses they travel to B's brain, where they are transformed back into thoughts and presumably kept.

Should person A use a tape recorder to confirm the words used in the review? The answer is an emphatic "No!" Words themselves are nothing but a means; getting the right thought communicated is the end. Perhaps B has become so emotional he can't understand something that would be perfectly clear to anyone else. Perhaps B has become so preoccupied trying to formulate answers that she can't really listen and get A's message. Perhaps B has tuned out and as a defense is thinking of going fishing. All of these possibilities can and do occur, and all the more so when A's message is laden with conflict.

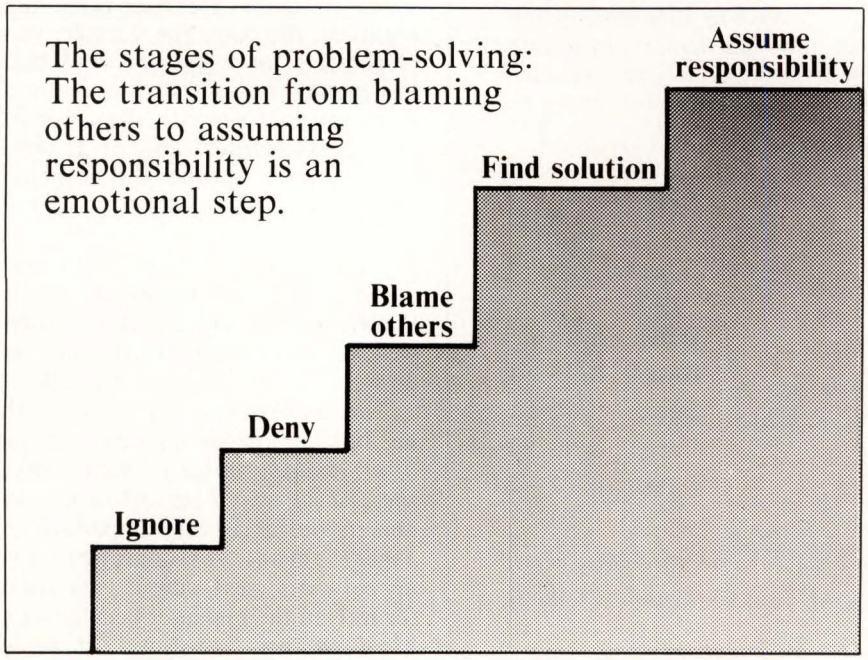
How, then, can you be sure you are really being heard? What techniques can you employ? Is it enough to have your subordinate paraphrase your words? I don't think so. What you must do is employ *all* of your sensory capabilities. To make sure you're being heard, you should *watch* the person you are talking to. Remember, the more complex the issue, the more prone communication is to being lost.

Does your subordinate give appropriate responses to what you are saying? If his or her responses—verbal and nonverbal—do not completely assure you that what you've said has gotten through, it is *your responsibility* to keep at it until you are satisfied that you have been heard and understood.

This is what I mean by *listening*: employing your entire arsenal of sensory capabilities to make certain your points are being properly interpreted by your subordinate's brain. All the intelligence and good faith used to prepare your review will produce nothing unless this occurs. Your tool, to say it again, is total listening.

All of us have had professors who lectured by looking at the blackboard, mumbling to it, and carefully avoiding eye contact with the class. The reason? Knowing their presentations were murky and incomprehensible, these teachers tried to avoid confirming visually what they already knew. Don't imitate your worst professors while delivering performance reviews. Listen with all

(Continued on page 246)



ARTEMIS:
The Thoroughbred of Project Management

Metier Management Systems introduced the first project management system on a minicomputer seven years ago. In ensuing years, ARTEMIS has been refined and expanded into the most powerful race horse on the track. A veritable Triple Crown Winner, ARTEMIS offers unparalleled depth, easily used, fully integrated and compatible systems across processors ranging from the IBM-PC through a brand new line of minicomputers and on to the IBM and compatible mainframes.

The continuity and compatibility of ARTEMIS on a mainframe processor marks a significant advancement in our industry for Metier. This new capability allows projects to be controlled independently on micro and minicomputers and summarized on a central system for uniform reporting. MIS staff can direct the overall system design, act in an advisory capacity, and be relieved of daily requests for reports and system modifications.

Today more than 550 ARTEMIS systems are supporting a wide variety of industries and government organizations. The thoroughbred nature of ARTEMIS and Metier's "user comes first" philosophy have driven Metier to the top. In 1983, INC. magazine ranked Metier 7th in its listing of the 500 fastest growing private companies.

If your business is project oriented, ride the control system born and bred to win: ARTEMIS.

METIER

5884 Point West Drive
Houston, Texas 77036
(713) 988-9100
Attn: Bruce Meyer

Sales and Support Offices in: Houston, Texas; Newport Beach and Burlingame, California; Alexandria, Virginia; Woodbridge, New Jersey; Englewood, Colorado; Southfield, Michigan; Orlando, Florida; Boston, Massachusetts; Caracas, Venezuela; Coyoacan, Mexico; London and Sheffield, England; Aberdeen and Edinburgh, Scotland; Nevilly-Sur-Seine, France; Turin, Italy; Taeby, Sweden; Sandvika, Norway; Dusseldorf, West Germany; Gouda, Netherlands; Dhahran, Riyadh, and Jeddah, Saudi Arabia; Abu Dhabi and Sharjah, United Arab Emirates; Istanbul, Turkey; Singapore; Seoul, Korea; Hong Kong; Jakarta, Indonesia; Sydney, Australia; Tokyo, Japan.

CIRCLE 83

SOFTWARE CELEBRATION

PART 2, APPLICATIONS

The right applications packages can rekindle the spark in your organization.

by Jan Snyders, Midwestern Editor

Application-software packages have long been celebrated performers in information processing. For many tasks, a prepackaged automated solution is more convenient and cheaper than one that is devised in-house. But finding the best package for a particular application is a daunting task. The number of independent offerings continues to grow, making it difficult to weed out inappropriate or inadequate packages when making a selection.

To make the situation even more confusing, the nature of some application categories is changing. Categories that were once big producers for data centers are losing luster. Word-processing software for mainframes, for instance, is fast becoming the Sanskrit of mainframe-application packages: Cheaper, easy-to-use packages for minis and micros have prompted many organizations to switch to mini- and micro-based systems. Also, packages that promise to give users at terminals the flexibility and simplicity offered by personal computers are rising in importance.

Don't be deterred by the potential pitfalls, however. As the users profiled in the stories that follow attest, finding the right package is worth the effort. Your organization will benefit from increased efficiency and productivity, operational economies, personnel savings, and reduced costs for user training. Those are achievements worth celebrating. Your boss may applaud your efforts, too.

Computer Decisions' annual software showcase gets bigger every year, even though we've narrowed its scope to IBM mainframes and plug-compatibles only. Word-processing packages that run on minis and personal computers only will be the subject of a separate article next month. The pros and cons of today's database management systems were discussed by a roundtable of experts in our February issue ("DBMS: The more you get, the more you want"). Coming issues will also feature articles on personal-computing software for mainframes and minis (June), manufacturing-resource-planning software (October), and project-management packages

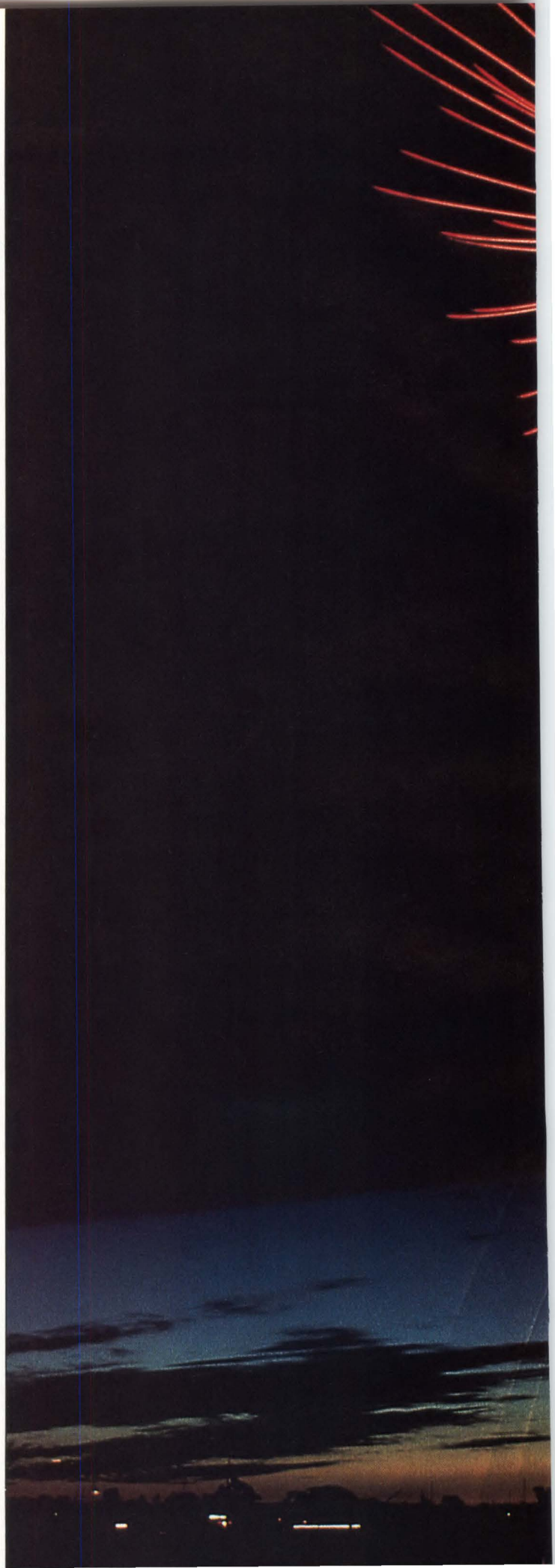


Photo by Chuck O'Rear/Westlight

(December). Of course, we'll continue to report every month on significant developments and trends in our "News & Comment" and "New products" sections, as well as in Software Editor David Kull's monthly column. Kull makes his debut in the July issue.

Personal computers have had a big impact on mainframe-application software. Users want to tap computers for functions that aren't necessarily structured or dependent on predetermined forms and reports, and mainframe-application software has been modified to give them that capability. This category of software includes packages that organize databases in a way that allows users themselves to retrieve the information they need. Many packages then add features that make data retrieval and analysis easier, like spreadsheets. The result is "decision support" software.

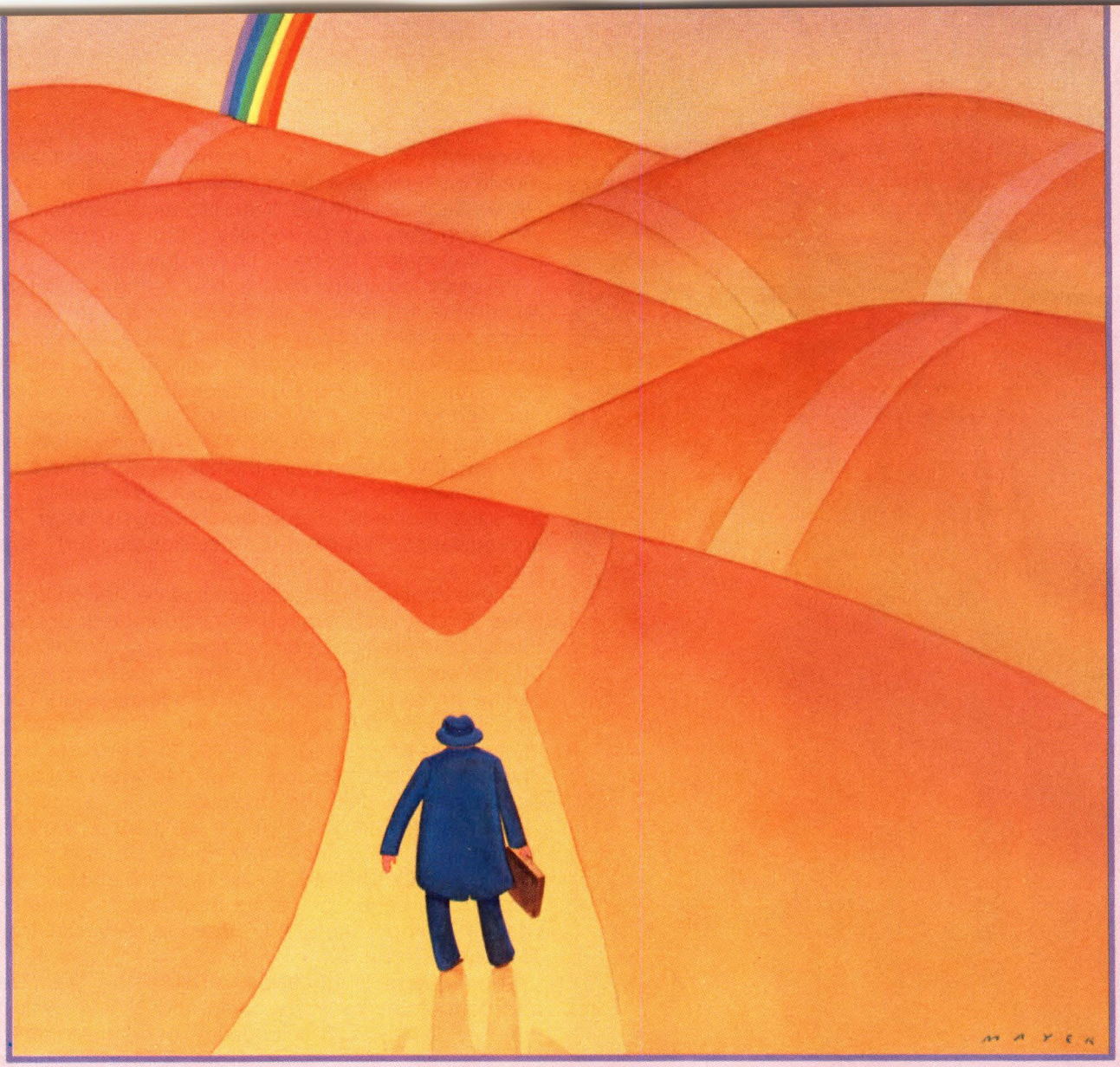
These applications packages can be viewed in two ways. First, many managers consider them productive ways to provide personal-computing power without surrendering control to users or investing in lots of new hardware. Second, these packages are considered to be the engines of an "opening up" of information-processing resources to a broader base of users. For these reasons, such packages are really on the cutting edge of innovation.

The Atomic Energy Division of the giant E.I. du Pont de Nemours & Co. Inc., Wilmington, DE (last year's revenues: $33.3 billion), needed a more efficient way to pull information out of its database to complete vital government reports. It turned to Megacalc from The Mega Group Inc.

The reports in question provide the U.S. Department of Energy with a comprehensive analysis of the division's production capacity for defense materials. Typically, says Robert Gotschall, programmer/analyst for the Aiken, SC-based division, reports are due three months from the original request. Three months may seem like a hefty chunk of time, but it wasn't enough for the division to complete the long-range production forecasts required by the government, he says.

Du Pont was hampered by several shortcomings. First, its information-retrieval system was inflexible and unable to keep pace with the constantly shifting assumptions and formats that went into the federal reports. Second, modifications could only be done by a programmer working with a Cobol report-writing program. The engineering staff had to budget time in advance for already busy programmers to make changes. Unfortunately, the engineers couldn't always wait for changes. Hard coding by programmers was ruled out as a solution because hard-coded programs can't provide ad hoc reports without expensive programmer-coded modifications.

Clearly, the division's users needed a faster, more flexible information-recovery system. The best solution seemed to be giving the engineers spreadsheet software that would allow them to pull data out of the computer and make projections themselves. Installing personal computers with spreadsheet software



The Power Of The Right Decision

Making the right decision earlier gives you a powerful advantage. Having confidence your decision is based on superior information—that's powerful, too. Finally, being able to use your decision for greater impact, improving the quality of future decisions—still more power.

For 14 years now, American Software has been perfecting the tools you need for powerful decision-making. Like you, we quickly realized that dealing separately with each business function only makes things more complex.

So we have designed cross-industry management systems software—MRP-8™ (manufacturing), DRP-8™ (distribution), and FINANCIAL-8™ (financial operations). In each, we have recognized business inter-relationships—harnessing the powerful impact of one decision on another. Isn't that the kind of power you've been looking for?

American Software: ***The Power of the Right Decision.***™

AMERICAN SOFTWARE®
THE MANAGEMENT SYSTEMS COMPANY

443 E. Paces Ferry Rd., Atlanta, GA 30305 (404) 261-4381

Circle No. 84 on product card

Software Celebration

(Continued from page 199)

was considered, but rejected because of the difficulty of connecting and using microcomputers linked to mainframes. (The division has an IBM 3081 and a 370/158.)

In contrast, Megacalc runs on a 24-Mbyte IBM 3081. It lets the engineers access files on the mainframe and plug data into spreadsheets for calculations and projections. Megacalc has a special function that gives users access to a subroutine they wrote themselves. "With this subroutine, Megacalc allows our users to manipulate data on their own, and that really saves time," says Gotschall.

Megacalc has reduced system-development time by half. It provided the division with its first reports in approximately 800 programming hours, less than half the time needed by the second-best alternative solution. Four engineers are still generating the reports, says Gotschall, but they're doing it in about 75 percent of the time. "We're using the same

A spectrum of applications packages

Accounting

American Mgt. Syst.
(703) 841-6395
Circle 438

AVP Syst.
(617) 598-2716
Circle 439

Cincom Syst.
(513) 662-2300
Circle 440

Computer Assoc. Int'l.
(516) 997-8800
Circle 441

Cullinet Software
(617) 329-7700
Circle 442

EPS
(603) 898-1800
Circle 443

ETDS
(313) 626-0770
Circle 444

Financial Tech.
(312) 280-0600
Circle 445

Gemini Information Syst.
(303) 773-1805
Circle 446

Global-Ultimacc Syst.
(201) 445-5050
Circle 447

Harris Data Svc.
(414) 475-1760
Circle 448

JEM Assoc.
(703) 471-9550
Circle 449

Mid-American Control
(502) 633-5700
Circle 450

Personnel Data Syst.
(215) 828-4294
Circle 451

I.P. Sharp Assoc.
(416) 364-5361
Circle 452

Software Int'l.
(617) 285-1400
Circle 453

Tominy
(513) 984-6605
Circle 454

Tres Syst.
(214) 248-8737
Circle 455

University Computing
(214) 353-7444
Circle 456

Vertex Syst.
(215) 687-9060
Circle 457

Xerox
(213) 306-4000
Circle 458

Computer-based education

American Mgt. Syst.
(703) 841-6395
Circle 459

Decision support

Computer Assoc. Int'l.
(516) 997-8800
Circle 460

Cullinet Software
(617) 329-7700
Circle 461

SPSS
(312) 329-2400
Circle 462

Electronic mail

Applied Data Research
(201) 874-9000
Circle 463

AVP Syst.
(617) 598-2716
Circle 464

CACI
(703) 841-7800
Circle 465

Computer Corp. of America
(617) 492-8860
Circle 466

Cullinet Software
(617) 329-7700
Circle 467

JEM Assoc.
(703) 471-9550
Circle 468

I.P. Sharp Assoc.
(416) 364-5361
Circle 469

Financial planning

Applied Data Research
(201) 874-9000
Circle 470

Argonaut Information Syst.
(415) 444-5954
Circle 471

Lloyd Bush
(212) 962-4004
Circle 472

Computer Assoc. Int'l.
(516) 997-8800
Circle 473

Cullinet Software
(617) 329-7700
Circle 474

EPS
(603) 898-1800
Circle 475

ETDS
(313) 626-0770
Circle 476

Execucom Syst.
(512) 346-4980
Circle 477

Financial Tech.
(312) 280-0600
Circle 478

Harris Data Svc.
(414) 475-1760
Circle 479

MDCR
(201) 257-5700
Circle 480

SAS Institute
(919) 467-8000
Circle 481

Software Int'l.
(617) 285-1400
Circle 482

SPSS
(312) 329-2400
Circle 483

Xerox
(213) 306-4000
Circle 484

Graphics

Cullinet Software
(617) 329-7700
Circle 485

SAS Institute
(919) 467-8000
Circle 486

Inventory control

Computer Assoc. Int'l.
(516) 997-8800
Circle 487

Cullinet Software
(617) 329-7700
Circle 488

Gemini Information Syst.
(303) 773-1805
Circle 489

Tominy
(513) 984-6605
Circle 490

Tres Syst.
(214) 248-8737
Circle 491

Xerox
(213) 306-4000
Circle 492

Manufacturing

Cincom Syst.
(513) 662-2300
Circle 493

Computer Assoc. Int'l.
(516) 997-8800
Circle 494

Cullinet Software
(617) 329-7700
Circle 495

Software Celebration

(Continued from page 201)

number of people, but it just takes them a lot less time," he says.

Megacalc runs on the IBM 370, 43XX, and 30XX, and sells for $15,000. *Circle 569*

Playing games on a big machine

The State Universities Retirement System of Illinois chose a similar "mainframe personal computing" package, rather than buying personal computers. Dennis D. Spice, assistant executive director, considered acquiring personal computers to provide member employees with better information about their benefits, but decided instead to install Omnicalc from Tower Systems International on his organization's IBM 4331.

The agency manages a $1.5 billion pension fund covering about 50,000 employees in 70 state agencies. Pension-fund participants need all sorts of information to make their career decisions. For example, a participant might want to know what her monthly annuity will be if she retires at age 55 rather than age 58, or how much accrued vacation time will be worth in cash at retirement, or how retirement benefits will be affected by a promotion. The answers to these questions depend on a wide assortment of variables. Personal-computer spreadsheet software is highly touted as being adept at fielding such complex questions. But micros were too expensive and failed to leverage the agency's investment in the 4331 mainframe, says Spice.

Omnicalc was installed last June, and it provides the planning, forecasting, and modeling capabilities of personal computers to *terminal* users. Like personal-computer spreadsheets, Omnicalc allows users

A spectrum of applications packages

Manufacturing

Formation
(609) 234-5020
Circle 496

IMSL
(713) 772-1927
Circle 497

Informatics General
(213) 887-9040
Circle 498

Nichols
(213) 670-6400
Circle 499

Xerox
(213) 306-4000
Circle 500

Marketing

Cullinet Software
(617) 329-7700
Circle 501

SPSS
(312) 329-2400
Circle 502

Xerox
(213) 306-4000
Circle 503

Mathematical analysis

IMSL
(713) 772-1927
Circle 504

Order entry

Computer Assoc. Int'l.
(516) 997-8800
Circle 505

Cullinet Software
(617) 329-7700
Circle 506

Informatics General
(213) 887-9040
Circle 507

Tominy
(513) 984-6605
Circle 508

Xerox
(213) 306-4000
Circle 509

Payroll

Genesys Software Syst.
(617) 685-5400
Circle 510

Personnel Data Syst.
(215) 828-4294
Circle 511

Tominy
(513) 984-6605
Circle 512

Tres Syst.
(214) 248-8737
Circle 513

Xerox
(213) 306-4000
Circle 514

Personnel (human resources)

Computer Assoc. Int'l.
(516) 997-8800
Circle 515

Erisco
(212) 247-2444
Circle 516

Genesys Software Syst.
(617) 685-5400
Circle 517

Personnel Data Syst.
(215) 828-4294
Circle 518

I.P. Sharp Assoc.
(416) 364-5361
Circle 519

Software Int'l.
(617) 285-1400
Circle 520

Tominy
(513) 984-6605
Circle 521

Tres Syst.
(214) 248-8737
Circle 522

Xerox
(213) 306-4000
Circle 523

Purchasing

Computer Assoc. Int'l.
(516) 997-8800
Circle 524

Cullinet Software
(617) 329-7700
Circle 525

Global-Ultimacc Syst.
(201) 445-5050
Circle 526

Tominy
(513) 984-6605
Circle 527

Tres Syst.
(214) 248-8737
Circle 528

Xerox
(213) 306-4000
Circle 529

Sales forecasting

Cullinet Software
(617) 329-7700
Circle 530

Prediction Syst.
(201) 223-4572
Circle 531

Statistical analysis

Cullinet Software
(617) 329-7700
Circle 532

IMSL
(713) 772-1927
Circle 533

Prediction Syst.
(201) 223-4572
Circle 534

SAS Institute
(919) 467-8000
Circle 535

I.P. Sharp Assoc.
(416) 364-5361
Circle 536

SPSS
(312) 329-2400
Circle 537

Xerox
(213) 306-9000
Circle 538

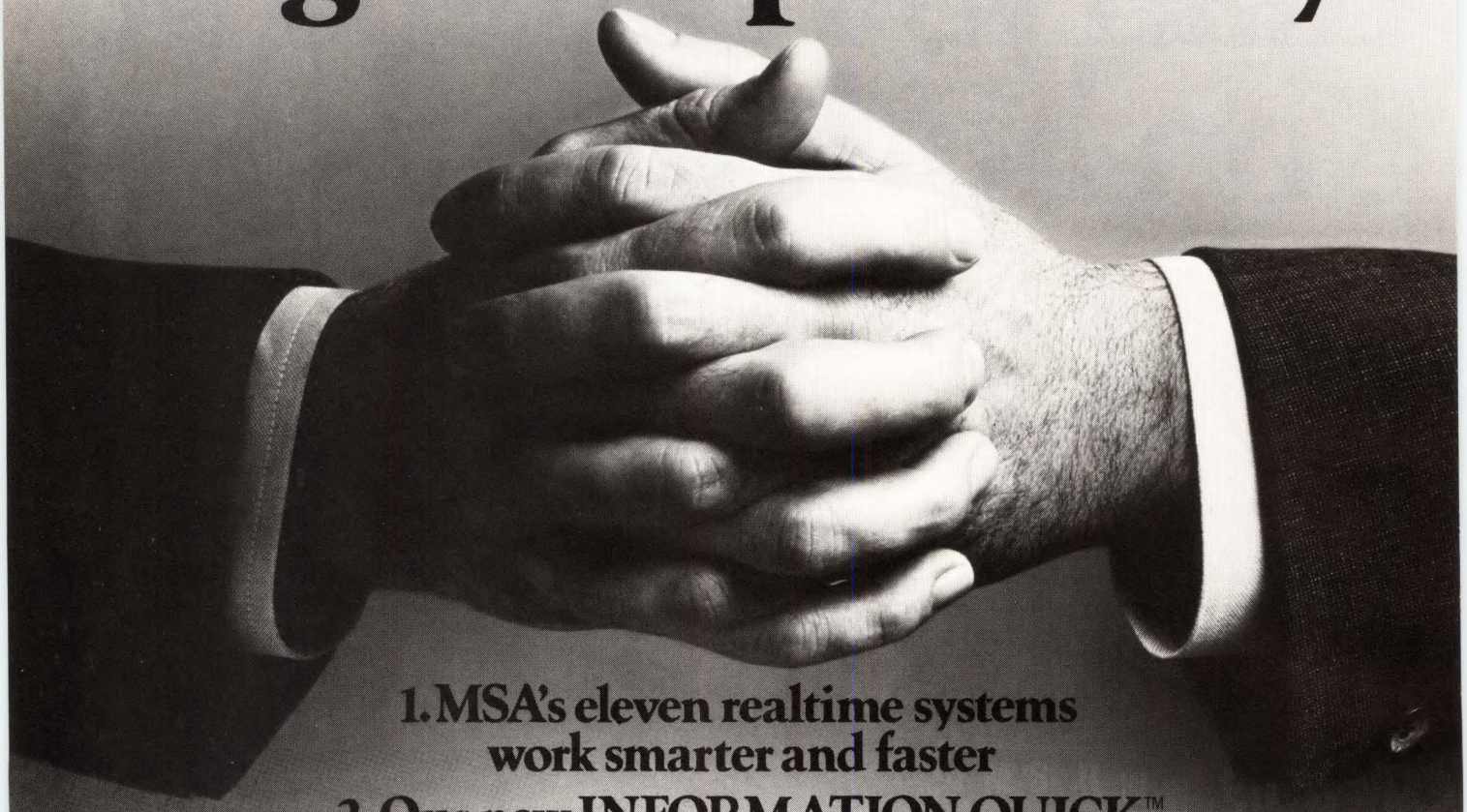
Word Processing

A detailed list of word-processing packages for minis and micros will appear next month.

MSA has more realtime systems than you can count on both hands...

(Plus a surprising new way to let your fingers do the talking...)

...and they're all designed to work together perfectly



1. MSA's eleven realtime systems work smarter and faster

2. Our new INFORMATION QUICK™ offers an English-based command language for fast, easy information retrieval

MSA offers you more integrated realtime systems than our next three competitors combined.

We've been producing realtime systems since 1978. And solved the problems associated with realtime, including accounting control, security and recovery. The result: a full range of finely tuned, highly reliable realtime systems.

Nobody can give you a software product line this broad. Nobody can offer you a choice between realtime and online systems.

And nobody else offers a true borderless environment like INFORMATION QUICK.™ This new capability lets you use plain English commands for fast and easy retrieval of information and interactive online report writing. Make the most of realtime. Get INFORMATION QUICK. Ask your MSA representative for details.

MSA Realtime Mainframe Systems	
1. General Ledger	8. Foreign Exchange
2. Accounts Payable	9. Forecasting & Modeling
3. Accounts Receivable	10. Manufacturing
4. Budgetary Control	11. Personnel
5. Project Tracking	12. Fixed Assets (Available for delivery December, 1984)
6. Payroll	
7. Order Processing	

MSA

The Software Company

Management Science America, Inc.
3445 Peachtree Road, NE, Atlanta, GA 30326

Software Celebration

(Continued from page 202)

to change the questions by changing the formulas that govern particular sets of calculations, and when a change is made, the program automatically updates and modifies figures to reflect it.

Omnicalc was brought in for use by five staffers, but it has become a working tool for the entire staff. In addition to handling queries about pension benefits, the package is being used to handle a vacation-and-sick-leave system. That system had an estimated development cost of $3,000, says Spice. "With Omnicalc, in less than a day you can create what you see in your mind's eye," he says. "It's the best purchase I've ever made."

Omnicalc runs on the IBM 370, 43XX, 30XX, and PCMs; it costs $4,600. *Circle 570*

Model building brought in-house

United Telephone System Inc., Shawnee Mission, KS, bought a spreadsheet-related package—a financial-modeling language—to cut the cost of timesharing services. FCS-EPS from EPS Inc. is more restrictive than the imitation micro spreadsheets, but Neil P. Buterbaugh, manager of network planning and budgets, says it has proved to be an effective cost-cutter. "We wanted to reduce our timesharing bills," he says.

United Telephone is the third-largest telephone system in the United States, with $1.4 billion in sales last year. It comprises 21 local companies in 20 states. In mid-1982, FCS-EPS was installed on IBM 3033s in the four regional data centers of United Data Services Inc., a subsidiary. Budget analysts at headquarters trained users in the regional locations to build their own models with the package. Eventually, the finance departments of the 21 operating companies were also taught how to use the software. One result of this vertical integration has been the consolidation of all financial reports into models for the headquarters staff. FCS-EPS performs the consolidations. Financial staffers use the package to forecast access-line gains, revenues, and toll-message volume, as well as to prepare routine reports.

Although it has some restrictions, the package is actually more flexible than the timesharing application, says Buterbaugh. "FCS-EPS is hierarchical, and that allows us to look at a variable across many divisions without additional programming," he explains. "It allows us to slice along a third dimension of our financial pie." In addition, it has a full-screen editor. The timesharing system did not.

Recently, four of the operating companies installed MicroFCS, a mainframe-style modeling system for micros, on IBM Personal Computers. These purchases are testimony to the growing importance of the system, says Buterbaugh. "I've lost track of the number and types of uses, but I know the number of users and applications is growing," he says.

FCS-EPS runs on most mainframes and costs $25,000 to $150,000. *Circle 571*

Quick retrieval

Gaining quick access to massive storehouses of information speeds decision-making, production, and, indirectly, the accumulation of profits. Organizations that have the cumulative total of their efforts on hand without an effective way of locating particular records are, in effect, operating libraries without card catalogs. B.F. Goodrich Co., the big tire-maker based in Akron, OH, attacked this kind of problem by installing Basis from Battelle Software Products Center.

Goodrich, which had sales last year of $3.2 billion, has a research-and-development library of 94,000 citations of technical documents, representing the work of 20 years. Employees retrieved files from separate libraries in Akron, Avon Lake, and Brecksville, OH, using a 12-year-old batch-processing system. It processed searches far too slowly, and employees in one office couldn't access the data stored in either of the other two facilities. Goodrich needed

Carol Lioce (standing), manager of two B.F. Goodrich information centers, looks on while Rosa Raskin, information specialist, uses Battelle Software's Basis to call up a file.

Software Celebration

(Continued from page 205)

a way to provide quick and accurate access to all the information for all the employees.

Basis was installed in March of 1983, and it has reduced turnaround time from about two hours to several minutes. (Some searches under the old system took 24 hours.) Technical staffers still handle some of the searches, but research scientists are also doing many of their own under the new system. The package offers free-text and selective searching. Basis also has streamlined database-update procedures, dramatically cutting the time necessary to add and change information.

A key feature of the package for Goodrich is its thesaurus capability, says Carol Lioce, manager of the information centers at Avon Lake and Brecksville. The thesaurus controls the vocabulary used to validate new bibliographic information, and, like a self-adjusting card catalog, adds and updates key terms, authors, titles, abstracts, report types, and dates. As information is entered, the thesaurus automatically adds new terms to the vocabulary and expands its classifications as needed. After the new information is validated by the thesaurus, it becomes part of the database.

Goodrich's old system had two thesauri, one shared by Akron and Brecksville, and the other used by the Avon Lake center. The manufacturer wanted to consolidate the database the three centers use, but maintain the separate thesauri. Basis allowed the tire-maker to do so.

Basis data-management software runs on IBM and plug-compatible mainframes; it costs $38,000.

Circle 572.

Quick transmission

The flip side of fast database access is getting the word distributed to employees quickly and accurately. For many organizations, effective distribution is synonymous with a good electronic-mail system. Penn Mutual Life Insurance Co., a Philadelphia-based carrier with $2.8 billion in revenues last year, has had electronic mail for 15 years. But its system was outmoded, and last September, Penn Mutual installed Sysm from H & W Computer Systems Inc. to replace it.

The package runs on Penn Mutual's IBM 3081 and Amdahl 470 V-8 mainframes. The new system serves the carrier's more than 1,000 independent insurance agents across the country. They receive messages and important policy information via more than 500 terminals from IBM and Data General. Another 350 IBM and Data General terminals are used in the home office. The agents have access to Data General Eclipse minicomputers, which provide local-computing power and serve as front ends to the mainframe.

Electronic mail gets information to agents faster, and that translates into better service to clients. However, the system also offers measurable benefits. Long-distance phone costs dropped immediately after the system was installed. The system also stores preformatted "boilerplate" messages that have standardized the agents' order forms and shortened the delivery cycle for materials.

Sysm runs on IBM mainframes and PCMs under CICS. Prices are $12,000 for the DOS operating system and $14,000 for an OS version. *Circle 573*

How to improve decision-making

Easy, effective database access is the first step; the logical extension of the process is providing better support for executive and managerial decision-making. Some applications packages facilitate so-called decision support. Perkin-Elmer Corp. (Norwalk, CT), the big instrumentation and computer manufacturer, installed one such package—Impact from MDCR—for just that purpose.

Perkin-Elmer, which had sales last year of $996 million, needed a package that would support decision-makers in widely separated divisions across the country. "We needed a system that was easy to obtain, easy to use and understand, and flexible enough to meet specific needs," recalls Edward S. Cartier, manager of technical services in the Data Systems Group, which is located in Oceanport, NJ. "Impact has become a key decision-support tool for financial and MIS users."

Perkin-Elmer runs Impact on an IBM 3032 at a central location. Users in offices around the country can access the software via a proprietary network or through a dialup system. Impact is also available for popular personal computers. Some Perkin-Elmer divisions are making use of these scaled-down packages. Both versions of the program let users build their own models, update common databases, and create reports using common models. The departments that are using the personal-computer version also can create files locally and upload them to the central mainframe. Conversely, they can download files from the central site and modify them at their machines.

> Packages that promise to give users at terminals the flexibility offered by microcomputers are rising in importance.

"Impact has allowed us to consolidate divisional-, group-, and corporate-level reports, even though the business units may have different reporting requirements," says Cartier. Impact identifies the common elements of the various reports and combines them according to the definitions of a central model. Thus, while the departments and divisions of the corporation design models to meet their peculiar needs, they also are contributing to consolidated, generally available corporate models.

Impact has also been used for more specific purposes, says Cartier. For example, it was used to build models to track employee turnover, perform marketing projections, and track orders. "These models were quickly and easily generated, even though they're

We'll be there.

When you commit yourself to a purchase of computer terminals, you need a partner you can trust 100 percent. Not only for superb performance today, but for premier service and support in the years ahead. That's why so many companies are choosing Qume QVT™ terminals for everything from simple data entry to sophisticated editing and graphics workstations. In both ASCII and ANSI, Qume QVT terminals assure you of superlative performance at more affordable prices. And because Qume is a member of the ITT family of companies, you can be sure we'll always be there with solid support.

QVT TERMINALS

For complete details on Qume QVT alphanumeric and graphics terminals, call **(800) 223-2479.** Or write Qume Corporation, 2350 Qume Drive, San Jose, CA 95131.

Qume®
A Subsidiary of ITT

CIRCLE 145

(Continued from page 206)

customized to meet specific requirements," says Cartier. "Local design of models allows new and revised data and formats to be included at will."

Impact runs on the IBM 370, 43XX, and 30XX and sells for $60,000. *Circle 575*

Hotel chain joins the online era

Before December 1981, Best Western International Inc., operator of 3,000 hostelries across the country, didn't have a computerized corporate-information database. As business grew, however, the brass recognized the need for an online, integrated corporate-information system. TIS from Cincom Systems Inc., a database package that lets nontechnical users maintain and access their own information, was installed on Best Western's IBM 4341 to speed implementation of the system.

TIS and packages like it are vital parts of integrated information-retrieval systems. They provide the facilities users need to conduct their own searches of the database, eliminating a big additional chore for the programming staff. The savings in time—and thus money—can be considerable. At Best Western, for instance, the database-inquiry package cut the estimated development time of a payroll/personnel-information system in half, says Wendall Allen, database administrator. "There is no way we could have implemented this system in such a short time using conventional methods," he says. "We estimated that we'd have to write 30 programs just to give the users the information they needed, and that would have added six months to the project. Using TIS, users are writing their own queries and getting their information in 10 minutes."

Carol Kuhara (seated) and Kendra Williams-Green, both personnel-department staffers for Best Western, call up a file from the company's database using TIS, a database-access package.

TIS will continue to pay dividends as other systems are designed and implemented, says Ray Siggins, MIS manager. "The package is helping us build an ambitious online information system from the ground up without the burden of a large budget for extra programmers and other dp specialists," he says.

TIS runs on IBM 370s and larger mainframes and costs from $150,000 to $300,000. *Circle 574*

Looking for buried treasure

Zale Corp., Dallas-based operator of 1,500 jewelry stores and catalog showrooms, is using a decision-support package to find golden opportunities in the future. Zale's strategic planners rely on System W from Comshare Inc. to help them chart the retailer's future. "Our business units maintain five-year forecasts that are constantly updated," says Gean Morphis, vice president of corporate planning. Consolidations of the separate five-year plans are vital to corporate-level strategic planning, he adds.

Of course, many corporations prepare strategic plans, but Zale's credit division requires data exchanges that are a bit unusual, says Morphis. The credit division's rates are determined, in part, by the sales of other divisions. Also, the credit division passes its expenses along to the other divisions. Thus, the retailer needed a more flexible way for the divisions to exchange information. "Most modeling languages are built to pass data up a hierarchy," says Morphis. "But we need to pass data *across* models. System W lets us do that."

Zale's brain trust also uses System W for sales-demand forecasts, says Morphis. "We use raw federal census data that must be consolidated for us to make market estimates," he says. "System W allows us to roll over the same data in many different ways."

Catalog sales are a fast-growing portion of Zale's business, and a model has been constructed using System W to analyze return on investment in showroom floor space. "This is one of the more exciting analyses we're doing," says Morphis. "It is more than a primitive pro forma report based on percentages-of-sales figures. It is a working tool for line management."

System W costs from $55,000 to $100,000. Versions are available for IBM mainframes under VM/CMS or MVS/TSO. Versions of the software for the IBM Personal Computer and the XT, the hard-disk version of the PC, are also available as add-ons to the mainframe package. Micro versions cost $200 each. *Circle 576*

Encouraging users to ask questions

Purity Supreme Inc., a Newton, MA-based food retailer, installed a database-inquiry system because users were suspiciously quiet. Under the old system, users had to process requests for reports using corporate data through the dp department, says David Hayes, vice president of dp. "We had a constant backlog of requests and as a result, many users stopped asking for reports I know they wanted or could have used," he says.

Purity Supreme installed Friendly Query System (FQS) from Altergo Products Inc. to loosen its employees' tongues, as it were. FQS won a "compute-off," of sorts, with IBM's Query By Example. The package is installed on an IBM 4341 at the data center in Billerica, MA. "FQS helps nontechnical employees conduct queries via simple menus and prompts," says Hayes. FQS is more limited than some database-access packages be-

Dynamic mainframe looking for suitable personal mate.

If you speak or want to learn IFPS®, we could make beautiful decisions together. P.S. Let's meet at the Information Center.

In the past, the hardest thing about financial planning was planning how to do it. That was until Execucom introduced IFPS. IFPS makes problem solving and decision making a lot easier. The tangle of technical details is avoided. And managers are able to master it in a very short time.

Now, financial planners have an opportunity to extend the power of IFPS Decision Support Software to their personal computers, an incredible advantage over any other Decision Support System available.

See Your Mainframe And Personal Computer Work Together At The Information Center.

When IFPS/Personal™ is linked to your mainframe through the Corporate Information Center, the reach of financial planning software is extended throughout your entire organization. You can easily and quickly transfer models and data between your mainframe and desktop computers and solve these models on *either* end.

You can share and consolidate individual models, reports and data files. You can create them all on your Personal Computer and process them on your mainframe. And IFPS is compatible with the leading general ledger, database and statistics software packages used by corporations.

Do All Your Planning And Modeling In English.

Thanks to the non-procedural language used in both IFPS and IFPS/Personal, you do not have to be a computer expert to build sophisticated models. Or to understand those that other people construct.

Receive The Most Comprehensive Computer Software Training And Service Program Available.

Not only a fact, but a promise. We have developed a support program that offers mainframe-level support on IFPS/Personal. It includes expert technical support for installation, superb documentation, comprehensive training programs, HotLine support, specialized consulting, periodic product enhancements and user associations. We believe that state-of-the-art technology deserves state-of-the-art service.

If the personals ad above looks like it may have been written by your lonely mainframe, call or write Execucom immediately and we'll tell you how you can get it an IFPS/Personal mate. If your mainframe doesn't have IFPS yet, call or write us today and we'll help you make your decision. Execucom Systems Corporation, 3410 Far West Boulevard, Austin, Texas 78731. **Call 1-800-531-5038** or in Texas or Canada, **call 512-346-4980.**

EXECUCOM

IFPS, IFPS/Personal are registered trademarks of Execucom Systems Corporation.

CIRCLE 86

(Continued from page 208)

cause users can't change the data they call up for review. However, that limitation helps protect data integrity.

So far, 50 employees have asked for FQS passwords, says Hayes. Users of the system prepare vital reports on the operations of the retailer's 114 supermarkets, pharmacies, and convenience stores throughout New England. For example, personnel employees use the package to answer questions such as: "How many employees need work permits because they are under 18 years of age?" Also, when the personnel department was planning for a relocation of the corporate headquarters to Newton, MA, staffers used FQS to determine how many employees would be adversely affected by the move.

FQS has had a tangible impact on inventory and warehouse management, adds Hayes. "A manager might need to know how much of a specific product has been in the warehouse for more than 90 days," he says. "FQS provides the information much more quickly than we previously could."

On the average, users need about 10 minutes to make a request, and wait about five minutes for reports to be printed. They can save their FQS programs for future use. "Users no longer need our help," says Hayes. "They just do their own thing."

FQS costs $15,000 for IBM mainframes and PCMs under DOS and $18,000 for those running under OS. The package also runs under CICS/VS or Shadow II operating under DOS/VS(E), OS/VS1, or MVS. *Circle 577*

Computerized card file

Some organizations, forced to automate a burgeoning index-card file or some other collection of paper threatening to burst its seams, must start from scratch. The Alaska Department of Public Safety, for instance, installed Inquire from Infodata Systems Inc. to help organize a manhunt for a murder suspect. Other law-enforcement agencies around the country, including the task force probing the Atlanta child murders and the Los Angeles team tracking the Hillside Strangler, have also turned to database-management packages to help track criminals.

The Alaska investigation centered on the murders of six Fairbanks women over two years. Investigators indexed the mountains of information they gathered on index cards, but as the investigation went on, this system became unwieldy. Comparing the facts and circumstances of each murder—a vital investigative technique—was almost impossible. "The investigators had devised a complex 'tickler-file,' says Becky Schroeder, project coordinator. "But information retrieval was an immense problem. The investigators complained that they could not easily manipulate information or perform 'what if' scenarios."

Schroeder was charged with finding the best package for the investigators. One possibility was to piggyback the investigation on a system used by the Alaska Legislature's Legislative Affairs Office in Juneau. The office already had ATMS/Stairs, the same database-management package that was used to investigate the Atlanta child murders. But Schroeder rejected that possibility. "The investigators didn't have the time or the desire to learn how to use it," she recalls. Also, they wanted to manage their own database in Fairbanks, she says.

Inquire was chosen in March 1982 over several alternatives, including timesharing, because it is easy to install and use. It was installed on an IBM 4341. "Inquire isn't rigidly structured, so it is easy for non-technical users to set up screens and create the files they need," says Schroeder. "It also offers flexible search procedures."

Nobody was ever brought to trial for the Fairbanks murders, although investigators identified a suspect in March 1983. He was killed in a motorcycle accident shortly afterward. Inquire is still working on investigations for the Alaska Department of Public Safety.

Inquire runs on IBM 370, 30XX, and 43XX, and costs from $55,000 to $215,000. *Circle 590*

The workhorses: Financial packages

Applications software that imitates personal-computer software is a new and exciting arena for many organizations. But other applications are no less important. Indeed, even if they are a bit unglamorous, financial applications help an operation achieve high-performance standards. Systems like accounts payable and receivable are the bedrock of an operation; if they're not right, a corporation faces fundamental problems.

At the Kayser-Roth Corp., a New York-based conglomerate with $747 million in sales last year, Accounts Payable/Purchase Control System from Data Design Associates was installed for the Catalina fashion division to solve one such fundamental problem. "Increasing sales were starting to burden our accounts-payable staff," recalls Paul Coyne, controller of the fashion manufacturer. "We realized that a good accounts-payable package was the only way to quickly handle the growing workload."

The online Data Design system was installed on Catalina's IBM 4341 in May 1981. Since that time, sales have increased by 25 percent, yet Catalina has not been forced to expand the accounts-payable department, says Coyne.

Having an efficient accounts-payable system is particularly important in the fashion business, says

Cyborg's Payroll and Human Resource Software Does Everything But the Dishes...

at DELTA FAUCET

Delta Faucet never asked us to do the dishes, but it did come to Cyborg with a challenge. It wanted the best payroll and human resource management software on the market.

Delta Faucet has been a leader in its industry for over thirty years. One of the reasons why is that the people at Delta Faucet made a commitment to produce high quality goods that endure. Delta expects the same commitment from the people it does business with.

When Delta evaluated payroll and human resource software, it looked for high quality and comprehensive features: software to solve current problems, with enough flexibility to handle new situations that occur in a manufacturing environment.

THAT'S WHY DELTA CHOSE CYBORG.

Cyborg met Delta's challenge and we would like to meet yours, no matter what the environment or industry. Cyborg offers enduring quality in both software and support. Give us a call and we'll take your challenge.

CYBORG...LIKE DELTA FAUCET, FIRST BECAUSE WE LAST.

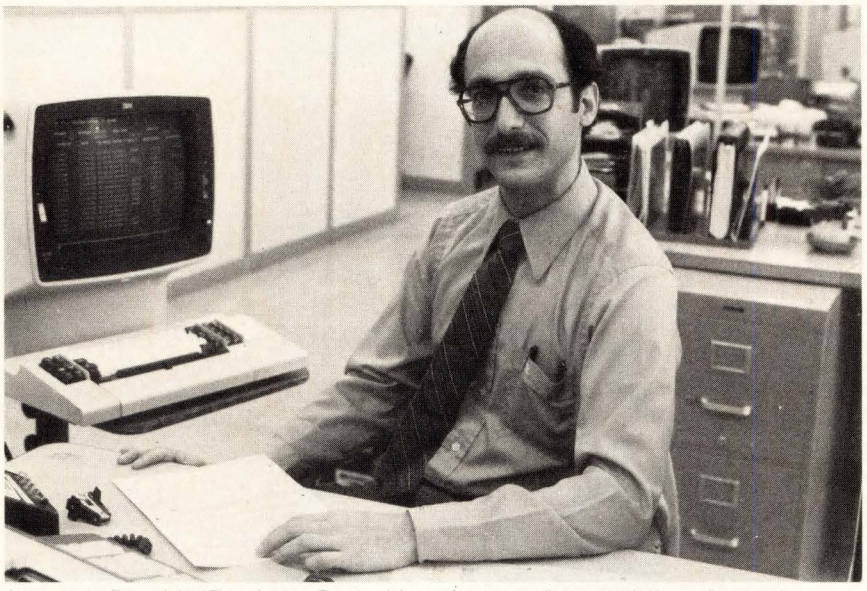
Cyborg Systems, Inc.

John Kluska
Marketing Manager
2 N. Riverside Plaza, 21st Floor
Chicago, Illinois 60606
(312) 454-1865
Telex: 9102216009

CIRCLE 87

Software Celebration

(Continued from page 210)



Accounts Payable/Purchase Control has the two characteristics of a cost-effective applications package, says Harold Abelow, systems analyst. It interfaces with other accounting packages and it simplifies program changes.

Coyne. "Things move fast in this industry," he says. "Having vendor-payment information readily available gives us the ability to respond rapidly to inquiries, eliminating a lot of frustration for our staff and improving vendor relations."

Any new accounting package must have two characteristics to be cost-effective, says Harold Abelow, systems and procedures analyst. First, it must fit in with existing software systems. "We were pleasantly surprised at how easily Data Design's package interfaced with our general-ledger, inventory, and materials-management systems," says Abelow. Second, the package must be flexible. "Six months after we implemented the system, users asked for information on open orders by classification of material," recalls Abelow. "Normally, it would have taken us weeks to convert the system, but the new system allowed us to make the necessary changes in about an hour." Data Design's package is based on "data-mapping" architecture, which simplifies changes, he says, and that kind of feature saves money in the long run.

The Accounts Payable/Purchase Control System starts at $34,000 and runs on most mainframes.

Circle 578

Payroll can be a rich vein of data

One of the big financial applications is payroll, despite the attraction of payroll services provided by outside bureaus. Payroll can be a gold mine of information for management, says David Becker, supervisor of systems and programming for Anne Arundel Community College, Annapolis, MD. However, you won't mine these riches unless you bring payroll in-house, he says.

"Today it takes moments to generate a specialized report," Becker says. "It used to take days or even weeks." The college switched from payroll on a timesharing service to Pass Accu/Pay from Personnel Data Systems Inc. running on an IBM 4341 last July. Fast generation of reports is important, but it may not be the best benefit provided by the package, says Becker. "We never realized how much information we weren't getting until we saw what we could get from our in-house system," he says.

The college has almost 13,000 students and very complicated payroll requirements. It must separate teaching from administrative positions to get state matching funds. As at many other colleges, teachers can elect to take their salaries in 10 or 12 installments, and that factor also complicates payroll.

Pass Accu/Pay handles the ins and outs of the college's payroll requirements and provides better reports as well. The key to its success at the college is an integrated report writer. "We traded long, usually frustrating waits for practically instantaneous, custom reports," says Becker. The report writer is also easy to use—so much so that a nontechnical clerical worker took responsibility for reports without missing a beat.

Pass Accu/Pay prices range from $49,000 to $160,000. It runs on IBM 43XX and 30XX. *Circle 579*

The modular way

Today's financial-application packages should anticipate the future. That was the motto of Orange & Rockland Utilities Inc., Spring Valley, NY, when it installed a series of new financial packages from Walker Interactive Products in June 1982.

O&R provides power to 600,000 ratepayers in New York, New Jersey, and Pennsylvania, and had revenues of $425 million last year. In 1981, the utility adopted a new five-year plan calling for several key changes. The plan included a mandate to expand the utility's Consumer Affairs Department by the end of the following year. That meant reducing computer-response time for customer inquiries. The plan also called for software and hardware expansions with the goal of integrating all key systems.

To improve response time, O&R replaced two IBM 370/158 mainframes with a 16-Mbyte IBM 3083 last December. "We reduced our response time from up to 30 seconds per customer inquiry to under five seconds," says Charles E. Cassaro, manager of systems development.

After the upgrade, O&R also installed new financial-applications

(Continued on page 216)

What do top computer professionals usually say when we tell them about our unique, completely portable software?

"Show me!"

And actually we are not surprised. After all it took us 5 years to figure out how to do it. And now that we've gotten over that hurdle our biggest problem has been convincing people that Tominy's* completely portable application development system really works.

Tominy allows you to develop completely portable application programs which can be used without modification on micros as well as mainframes and everything in between. That means no more costly and unproductive time spent in developing special systems to fit individual computers. With Tominy one size fits all.

We have such confidence in the system that we offer it with a 90 day no questions asked money back guarantee.

Because it is not possible to tell you here everything our portable application development system does, we have ready to send you a kit that not only offers detailed information on how the system operates but also shows how it is presently being used to increase productivity and reduce costs in over 1000 installations nationwide, including 25 of the Fortune 500 companies. It's yours free for the asking if you send in the coupon or call (513) 984-6605.

We are sure that after reading it Tominy will make a believer out of you too.

Tominy

Once is finally enough.

*Tominy's completely portable application development system is presently available for IBM's PC, System/34, System/36, Series/1, 43XX, 30XX, 370xxx; DEC VAX/VMS systems, UNIX and XENIX operating systems

01-CD-4-4

☐ I'd like to be convinced. Send me your information kit.

☐ Have a representative call.

NAME (PLEASE PRINT)

TITLE

COMPANY

ADDRESS

CITY STATE

ZIP

( )

TELEPHONE

Mail to: **TOMINY** Inc.
Dept. B
4221 Malsbary Rd., Bld. #1
Cincinnati, Ohio 45242

CIRCLE 88

"HUNDREDS OF DIFFERENT OPERATING

"R:BASE™ KEEPS ME ON TOP OF THE WORLD'S BIGGEST BUSINESS."

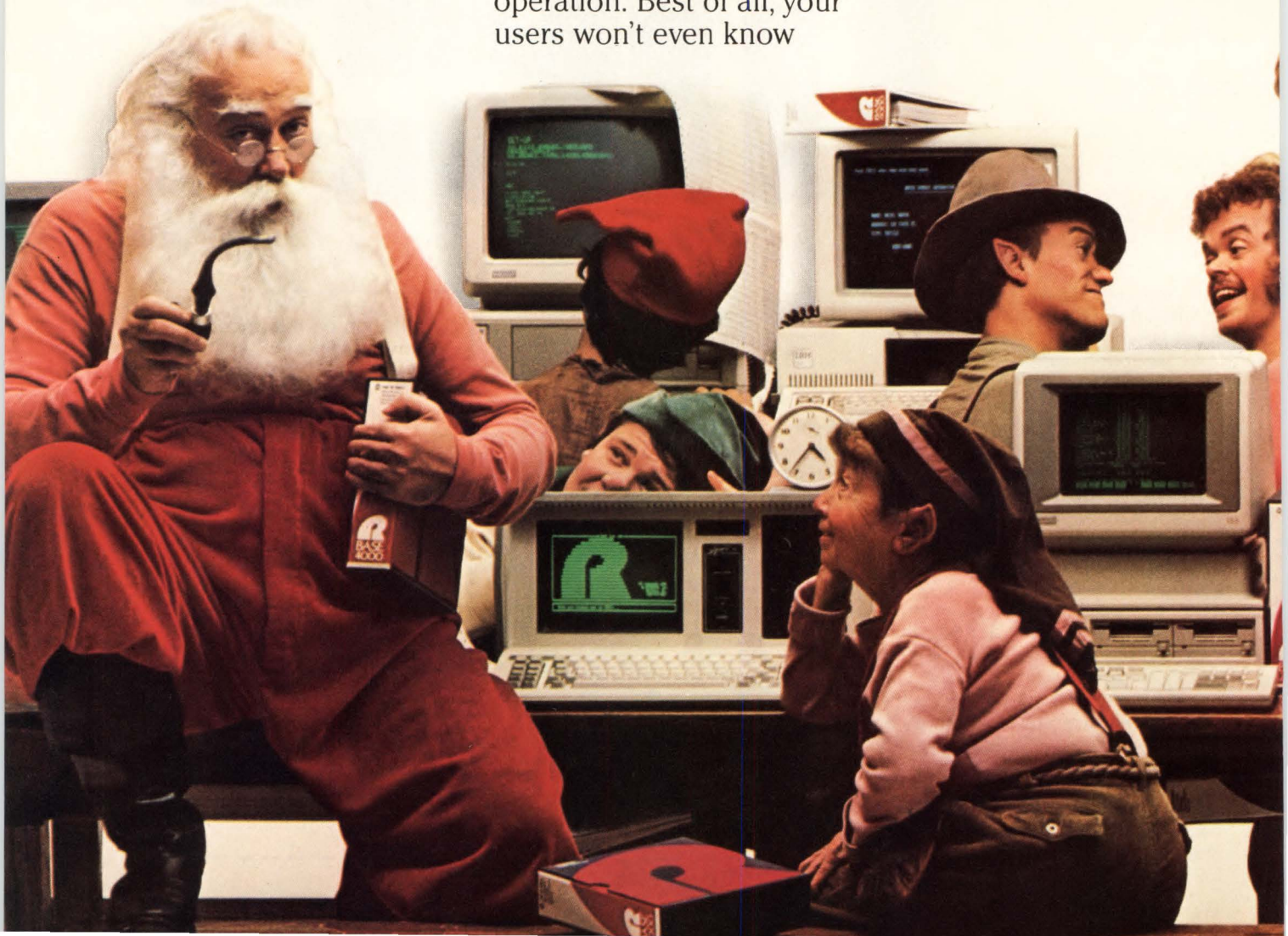
Now there's a brand new way to make sense out of all the micros in your company. Glue them together with the world's most complete family of DBMS software. R:BASE.™

This high-performance software comes in a whole range of versions. In MS™-DOS, PC/DOS,™ CP/M,® BTOS™ and CTOS.™ For multiuser or stand-alone applications, and even for personal use. So you can literally grab every one of those expensive little machines by the database. And standardize your data acquisition and information management practices.

Of course, data and file structures used on one type machine are completely compatible with any of the others. It's the end of jargon as you know it. The beginning of a totally buttoned-up, cost-efficient operation. Best of all, your users won't even know how tight the control is. They'll just think they're having the time of their lives playing with the computer.

"A PROGRAM YOUR PEOPLE CAN RELATE TO."

Now, there's a brand new option that makes R:BASE a lot easier to relate to. R:BASE CLOUT™ (Conversational Language Option). It lets everyone communicate with a microcomputer in



LITTLE MICROS. SYSTEMS. HO! HO! HO!"

plain English. It even remembers an individual user's favorite abbreviations and slang. In fact, this is nothing less than an artificial intelligence system that actually learns from experience. And when you put it together with all the power of R:BASE, you've got a package that just can't be beat.

"DON'T WAIT TILL CHRISTMAS. OPEN IT UP NOW."

Want to see how it feels to have a little order for a change? For only $14.95 (plus shipping) we'll send you a comprehensive demonstration packet* of R:BASE and R:BASE CLOUT DBMS software, including three separate diskettes. Just call 1-800-547-4000, Dept. 829. In Oregon, or outside the U.S., call 1-503-684-3000, Dept. 829.

Or ask for it at your nearest software store or ComputerLand® dealer.

R:BASE™ FROM MICRORIM®

*Requires 256K of memory. Runs on MS™-DOS and PC/DOS operating systems.

CIRCLE 89

(Continued from page 212)

software. "Instead of putting in a general-ledger system first, followed by accounts payable and so on, we decided to select subsystems that would permit gradual expansion into larger and more complex applications," says Louis F. Campione, director of corporate services. "Walker's systems and programs are well-designed and easy to use."

O&R has three Walker II/FS software modules—purchase order, accounts payable, and materials management. The accounts-payable module helped mitigate the impact of a six-week strike by utility employees last summer. "The strike could have shut down operations," recalls Cassaro. "But with Walker's module, our management staff was able to operate the utility despite the strike." Overall, the three modules have also reduced inventory and reduced the cost of borrowing. "Lower costs, greater efficiency, and improved service translate into improved shareholder profitability," says Cassaro. "Also, customers will at some point see reductions in our charges."

Walker II/FS runs on IBM 360, 370, 43XX, and 30XX. Prices range from $66,000 to $225,000, depending on the number of modules purchased.

Circle 580

Special-function software saviors

Financial-applications software is not limited to the boilerplate accounting systems. A host of special-function packages handle many important tasks, improving the accuracy and efficiency of financial record-keeping. BASF Systems, New Bedford, MA, for example, deployed The Sales/Use Tax System from AVP Systems to introduce order to chaotic sales-tax records.

BASF Systems is a manufacturer of magnetic tapes with more than $100 million in sales last year. "We've almost doubled our sales volume since we started using this system," says Arthur Heard, tax manager. "Without it, we would have had trouble keeping up."

Local and county taxes are troublesome for businesses that are national in scope. Some cities levy taxes on transportation, others have sales taxes, and still others have special taxes for certain business and product classifications. AVP's package handles the sales taxes of some 4,500 state, county, and local government bodies. Like most billing systems, it is based on zip codes. The system computes the tax due to various localities, and then integrates the information into BASF's automated billing and accounting system, saving a hefty chunk of time.

The Sales/Use Tax System runs under any system with Cobol '74 and ISAM or VSAM file structures. It leases for $4,800 the first year and $2,100 each succeeding year.

Circle 581

Greasing the wheels of progress

Many applications packages address special needs. Indeed, there are potentially as many applications packages as there are tasks for computers to tackle. Project-management packages, for example, are important productivity raisers in many data centers.

Patrick B. Forness, general manager of systems and programming for the U.S. Postal Service's St. Louis data center, uses an automated project-management system to manage the efforts of 130 employees.

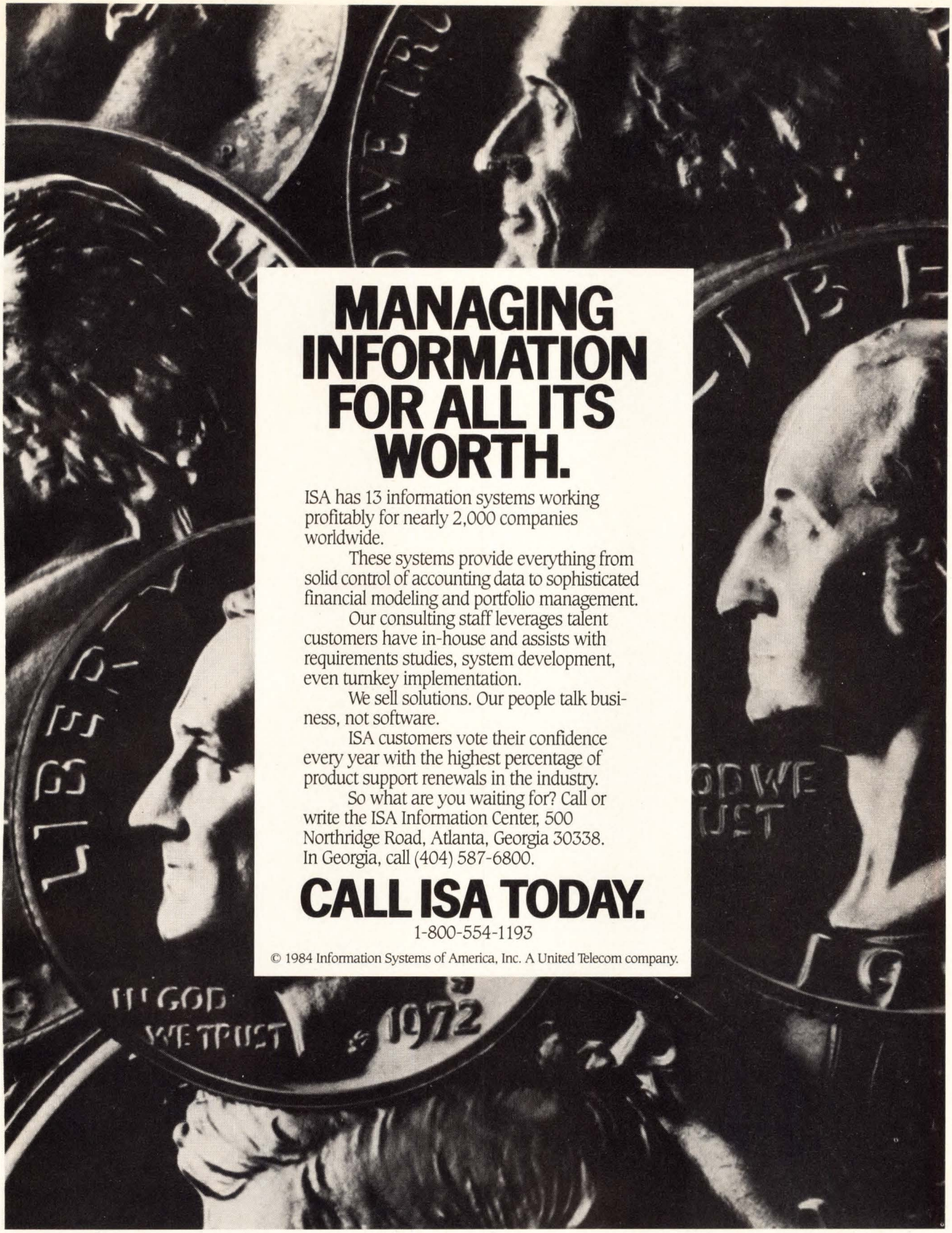
The U.S. Postal Service's data center in St. Louis installed Pac II from AGS Management Systems to help the staff complete a backlog of some 70 projects. The package was first installed as a batch-processing system in November 1979, and upgraded last December run online under IBM's Time Sharing Option. It runs on one of the data center's three IBM 3081s. Patrick B. Forness, general manager of systems and programming, installed the package when his staff was given an ambitious and time-consuming business-systems plan (BSP) to implement. "Given the size of the outstanding projects and the size and complexity of the BSP, I knew we'd need an automated project-management system," he recalls.

Since that time, Forness' staff has grown from 35 to 130, the largest of seven similar organizations in the Postal Service. The inventory of projects is up to 100, many of which are complicated new systems. Pac II and a structured program "life cycle" help keep all of this work under control. Standards developed using Pac II, for instance, assure the proper control of projects from inception to production. As work orders are received, they are assigned a project number, initialized by Pac II, and assigned to the responsible functional supervisor for initial review. The supervisor estimates the number of hours required to complete the project and sets deadlines.

Pac II keeps track of each project's deadlines, according to preset standards, and sets schedules taking into account holidays and vacation time. It also helps supervisors determine how much of the data center's resources a particular project will require. All of the information about each project is automatically loaded into the Pac II database, ensuring uniformity and integration.

"Pac II gives us the flexibility to

(Continued on page 220)



MANAGING INFORMATION FOR ALL ITS WORTH.

ISA has 13 information systems working profitably for nearly 2,000 companies worldwide.

These systems provide everything from solid control of accounting data to sophisticated financial modeling and portfolio management.

Our consulting staff leverages talent customers have in-house and assists with requirements studies, system development, even turnkey implementation.

We sell solutions. Our people talk business, not software.

ISA customers vote their confidence every year with the highest percentage of product support renewals in the industry.

So what are you waiting for? Call or write the ISA Information Center, 500 Northridge Road, Atlanta, Georgia 30338. In Georgia, call (404) 587-6800.

CALL ISA TODAY.

1-800-554-1193

ISA™

INFORMATION SYSTEMS
OF AMERICA, INC.

CIRCLE 90

(Continued from page 216)

effectively plan and control a large number of resources and projects," says Forness. "The payoff has been an improved ability to determine the status of all projects and resources at any given time."

Pac II runs on IBM mainframes and sells for $42,000. *Circle 587*

"Singing the same music"

For many manufacturers, installing a manufacturing-resource planning (MRP) system is an introduction to discipline and unity. Safeguard Powertech Systems, an Aberdeen, SD-based manufacturer of engines, was looking for those two qualities when it purchased Amaps—Advanced Manufacturing Accounting Production System—from Comserve Corp. in April 1982. "To gain control of inventory, we needed better coordination between the manufacturing and purchasing departments," says Francis Garvin, vice president of materials. "We wanted everyone singing from the same sheet of music."

Installation of the MRP system, which included replacement of an old IBM System/3 with a 4-Mbyte 4331, was straightforward, says Garvin. Amaps is being installed module by module under Software A.G.'s Adabas database management system. There are 15 user terminals. To date, four modules have been installed; Garvin plans to install three more this year and the last one early next year.

The system has also proved to be flexible, says Garvin. Less than two months after Safeguard acquired a ball-bearing manufacturer last year, Amaps was in use at the new plant. Communications between headquarters and the ball-bearing plant are handled over leased lines.

Amaps/Q runs on the IBM 370 and up and PCMs; it sells for $15,000 to $50,000 per module. Amaps/G runs on the same equipment and sells for $25,000 to $50,000 per module. *Circle 582*

Emphasis on inventory

Like Safeguard Powertech, many manufacturers install applications packages to more closely match inventories to actual needs. Smaller inventories are one of the hallmarks of the current economic recovery. After the last recession, it seems, many corporations vowed never again to be slowed by burdensome inventories.

General Telephone Co. of Florida, a Tampa, FL, subsidiary of GTE with 1.2 million customers in western Florida, is one such company. General Telephone keeps more than 14,000 different kinds of phones, cables, tools, and electronic components on hand to serve its customers. In the past, inventory was managed by a

batch-processing system that generated fixed-form reports. Data about orders, shipments, and stock levels were compressed into monthly reports that often exceeded 1,000 pages. Obviously, in that format, pertinent facts and red flags indicating trouble spots were hard to find.

In March 1982, General Telephone overhauled its reporting system using an information center built on the Ramis II database management system and fourth-generation language from Mathematica Products Group. Now, supply-department staffers generate their own reports on inventories on an IBM 3081 under MVS/TSO. Data from an old materials-management system were the foundation of a new database of inventory information.

"With this subroutine, Megacalc allows users to manipulate data, and that really saves time."

Gotschall, Du Pont

Using the new system, analysts are able to zero in on duplicate or excessive orders, for example, by summarizing data from a long period. One result was a $760,000 reduction in General Telephone's budget for tools last year, a 46 percent decrease from the previous year.

"The data were always here, they simply were not accessible," says D.L. Russell, information-center administrator. "Without Ramis II, ad hoc managerial reports required prohibitively long development cycles using Cobol. The system was also unable to respond quickly to the supply department's changing requirements." Ramis II has also replaced manual record-keeping systems at considerable time savings for the company, he says.

Ramis II runs on IBM mainframes and PCMs and costs from $45,000 to $90,000. *Circle 583*

Parkland strikes inventory balance

Inventory control is a touchy subject for hospitals. Lack of vital supplies can result in tragedy: A premature infant without an incubator, for instance, is in mortal danger. At the same time, inefficient inventory management puts pressure on the budget. How can hospitals keep inventory in line without compromising the availability of vital sup-

(Continued from page 221)

plies? It's not easy. Parkland Hospital, Dallas, installed Inventory and Purchasing System from Management Science America Inc. (MSA) to help it find the balance between savings and shortages.

Parkland, a teaching hospital for the University of Texas Southwestern Medical School, is one of the nation's leading trauma centers. The MSA package runs on an IBM 3081, which is backed up by an IBM 4341. It replaced an internally developed, extensively patched Cobol inventory system last April.

"We realized that a good accounts-payable package was the way to handle our growing workload." *Coyne, Catalina*

Parkland had general goals for improving management of its inventory of medical supplies. Estimated value of the inventory is $45 million a year for 33,000 patients and 11,000 newborns. But when the MSA package was installed, the hospital also faced a space problem. A remodeling and expansion program had eliminated 6,000 of the 20,000 square feet of storage space.

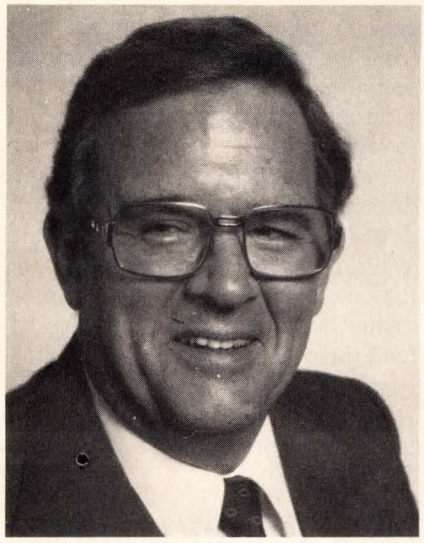
The online MSA system includes an interface between accounts payable and purchase-order control. It gives the dietician, the general-stores manager, and the materials/services manager access to data about supplies. Parkland used the system to integrate inventory management and purchasing, and that's helped to increase stock-turnover frequency, says Jo Nekuza, manager of materials/services.

Kathy Marcellus, purchasing director, says the new system speeds purchases of materials. "We need to enter only the vendor name on nonstock items, saving valuable time," she says. "The system speeds up every purchase order and tracks expenditures." Ron Jones, general-stores manager, adds that the package helps him more closely match supplies to needs—without compromising availability. "An online system immediately tells us what's on hand," he says.

The Inventory and Purchasing System runs on many mainframes and costs from $33,000 to $74,000. *Circle 584*

$500,000 savings on sorted mail

Having to mail 60 million items a year, the Unity School of Christianity, Unity Village, MO, savors any postage discounts it can get. A new opportunity for savings arose when the U.S. Postal Service extended discounts for carrier-route sorting to nonprofit organizations about five



Mail-sorting software saves Unity School of Christianity $500,000 a year on postage, reports James Sproul, data-services manager.

years ago. To take advantage of the savings, Unity installed the Carrier Route Sorting System from the Com-Mail division of Computer Network Corp. last January.

"We've saved $500,000 a year in postage by sorting with CRSS," says James Sproul, data-services manager. "It sorts mail by all the major delivery classes, and we get our discounts." Discounts vary for first-, second-, and third-class deliveries. In fact, postage for almost all of the school's mailings is discounted now, says Sproul.

Unity employs 350 workers in its direct-mail program, including data-entry clerks. About 3 million devotional publications are mailed second class each month. About the same number of third-class mailings promoting literature, books, and cassettes go out each month.

CRSS runs on IBM mainframes and PCMs under OS or DOS, and costs $25,000. *Circle 589*

Unified purchasing saves money

One of the secrets to streamlining the manufacturing process is consolidating supply purchases. Westinghouse Electric Corp., Pittsburgh, for instance, cut the cost of producing a turbine generator by unifying five separate purchasing and accounts-payable systems using Midas from Martin Marietta Data Systems Inc.

The product in question was a low-pressure turbine, one of the many pieces of power-generation equipment manufactured by the $9.4 billion-a-year mammoth. It is made from 3,500 separate components. "Fragmented purchasing resulted in separate orders being placed for the same products, reducing the potential for quantity discounts," says Barry

(Continued from page 223)

Schniepp, manager of purchasing.

The accounting department also was burdened by the arrangement, says Marie Williams, manager of financial systems for the Steam Turbine Generator division of Westinghouse (based in Orlando, FL). "For instance," she says, "when an invoice didn't match a handwritten purchase order, an accountant had to call the buyer to resolve the discrepancy." As a result, much of her department's time was spent resolving purchasing problems.

Midas was installed in January 1981, as Westinghouse began to consolidate its separate turbine- and generator-manufacturing operations in Orlando. (The consolidation was completed last September.) The five separate purchasing/accounting systems were replaced by a single system, which was modified to meet the special needs of each factory. The package was installed on IBM 3081 and 3084 mainframes and the customized system dubbed "Topas" for Turbine Generator Online Purchasing and Accounts Payable System.

The facilities under the Turbine Generator umbrella organization generate an average of 350,000 transactions a month with the new system. The applications software runs in Orlando, and the division's factories feed data into the central site. The division now has only one set of buyers, but supplies are shipped both from the central location to factories and directly from suppliers to factories. Since the system was installed, says Schniepp, Westinghouse has been getting better volume-purchase discounts. Also, the system has introduced order to accounts payable. Williams' staff can automatically match an invoice to purchase agreements in the database, and that allows them to pay bills in a more timely manner.

Midas runs on the IBM 43XX and up and costs from $50,000 to $350,000. *Circle 585*

How to automate a manual shop

Of course, some manufacturers turn to MRP software to introduce automation to manual processes. RTE/Aerovox Inc., a New Bedford, MA, subsidiary of RTE Corp. (Waukesha, WI), installed integrated ap-

plications from Cullinet Software Inc. to bring the manufacturing processes of its capacitor division into the computer era.

RTE/Aerovox employs 600 workers making industrial capacitors, filters, coils, and motors. The motivating force for the automation of manufacturing came from Clifford Tuttle, the president, who was inspired by a seminar on MRP in 1979. Stuart Richardson, vice president of business planning, and Jim Amaral, MIS director, were given the task of finding and implementing a new system. Richardson and Amaral found that too many tasks were being done manually, and that existing automated systems could not effectively share information. The Cullinet packages addressed those problems.

At the heart of the system is Cullinet's IDMS database management system (DBMS). The system also includes Cullinet's Integrated Data Dictionary; ADS/Online, a fourth-generation programming language; Material Requirements Planning; Bill of Materials; and Inventory Control.

Installation of the new system has helped RTE/Aerovox standardize its procedures, says Amaral. Just as important, it has put all levels of management in closer touch with the manufacturing process and each other.

Cullinet's packages run on the IBM 370, 43XX, and 30XX. Prices are $55,000 for IDMS, $35,000 for Integrated Data Dictionary, $40,000 for ADS/Online, and $60,000 per module for the three manufacturing packages. *Circle 586*

The computer as teacher

A growing category of applications software trains employees to use complex systems. Wachovia Bank and Trust Co., of Winston-Salem, NC, for instance, is using one such package to train employees to use a new online interactive network of computers and automatic teller machines.

Wachovia installed Phoenix from Goal Systems International in September 1982. It is in the midst of installing its new online information system, which comprises 1,100 IBM 4700 teller terminals and 1,900 conventional terminals accessing two IBM 3081s. By the time the system is installed, about 3,000 employees will have completed four training courses, each covering a phase of installation, says Bob Davis, vice president and manager of retail operations/electronic banking. "From the very beginning, we knew one of the keys to success would be how well we trained our employees," he says. "Yet when we looked at how to train them, neither classroom nor self-paced training manuals seemed suitable."

The drawback of running classes is the expense and shortage of good instructors, Davis continues. In addition, the bank's employees work in locations spread over a 500-mile region. Self-paced courses with tests are too time-consuming and difficult to monitor.

Even if they are a bit unglamorous, financial applications help an operation achieve high standards.

Phoenix, on the other hand, is immediate and easily monitored. The training course starts with a session about itself. A second course introduces employees to general-use terminals, including simulations of all key functions. Another course explains the uses of the teller terminals. Other courses will address other aspects of the system. Students move through each of the courses at their own pace; they get a five-minute introduction to each course from an instructor.

Phoenix, which runs on IBM mainframes and compatibles under VM/CMS, MVS, VS1, and SVS, costs $963 per month on a three-year lease. *Circle 588*

COMPUTER GRAPHICS: ART SERVES BUSINESS

You don't have to be an artist to make your point with pictures. Graphics—the kind that illustrate your organization's needs and projections—have leapt off the canvas and onto the display screen.

by David Whieldon, Senior Editor

Look over your shoulder, and you just may find one more new technology at your service. It's no longer restricted to the high-tech arms of your organization, no longer an esoteric pursuit of engineers, scientists, drafters, and technicians. It's business graphics, the low-end, small-system sibling of computer-aided design and manufacturing (CAD/CAM).

Though not the size of its older brother, business graphics is a fast-growing infant. In fact, it is becoming more accessible by the week. Many vendors are reducing prices while improving quality. And customers are overcoming obstacles to graphics literacy with improved software and output devices.

Some organizations don't even know they have a need for this technology—or, at least, they haven't glimpsed the possibilities. But others have, thanks to the farsightedness of an influential employee.

Take the case of the Potomac Electric Power Co. (PEPCO) in Washington, DC. What employees are doing there now can only be described as "innovative." But the man responsible for the changes refers to his accomplishment quite modestly: "*I'm* not selling business graphics," says Kenny Lint. "It's selling itself."

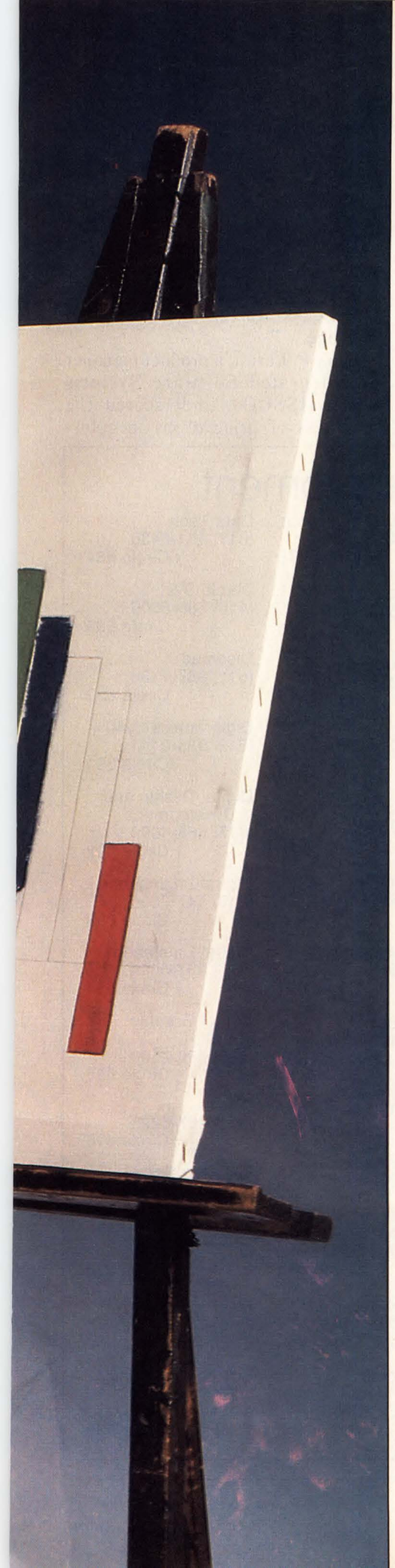
Lint, a principal project analyst, attributes the success of business graphics at the eastern utility to availability. He explains how that availability came about: "I didn't put an aura of sophistication around the idea of business graphics. As a matter of fact, it was impossible for me to become the graphics guru because I was the only one who supported it and I had too many other responsibilities. I forced it on end users, and they picked it up. I never announced it, never 'sold' it, and never encouraged employees to come to classes."

Lint claims he doesn't even have an accurate count of users around the utility. "Officially, we've trained 125 to 130 users—they've gone through classes," he says. "But there are probably half again that number who have learned on their own."

Who are the users at PEPCO? The first ones were the more technically advanced, Lint reports, but users now cover the entire spectrum of sophistication. Engineers produce plots dealing with loads, plant downtime and uptime, and boiler pressures, for example, while staffers who deal in rate comparisons and monthly overtime plot that information. Computer personnel produce all the computer statistics in graphics formats. The controller's secretary produces financial graphs on a word processor attached to an HP 3000. The jobs then go to

(Continued on page 228)

Photos by Edward Hardin



Computer Graphics

(Continued from page 227)

IBM mainframes for execution.

One might think the system's success is due to relatively light traffic. But that's not so, Lint maintains. Business graphics meets his colleagues' needs *and* gets a workout. "One plotter runs constantly—it's run ragged," he explains. "When we switched from an old flat-bed plotter in 1979, we were doing something like five plots a week on it. Now we average 60 plots a day; at the beginning of the month, that figure goes up to 100 a day."

PEPCO's main output is through two kinds of drum plotters, short-bed and long-bed, both Model 1051s from California Computer Products (Calcomp). The short-bed plotter, with a narrow drum, operates 20 to 24 hours a day. It mainly produces 8½-inch-by-11-inch hard copies. The long-bed machine can make plots up to 60 inches but plots mostly on 32-inch sheets.

You could say that Lint likes the long-bed model a lot: He bought one to begin with and now has seven. He says the company also operates five Hewlett-Packard plotters that produce 11 × 14 plots. One of them, a Model 7221, can make color transparencies.

"Our draftsman estimates it would take four hours to do one fairly simple plot, after a user had defined all the parameters and had given him a rough layout," says Lint. "Now, however, the user develops plots at the terminal. Every word-processing terminal, every IBM terminal, and every HP terminal can accept graphics. The most attractive feature is accessibility; if users have to look for graphics stations, they won't use graphics." Lint adds that an experienced user can now, with ISSCO's Tell-A-Graf software, define the parameters and get a rough draft in 30 to 45 minutes. It takes another half hour to clean it up or make minor changes, when necessary.

Lint describes Tell-A-Graf as "expensive" and the "Cadillac" of software packages, but he also acknowledges that it's "probably the most successful package we've ever installed. My experience is that if you buy a product that doesn't do everything, the first request will be for something it can't do!"

When a drafter or an artist produces graphics in the traditional, labor-intensive way, making changes is far more difficult and time-consuming, and a second copy takes almost as much time as the original. Modifications in an automated system, however, are easily managed. The information can be stored if another plot with new data must be produced a month later, for further savings in time and money. (The newer automated systems easily outshine the older ones, because the early machines required Fortran programming.)

As confirmation of the new graphics' value at PEPCO, Lint repeats the old adage, "A picture is worth a thousand words. If you're trying to make a point, there's no better way than with a graph," he maintains. For example, it is necessary to put greater effort into making rate-increase presentations to regulatory agencies than ever before. "If you want to emphasize—or de-emphasize—an item, it's easier with a graph than anything else," Lint says.

He also found graphics useful in making a case for a Calma micrographics machine. "The first one was producing 3 million frames a month, and I wanted to show that that output was much higher than the industry norm of 2 million a month," he explains. "With the information on the plots I circulated, I succeeded in obtaining a second machine."

Though certain employees can look at lists of figures and see the problems, graphs make it much easier for many others to do so, Lint contends. "If you want to show what percentage of your budget goes for labor, a pie chart with the labor slice pulled out and exploded gives managers something to look at. You're not presenting data that weren't there before, but you are putting them in an easily digestible form."

PEPCO's total investment in graphics gear, not including termin-

Computer Graphics

(Continued from page 229)

als and hardware originally bought for other purposes, came to about $250,000.

Graphics has sprouted and grown rapidly in the microcosm of Potomac Electric Power Co., and it's doing much the same throughout the business world. Indeed, "fast-growing" and "exploding" are adjectives commonly used to describe the technology. But Alan Paller, a consultant and president of AUI Data Graphics in Washington, sees the new developments as part of a long line of change and progress.

"It's not something that didn't exist before," Paller says. "Rather, it's a continuation of a trend. In 1965, the only way you could generate computer graphics was to be a Fortran programmer. In 1977, when some users could write in English-like commands, a lot more of them did graphics. But businesses couldn't easily afford computer graphics when the only equipment available cost $50,000. When it suddenly cost only $5,000, there was an explosion of usage."

Gary P. Laroff, a product manager at Integrated Software Systems Corp. (ISSCO), underscored the swiftness of price drops in color-

Vendors of business-graphics equipment

ABT Computer Graphics
(617) 661-2400
Circle 638

Adage
(617) 667-7070
Circle 639

Advanced Color Tech.
(617) 256-1222
Circle 640

Advanced Electronics Design
(408) 733-3555
Circle 641

Adwar Video
(212) 691-0976
Circle 642

Altek
(301) 622-3906
Circle 643

Amdek
(312) 364-1180
Circle 644

AMF Geo Space
(713) 666-1611
Circle 645

Anadex
(213) 998-8010
Circle 646

Apple Computer
(408) 996-1010
Circle 647

Applicon
(617) 272-7070
Circle 648

Applied Digital Data Syst.
(516) 231-5400
Circle 649

Applied Dynamics Int'l.
(313) 973-1300
Circle 650

Aristo Graphic
(201) 366-7000
Circle 651

A.S.J. Support Svcs.
(305) 723-7673
Circle 652

Astronautics Corp. of America
(414) 671-5500
Circle 653

Audio Visual Labs.
(201) 291-4400
Circle 654

Autographics Int'l.
(617) 890-8558
Circle 655

Autologic
(213) 889-7400
Circle 656

Auto-Trol Tech.
(303) 452-4919
Circle 657

Aydin Computer Syst.
(215) 643-0600
Circle 658

Aydin Controls
(215) 542-7800
Circle 659

BBN Communications
(617) 497-2800
Circle 661

Beck
(201) 922-3579
Circle 662

Bell & Howell
(213) 796-9381
Circle 663

Benson
(408) 945-1000
Circle 664

California Computer Products
(714) 821-2011
Circle 665

Calma
(408) 727-0121
Circle 666

Cambridge Development Lab
(617) 926-0869
Circle 667

Celco
(201) 327-1123
Circle 668

Celtic Tech.
(213) 884-6767
Circle 669

Chromatics
(404) 455-3921
Circle 670

CIE Terminals
(714) 660-1421
Circle 671

Colorgraphics Communications
(404) 455-3921
Circle 672

Columbia Data Products
(301) 992-3400
Circle 673

Compute Graphics Lab
(212) 557-5130
Circle 674

Computer Research
(303) 421-0644
Circle 675

Computer Talk
(303) 697-5485
Circle 676

Computervision
(617) 275-1800
Circle 677

Comtal
(213) 797-1175
Circle 678

Conrac
(213) 966-3511
Circle 679

Cromemco
(415) 964-7400
Circle 680

Cybersystems
(205) 883-4410
Circle 681

Datacopy
(415) 493-3420
Circle 682

Data General
(617) 366-8911
Circle 683

Datagraphix
(619) 291-9960
Circle 685

Datamedia
(609) 665-5400
Circle 686

Datapoint
(512) 699-7151
Circle 687

Datasouth Computer
(704) 523-8500
Circle 688

Data Tech.
(617) 451-0430
Circle 684

Diablo Syst.
(415) 786-5000
Circle 689

Dicomed
(612) 887-7100
Circle 690

Digigraphics Syst.
(612) 935-9111
Circle 691

Digital Design and Development
(617) 668-1090
Circle 692

Digital Engineering
(916) 447-7600
Circle 693

Digital Equipment
(617) 897-5111
Circle 694

Digital Graphic Syst.
(415) 856-2500
Circle 695

Digitus
(301) 467-3223
Circle 696

Eastman Kodak
(716) 724-4000
Circle 697

Elector USA
(408) 727-1506
Circle 660

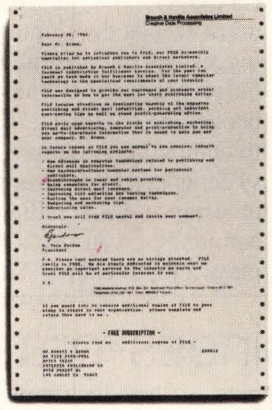
Electrohome Ltd.
(519) 744-7111
Circle 698

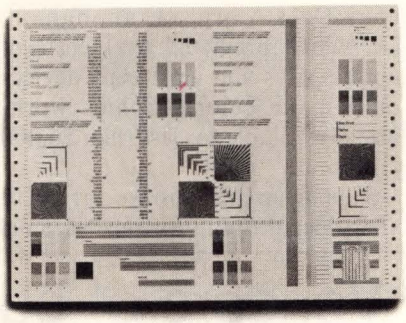
Engineering Design Concepts
(617) 749-1794
Circle 699

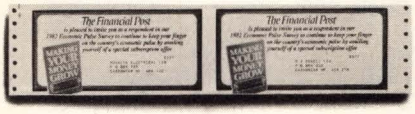
OUR 21,000 LPM PRINTER TAKES MANY FORMS.

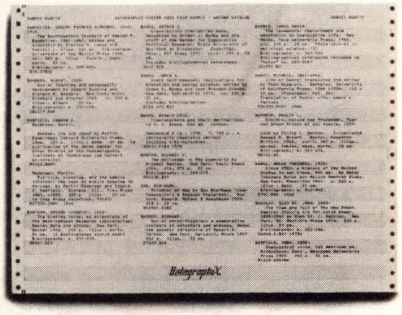
If you need high volume and flexibility, you should know that the DatagraphiX 9800 isn't just a 21,000 LPM laser printer. It also accepts the widest variety of paper form sizes of any non-impact printer, with form widths of 6.5" to 16" and a length range of 3.5" to 14." And all 9800 printers feature perf-to-perf printing on paper weights of 16 to 110 pounds, depending on paper type.

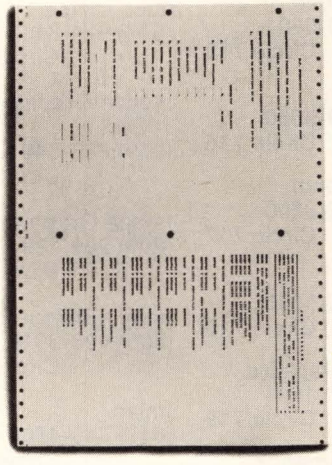
The 9800 series is an entirely new generation of non-impact, high speed laser printers—with more functions, features, and reliability. It offers up to 34 standard character sets, with a font editor that helps you create a nearly unlimited variety of fonts, logos or signatures of your own design.

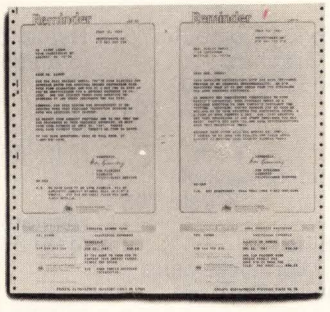


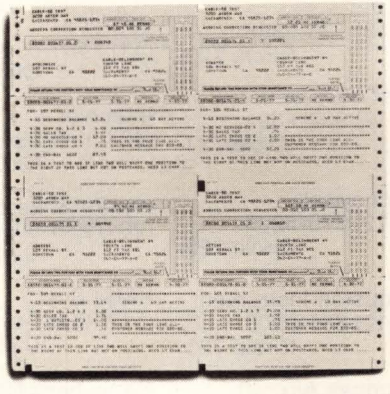


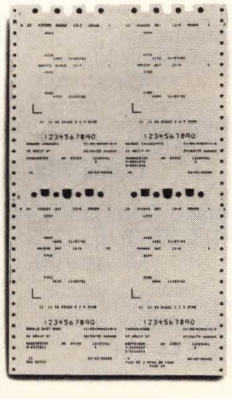












The 9800 series comes in a variety of on-line, off-line, or on-line/off-line configurations compatible with a broad selection of CPUs. Off-line models offer user-oriented menu-driven software, hard copy log, 6250 BPI tape drives with ping-ponging capability and more. On-line models offer full IBM 3800 compatibility, in addition to the advantages of DatagraphiX's advanced engineering.

Combine these advanced features with excellent print quality and unmatchable reliability, and you begin to see why DatagraphiX is recognized as a supplier of superior computer output management products. The full-featured 9800 printers are available now, setting industry standards for up-time in customer sites throughout the U.S. and Canada.

DatagraphiX®

The Computer Output Management Company

a General Dynamics subsidiary.

Dept. 3515, P.O. Box 82449, San Diego, CA 92138
(800) 854-2045, Ext. 5581
In California, please call (619) 291-9960, Ext. 5581
TWX: 910-335-2058

CIRCLE 8

Computer Graphics

(Continued from page 230)

graphics hardware at an ISSCO seminar two months ago. He cited a 1982 research report from International Data Corp., Framingham, MA, which predicted that costs of color displays and hard-copy devices would make color-graphics workstations available for less than $6,000 by 1986.

Aside from his position at AUI, Paller does training for the National Computer Graphics Association (NCGA), and he sees more landmark trends developing. "One of the biggest in mainframe and minicomputer graphics is the use of chartbooks," he contends. "Chartbooks are to command systems what command systems are to programmers. Instead of using a book telling how to pick commands, you use a book that displays a lot of charts. Then you tell the terminal, 'Give me Chart No. 7.' The chart appears on the screen, and you alter it as necessary."

Another development is the advent of graphics accessories for personal computers. "In the early days, nobody had graphics devices," says Paller. "Now, one out of every eight or 10 IBM Personal Computers is sold with some kind of graphics-output device.

(Continued on page 234)

Vendors of business-graphics equipment

Enter Computer
(619) 450-0601
Circle 700

Envision
(408) 946-9755
Circle 701

Epson America
(213) 539-9140
Circle 702

Evans & Sutherland
(801) 582-5847
Circle 703

Florida Computer Graphics
(305) 321-3000
Circle 704

Forward Tech.
(408) 988-2378
Circle 705

Fujitsu Microelectronics
(408) 980-0755
Circle 706

Genicom
(703) 949-1170
Circle 707

Genigraphics
(315) 456-2711
Circle 708

Genisco Computers
(714) 556-4916
Circle 709

Gerber Scientific Instrument
(203) 644-1551
Circle 710

Gerber Syst. Tech.
(203) 644-2581
Circle 711

Gould
(408) 263-7155
Circle 712

Gould Instruments
(216) 953-5000
Circle 826

Grinnell Syst.
(408) 263-9920
Circle 714

Grove Video
(301) 840-5801
Circle 715

GTCO
(301) 279-9550
Circle 716

Heath/Zenith
(616) 982-3200
Circle 717

HEI
(312) 665-5500
Circle 718

Hewlett-Packard
(415) 857-1501
Circle 719

Hitachi America Ltd.
(213) 533-0888
Circle 720

HMW Enterprises
(717) 938-4691
Circle 721

Honeywell
(612) 870-5200
Circle 722

Houston Instrument
(512) 835-0900
Circle 723

Hughes Aircraft
(619) 438-9191
Circle 713

IBM Information Syst.
(914) 686-1900
Circle 724

IBM Instruments
(203) 796-2500
Circle 725

ID Syst.
(614) 876-1595
Circle 726

Ikier Tech.
(617) 924-3113
Circle 727

Ikonas Graphics Syst.
(919) 833-5401
Circle 728

Image Graphics
(203) 259-1394
Circle 729

Image Resource
(805) 496-3317
Circle 730

Imlac
(617) 449-4600
Circle 731

Impres
(512) 451-6549
Circle 732

Intecolor
(404) 449-5961
Circle 733

Keuffel & Esser
(201) 285-5000
Circle 734

KMW Syst.
(512) 288-1453
Circle 735

Kongsberg North America
(713) 466-4881
Circle 736

Lang Syst.
(415) 328-5555
Circle 737

Lasergraphics
(714) 957-1588
Circle 827

Lexicon
(617) 891-6790
Circle 738

Lexidata
(617) 663-8550
Circle 739

Log E/Dunn Instruments
(415) 957-1600
Circle 740

Loge/Spatial Data Syst.
(805) 967-2383
Circle 741

Logic Syst.
(408) 988-7722
Circle 742

Lundy Electronics & Syst.
(516) 671-9000
Circle 743

L-W Int'l.
(213) 348-8614
Circle 744

Management Graphics
(612) 854-1220
Circle 745

Market Data Syst.
(901) 363-0500
Circle 746

Mathematical Applications Group
(914) 592-4646
Circle 747

Matrix Electronics
(516) 924-0100
Circle 748

Matrix Instruments
(201) 767-1750
Circle 749

Matrox Electronic Syst.
(514) 735-1182
Circle 828

McDonnell Douglas
(314) 232-5911
Circle 750

Megatek
(619) 455-5590
Circle 751

Metheus
(503) 640-8000
Circle 752

Micro-Expander
(212) 308-2328
Circle 753

Micro Products
(703) 471-6000
Circle 754

Micro Tech. Unltd.
(919) 833-1458
Circle 755

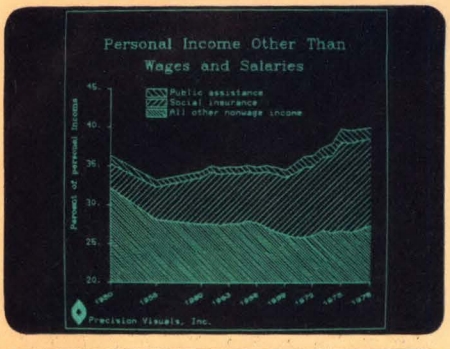
Miltope
(516) 420-0200
Circle 756

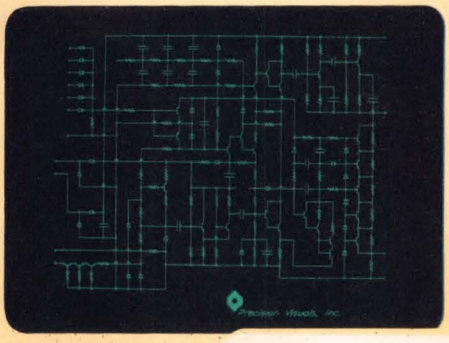
Modgraph
(617) 890-5764
Circle 757

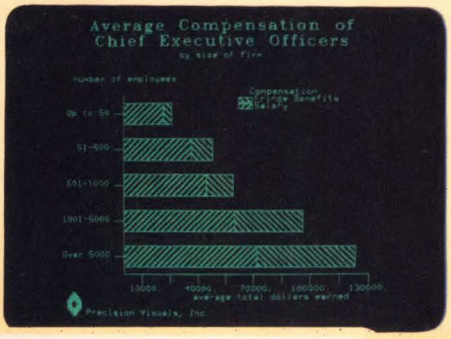
MQI Computer Products
(714) 964-4722
Circle 758

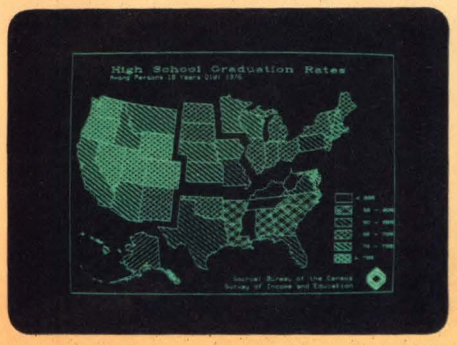
NEC Information Syst.
(617) 862-3120
Circle 759

High resolution, low cost graphics should be more than a retrothought.









Why settle for a low resolution retrofit graphics terminal when you can have a VISUAL high resolution terminal with quality and reliability built in. And at a cost that makes retrofits overpriced.

The VISUAL 500 and VISUAL 550 emulate the Tektronix® 4010/4014 but cost only about half as much. And they provide 585(V) x 768(H) resolution for sharp text and graphic display on a large 14″ screen without the need to add boards or change the CRT. This superior resolution offers the ideal vertical to horizontal dot density ratio of 1:1 for balanced images and reduces the "stairstep" effect you get with most retrothoughts.

The VISUAL 500 provides selectable emulations of the DEC VT52,® Data General D200, Lear Siegler ADM3A,™ and Hazeltine 1500 terminals. The VISUAL 550 is DEC VT100® protocol-compatible as well as a character or block mode terminal which complies to the ANSI X3.64 standard.

Call or write for a free comprehensive reference booklet on graphics terminals including a glossary of graphics buzzwords.

VISUAL See for yourself

Visual Technology Incorporated
540 Main Street, Tewksbury, MA 01876
Telephone (617) 851-5000. Telex 951-539

VISUAL 500/550

	VISUAL		RETROTHOUGHTS						
			DIGITAL ENGINEERING				SELANAR		
	500	550	VT640S	VT640	DQ650S	DQ650M	SG100 PLUS	SG200	SG480
Vertical Resolution	585	585	240	480	240	480	240	240	480
Horizontal Resolution	768	768	640	640	800	800	1225	1225	780
Dot Density Ratio	1:1	1:1	1:2	1:1	1:3	1:1	1:4	1:4	1:1
Screen Size	14″	14″	12″	12″	12″	12″	12″	12″	12″
Tektronix 4014 Compatible	STD	STD	NO	NO	NO	STD	NO	STD	STD
Data Tablet Support	STD	STD	NO	NO	OPT	OPT	NO	NO	NO
Multi-Vendor Printer Support	STD	STD	OPT	OPT	OPT	OPT	OPT	OPT	OPT
8 Dir. Cross Hair Cursor	STD	STD	NO	NO	NO	NO	OPT	OPT	OPT
Programmable Function Keys	STD	STD	NO	NO	NO	NO	NO	NO	NO
Tilt/Swivel Enclosure	STD	STD	NO	NO	NO	NO	NO	NO	NO
Compatibility	VT52	VT100	VT100	VT100	VT100	VT100	VT100	VT100	VT100
	ADM3A	VT52	VT52	VT52	VT52	VT52	VT52	VT52	VT52
	H1500	ANSI							
	D200	X3.64							
PRICE (suggested list*)	$2,495	2,695	3,025	3,355	3,025	3,510	2,890	3,390	3,190

*Retrothoughts price includes DEC VT100® terminal based on published information as of 4/1/83.

CIRCLE 99

Computer Graphics

(Continued from page 232)

One catalyst of this growth in business graphics is simply top management's increasing awareness of the tool's availability. Asserts Paller, "In 1978 senior managers became aware that they could obtain graphics—and more have found out since then."

Thomas De Fanti, chairman of Siggraph, the graphics special-interest group in the Association for Computing Machinery (ACM), adds that there is room for greater development. "If these graphics systems are used to input and massage data, you'll see all sorts of wonderful results," he says. "Now, though, they're too often just output devices. It makes sense to tie graphics into databases, so you can eliminate the step of laying out graphics on a piece of paper."

One development that's available now to users is 35mm-slide making, according to Paller. "Right now, producing slides for business purposes—training and briefing, for example—is something like a $3 billion business in the United States. My guess is that only 3 percent of that is done with computer graphics. That could easily go to 30 percent in a few years."

Slide making is one of three principal routes users can follow to pro-

Vendors of business-graphics equipment

New Media Graphics
(617) 547-4344
Circle 760

Nicolet Computer Graphics
(415) 372-7568
Circle 761

North Star Computers
(415) 357-8500
Circle 762

Numonics
(215) 362-2766
Circle 763

Octek
(617) 273-0851
Circle 764

Okidata
(609) 235-2600
Circle 765

Optronics Int'l.
(617) 256-4511
Circle 766

Panasonic Industrial
(201) 348-5337
Circle 767

Peritek
(415) 531-6500
Circle 768

Perkin-Elmer
(201) 870-4792
Circle 769

Philips Information Syst.
(214) 386-5580
Circle 829

Phoenix Computer Graphics
(318) 234-0063
Circle 770

Polaroid
(617) 577-3016
Circle 771

Princeton Electronic Products
(201) 297-4448
Circle 772

Printacolor
(404) 448-2675
Circle 773

Printronix
(714) 549-7700
Circle 774

Psitech
(714) 730-0981
Circle 775

Quantex
(408) 733-6730
Circle 776

Qubix Graphics Syst.
(408) 370-9229
Circle 777

Qytel
(212) 684-0146
Circle 778

Racal-Redac
(617) 486-3529
Circle 779

Ramtek
(408) 988-2211
Circle 781

Raster Graphics
(503) 620-2241
Circle 783

Recognition Concepts
(702) 831-0473
Circle 784

SAI Tech.
(619) 452-9150
Circle 785

Science Accessories
(203) 255-1526
Circle 786

Scientific Calculations
(716) 924-9303
Circle 787

Scion
(703) 476-6100
Circle 788

Seiko Instruments U.S.A.
(408) 943-9100
Circle 789

Selanar
(408) 727-2811
Circle 790

Siemens Communications Syst.
(305) 994-8800
Circle 791

Sigma Design
(303) 773-0666
Circle 792

Sony Corp. of America
(201) 930-1000
Circle 793

Southwest Technical Products
(512) 344-0241
Circle 794

Strobe
(415) 969-5130
Circle 795

Summagraphics
(203) 384-1344
Circle 796

Summit CAD
(713) 440-1468
Circle 797

Superset
(619) 453-8665
Circle 798

TAB Products
(415) 493-5790
Circle 799

Tandy/Radio Shack
(817) 390-3011
Circle 780

Technetronic
(613) 563-4666
Circle 848

Teknekron Controls
(415) 843-8227
Circle 801

Tektronix
(503) 685-3772
Circle 802

Telesis
(617) 256-2300
Circle 803

Televideo Syst.
(408) 745-7760
Circle 804

Terak
(602) 998-4800
Circle 805

Texas Instruments
(214) 995-6611
Circle 806

Texprint
(617) 273-3384
Circle 807

3M
(612) 733-3319
Circle 808

Trilog
(714) 549-4079
Circle 809

Tymshare
(408) 446-6000
Circle 810

USData
(214) 680-9700
Circle 811

Vector Automation
(301) 433-4200
Circle 812

Vector General
(213) 346-3410
Circle 813

Versatec
(408) 988-2800
Circle 814

Verticom
(408) 747-1222
Circle 815

Vicom Syst.
(312) 539-8200
Circle 816

Vision Peripherals
(714) 774-8642
Circle 817

Visual Tech.
(617) 851-5000
Circle 818

Wang Labs.
(617) 459-5000
Circle 819

Western Graphtec
(714) 770-6010
Circle 820

Wicat Syst.
(801) 224-6400
Circle 821

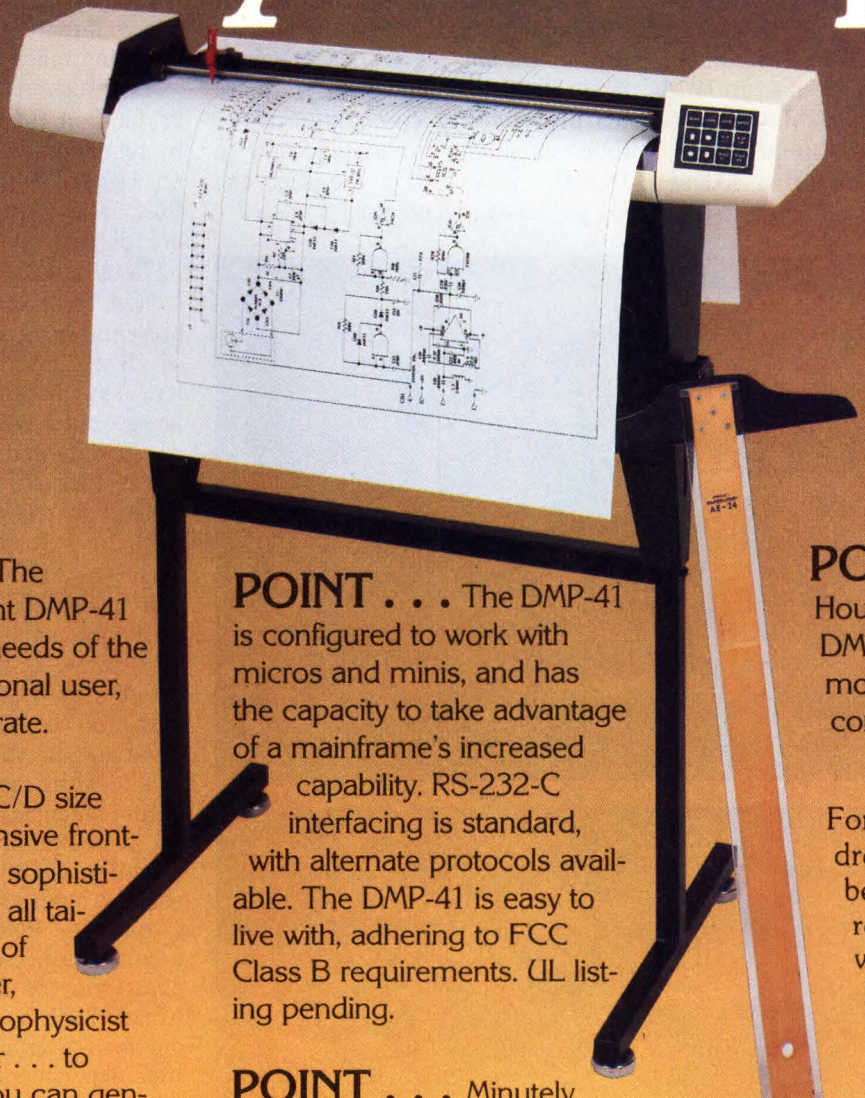
Xerox
(213) 536-7000
Circle 822

Xynetics
(408) 727-6500
Circle 823

XYvision
(617) 938-8095
Circle 824

Yokogawa Corp. of America
(404) 253-7000
Circle 825

It's easy to make points when you're a pro.



POINT . . . The Houston Instrument DMP-41 plotter meets the needs of the serious or professional user, yet it's easy to operate.

POINT . . . C/D size format, comprehensive front-panel controls and sophisticated firmware are all tailored to the needs of the surveyor, drafter, oceanographer, geophysicist and land developer . . . to name but a few. You can generate superior architectural elevations, contour maps, circuit-board layouts and assembly drawings quickly and accurately on bond, vellum or synthetic media.

POINT . . . The DMP-41 is configured to work with micros and minis, and has the capacity to take advantage of a mainframe's increased capability. RS-232-C interfacing is standard, with alternate protocols available. The DMP-41 is easy to live with, adhering to FCC Class B requirements. UL listing pending.

POINT . . . Minutely defined step size and high-resolution logic—combined with robust drives and optimized pen ballistics enable you to create plots of high precision and surpassing quality.

POINT . . . The Houston Instrument DMP-41 is one of your most cost effective considerations.*

For the name, address and phone number of your nearest representative, write Houston Instrument, P.O. Box 15720, Austin, TX 78761. Phone 512-835-0900, or 800-531-5205 if outside Texas. In Europe contact Houston Instrument Belgium NV., Rochesterlaan 6, 8240 Gistel, Belgium. Tel 059-27-74-45, tlx 846-81399.

houston instrument

*suggested US retail $2,995

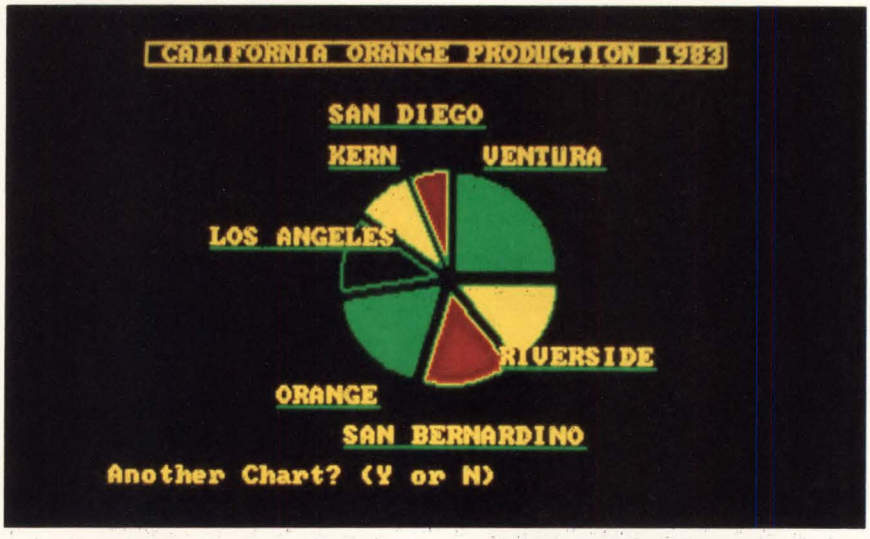
Computer Graphics

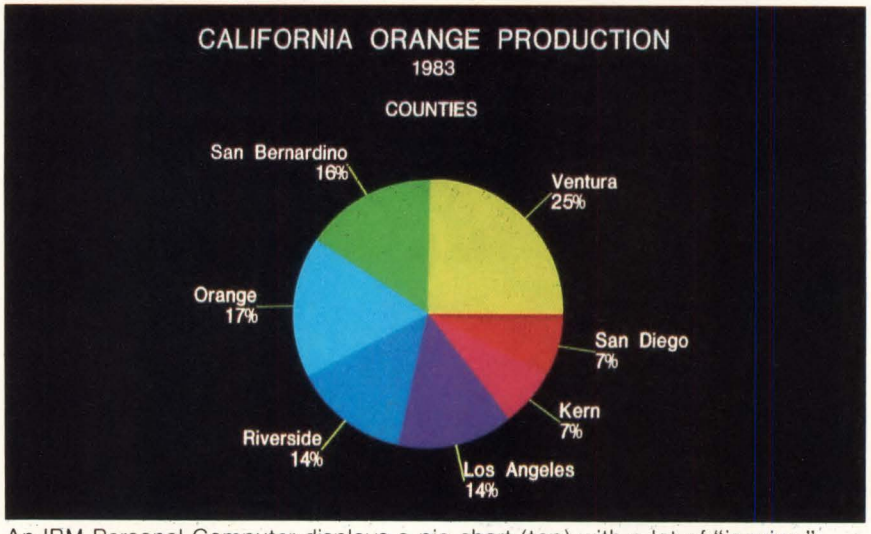
(Continued from page 234)

duce business graphics at Bausch & Lomb, the manufacturer of optical goods and scientific instruments in Rochester, NY. The other two are hard-copy graphics by mainframe and hard-copy graphics by IBM Personal Computer, according to Ted Mead, manager of the information center.

"There's a Houston Instrument DMP-29 plotter attached to an IBM PC running on Chart-Master software from Decision Resources Inc., Westport, CT," explains Mead. "Chart-Master is an easy-to-use, menu-driven package. It produces quite good standard business graphics. Though it doesn't mix line charts and bar charts or place text wherever you'd like, it puts out nicely formed characters for a professional look."

Houston Instrument is a subsidiary of Bausch & Lomb, so Mead felt some obligation to adopt the plotter. But he has few regrets. "A Hewlett-Packard 810, though it offers more features, would cost about three times as much, perhaps $5,000 to $6,000," he says. "For the price, the HI plotter is a good one."





An IBM Personal Computer displays a pie chart (top) with a lot of "jaggies," coarse lines made up of coarse dots. It produces a color slide with jaggies, too. A Samurai film recorder connected to the PC produces a more professional-looking slide (bottom). From Image Resource Corp., the system costs less than $10,000. The vendor claims a user can recoup the investment with 250 to 500 slides.

The users "get a kick out it," Mead continues, but it is also practical, plotting chiefly on acetate for meeting presentations. Sometimes a user will get one plot for the boss for a meeting, and a second for himself. "To get a graph up from scratch takes only 15 to 20 minutes, plus just a few minutes to edit it," he says. "Plotting takes 5 to 10 minutes."

The second way users tap into graphics at B&L corporate offices is by reaching out to the mainframe—an IBM 370/168—through IBM PCs. They're equipped with Irma boards that allow the PCs to act as 3278 terminals.

"On the mainframe we have the presentation graphics menu portion of IBM's interactive graphics utility," says Mead. "We also have in-house routines that will extract corporate data and download those data to the PCs, for use with the Chart-Master graphics software or with the Lotus 1-2-3 spreadsheet software. There are easy-to-use menus, the facility is flexible, and it supports many type fonts. The one disadvantage is that output is through a dot-matrix printer, the IBM 3287 four-color machine. So the quality of plots isn't as good as on the HI plotter."

The third graphics option, for 35mm-slide making, incorporates the use of Autographics equipment outside Bausch & Lomb. "It allows a user, through software and hardware (Apples or PCs), to produce high-quality business graphics such as bar charts and pie charts with text," says Mead. "We have two workstations, one for a graphic artist and one in a user department. An individual sits at the station and works up the desired graph, previewing it on a high-resolution screen. When it's ready, it's sent through modems to extremely high-resolution cameras at Autographics. (In this case, high resolution means either 2,000 by 2,000 pixels—picture elements, or points—or 4,000 by 4,000.) The slides, sent via courier within 24 hours, are stunning."

The best part about these "pre-

(Continued on page 240)

Plotter Supplies from Graphic Controls

Buy Direct From the Single Source Manufacturer

GRAPHIC CONTROLS... The Plotter Supplies Professional understands your needs. Whether your applications are CAD/CAM, BUSINESS GRAPHICS, or GEOPHYSICAL, the plotted image is there the way you want it . . . when you want it.

QUALITY and SERVICE have been our standards for over 60 years. Now you can enjoy these same standards and know that Graphic Controls stands ready to serve your needs.

OUR . . .

. . . large national sales force offers personalized service to meet your unique plotter requirements.

. . . national distribution network ensures rapid product delivery.

. . . innovative research staff is constantly providing new technological advancements.

. . . complete line of plotter supplies offers you the benefits of a Single Source manufacturer.

For more information on how to deal directly with your manufacturer of Plotter Supplies, send the coupon today. Or call 716-853-7500.

GRAPHIC CONTROLS
Plotter Supplies

CIRCLE 101

See us at Computer Graphics '84 Booth 111-113 Anaheim, CA.

GRAPHIC CONTROLS, Industrial Product Division
P.O. Box 1271, Dept. MC7P, Buffalo, NY 14240
Send complete information on plotter supplies, including pens. Our equipment is:

☐ Ink-Writing ☐ Electrostatic

Make and Model: _____

Name _____ Title _____

Company _____

Street _____

City _____ State _____ Zip _____

Phone _____

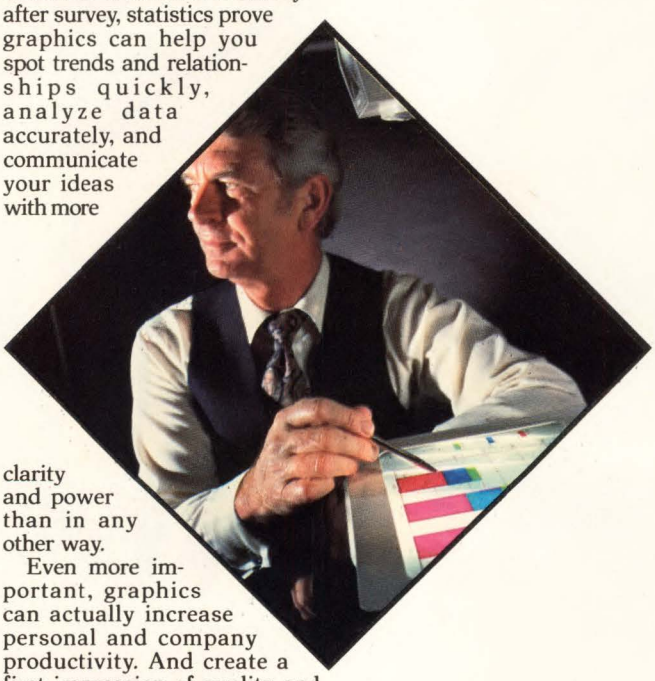
CD584

How HP business graphics

Enhance your reputation for being more professional, persuasive, credible and effective than your competition with the new HP 7475A Business Professional's Plotter.

Make a first impression that lasts

The vital importance of graphics to today's business professional cannot be overstated. In survey after survey, statistics prove graphics can help you spot trends and relationships quickly, analyze data accurately, and communicate your ideas with more clarity and power than in any other way.



Even more important, graphics can actually increase personal and company productivity. And create a first impression of quality and professionalism that lasts and lasts.

Graphics: the end to meetings that go nowhere

In a fascinating research project conducted by The University of Pennsylvania, 123 MBA candidates were involved in a study designed to test the effectiveness of business graphics in meeting situations. The results were startling. In the group where visual aids were used:

- **Meetings were shorter:** The study showed a 28% reduction in meeting length when transparencies were used.
- **Group consensus was faster:** Agreement was reached by 79% of the group using transparencies, compared with only 8% among the control group using no visual aids.
- **The decision process was accelerated:** 64% of study participants said they made their business decisions *immediately after the visual presentation.* When overheads were not used, the control group said they delayed decision-making until *some time after the group discussion following the presentation.*
- **Presenters with visual aids were perceived as being more professional, persuasive, credible and effective than those not using visual aids.**

Now, with the new HP 7475A Business Professional's Plotter, your meetings can have immediate and productive results like these.

How the quality look of HP graphics can help

The way you present your information can be equally as important as the actual information you're presenting. And that's where the new HP 7475A Business Professional's Plotter lets your professionalism shine through.

Standards unsurpassed in the plotter business

The technical standards of the HP 7475A have no equal for producing quality graphics. With a resolution of one-thousandth-of-an-inch, curved lines are smooth, not jagged, and straight lines are *consistently* straight. Its exceptional repeatability (the ability of a pen to return *precisely* to a given point) assures that intersecting lines and circular shapes will meet *exactly.* The result is *high-quality* charts and graphs you'll be proud to present.

Why 6 pens when experts say 4 will do?

Graphics industry experts maintain that good graphics contain four colors per chart. But Hewlett-Packard goes the experts two better by providing a six-pen carousel, so you can store and use pens of different widths—thick pens for bold headings and thin pens for details. And with six pens, you won't have to waste valuable time changing them. That's important when "the boss wants to see your presentation in twenty minutes!"

With the HP 7475A, you also get automatic pen capping to prevent pens from drying out between uses, and special "pen damping" (gently lowering the pen to the paper or transparency) to increase pen life and ensure better line quality... use after use after use. You also get a rainbow of 10 colors to choose from, in two line widths.

Your choice: 2 paper sizes and today's most popular graphics software packages

While most professional business applications will be satisfied with standard 8½ x 11" paper or transparencies, the HP 7475A adds the

can be the key to your success.

capability of plotting on larger 11 x 17″ media, too. The larger plots are especially well-suited for time lines, PERT charts, schematics and engineering drawings.

Best of all, you don't have to be a programmer to produce quality graphics on the HP 7475A. It's supported by a variety of professional graphics software packages for both HP and non-HP desktop and personal computers.

Naturally, speaking of software compatibility leads us to hardware compatibility....

Compatible with almost any personal computer in the marketplace today

With two interfaces available, the HP 7475A quickly "makes friends" with most models of today's most popular personal computers, including IBM,® Apple,™ Compaq,™ Osborne® and Commodore™ --as well as a host of HP computers.

The cost? Surprisingly affordable

The new HP 7475A Business Professional's Plotter is an amazingly affordable $1895. When you consider that a typical fee for a single five-color transparency from a graphics service is $50—and that the same transparency can be prepared for about $1 in materials on the HP 7475A—the return on your investment is almost immediate.

Another choice: HP's low-cost, high performance Personal Computer Plotter

For the "business on a budget," you may also want a look at our 2-pen Personal Computer Plotter, the 7470A. Its low cost (only $1095) is as remarkable as the quality of its plots. With many of the same features as the new HP 7475A, the HP 7470A plots on a single paper size (8½ x 11″). It stores and caps two pens, and you can easily change the pens yourself for multi-color plotting. Best of all, the HP 7470A 2-pen plotter lets you turn your personal computer into a personal graphics workstation for only $1095.

Send for your FREE "Better Presentations Package" today!

For a FREE sample plot, overhead transparency, and more details, mail the coupon below today. We'll also enclose a list of software packages you can use with the HP 7475A or HP 7470A.

For the name of your nearest Hewlett-Packard dealer call toll-free 800-FOR-HPPC.

1101303

HEWLETT PACKARD

11303 CC5

YES! I'm ready to gain a reputation for being more professional, persuasive, credible and effective than my competition. Please send me your FREE "Better Presentations Package," so I can learn more about the new HP 7475A Business Professional's Plotter and the HP 7470A Personal Computer Plotter. I understand I will receive this valuable package without cost or obligation.

Name_____ Title_____

Company_____

Address_____

City/State & Zip_____

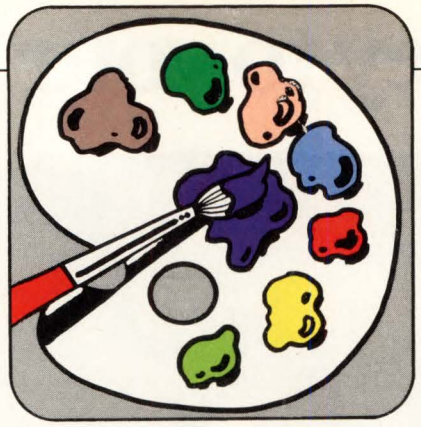
Phone Number (_____)_____

My computer is_____

Send to: Hewlett-Packard
16399 W. Bernardo Drive, San Diego, CA 92127
Attn: Marketing Communications

CIRCLE 102

(Continued from page 236)



mier-quality" slides is the cost savings. According to Mead, "We're charged about $6 a slide. Before, with Genigraphics, we spent $50 to $60 a slide." (Genigraphics Corp. operates 21 service centers, producing graphics on slides by accepting data over phone lines; the service now permits users to work at IBM PCs and produce hard copies or order slides.) Within three or four months, Mead reports, the two Autographics workstations B&L purchased, costing about $20,000 all told, had paid for themselves.

Giving it a try

Bausch & Lomb made a big investment in slide-making equipment, but if you're just getting your feet wet, another option is to rent or lease a machine. That's what Pitney Bowes of Stamford, CT, did. Previously, the industrial-design department often turned away slide-making jobs because there wasn't time to get the work done.

The department decided to lease a Xerox 350 Color Slide System, paying a modest monthly charge on the equipment, plus a charge on each slide. The Xerox 350 consists of a color terminal, a keyboard, dual disk drives, and a modem. The current monthly charge is $350 for each of two terminals in the department.

An operator may key in instructions by answering questions or by listing characteristics of the graphic, such as height, width, color, and position. The file is transmitted over phone lines to the nearest reproduction center. Slides are delivered within 24 hours. Depending on volume, a slide used to cost between $6 and $16 to make, says Joan A. Wright, who is a design-support specialist. With the new equipment, the cost is $10 to $14.

Though there is little difference in per-slide costs, Wright reports an impressive payoff. With the machine, she says, "I handle five times the volume three or four people in the department handled previously, and I'm doing it basically unaided. It used to be, when we prepared 400 to 500 slides for the board of directors, 15 employees worked madly for $1\frac{1}{2}$ to 2 weeks on the project, and all other projects came to a halt. With the slide-making system, though, I do the job myself with some free-lance help

A comparison of hard-copy output devices

	Impact devices		Nonimpact devices						
	Pen plotter	Impact printer	Electro-photo-graphic printer	Color electro-static plotter	Thermal printer	Thermal transfer printer	Ink jet printer	Laser printer	Camera system
Image quality	High	Low to medium	*B&W: Medium	High	Low	Medium to high	Medium to high	B&W: Very high	Very high
Pure colors	Up to 10	8	1	Versatec ECP-42: 8	1	8	8	Xerox 6500: 8 Others: 1	Unlimited
Resolution (points or line pairs per inch)	250-1,000	100-360	125	100-200	50	100-240	80-150	Color: 100 B&W: 240-600	8″x10″: up to 800 Slides: 3,000
Speed ($8\frac{1}{2}$″x11″)	3-10 min. or more	3 min. (approx.)	20 sec.	ECP-42 $8\frac{1}{2}$″x11″: 1 min. (approx.) E-size: 8 min.	20 sec.	45-120 sec.	1-5 min.	B&W: 0.2-6 sec. Color: 20 sec.	Polaroid: 1-2 min. Others: hours-days
Cost per copy	Paper: 1¢ Acetate: 50¢	4¢-15¢	5¢-15¢	$8\frac{1}{2}$″x 11″: 9¢ E-size: $1.44	5¢	Paper: 25¢ Acetate: 65¢	Paper: 15-25¢ Acetate: 85¢-$1	Color: 6¢ B&W: 0.4¢-2¢	$7-$10
Approximate equipment cost	$700-$1,660	$4,450-$11,500	$4,400-$7,900	ECP-42: $98,000	$1,000-$5,000	$4,500-$6,000	$800-$17,500	Color: $39,000 B&W: $22,000-$390,000	$6,600-$200,000

* *B&W = Black and white*

Note: This table was prepared by Gary P. Laroff, a product manager at Integrated Software Systems Corp. (ISSCO), and is published with slight modifications.

Bound for glory.

The Epson® Line has a printer for all reasons.

Epson is the best-selling name in printers for small computers the world has ever seen.

Because we make the right printer for virtually every computer. And every job.

Something for everybody.

Our reliable, affordable RX™ Series printers, for instance, are perfect for the small business or home user. Our FX-80™ and wide-carriage FX-100™ provide all the speed, graphics capability and features anyone could ask for. And our new LQ-1500™ is an astonishing breakthrough for business—it switches effortlessly between letter quality and high speed draft printing.

What's more, any printer you buy in the U.S. with the Epson name on it is guaranteed for a full year. Which is four times longer than the guarantee on most printers.

Get on board.

No matter what kind of computer you own, or what job you intend for it, your printer should be an Epson.

Because we build a better printer, price it fairly, guarantee it longer, and give you the one thing you don't always get from a printer company.

A choice.

Number one. And built like it.

EPSON
EPSON AMERICA, INC.

3415 Kashiwa Street, Torrance, California 90505 • Call (800) 421-5426 for the Epson dealer in your area. In California call (213) 539-9140.

CIRCLE 103

Computer Graphics

(Continued from page 240)

in 2 to 2½ weeks. My department manager tells me that the cost saving is approximately 65 percent."

Wright is convinced that slide-making systems are "ideally suited to the corporate world, where the work force is not instantly expandable for rush jobs and where much of the same kind of information is used repeatedly, with only the numbers and program titles changed."

Shortcuts

Undoubtedly, 35mm color slides are growing more popular for business presentations. But if you've ever wished you could simply project what you see on a graphics-terminal screen, Electrohome Ltd. stands ready to turn the wish into reality. The Canadian vendor's color projector resembles a TV projector, except that it has one lens instead of three. It connects by cables to almost any color-graphics terminal on the market and projects whatever appears on the terminal's display screen, changing as rapidly as the terminal display changes.

The ECP 1000 projector isn't plagued by the color-convergence problems of three-lens machines and can be moved about without refocusing, according to Electrohome. In addition, it's easy to operate because there are few controls. List price is $14,800.

A projector that doesn't need slides is matched by a plotter that doesn't have to be attached to a computer. That's the promise of the new 3M Corp. Electronic Graphics Maker, consisting of keyboard, microprocessor, and four-pen plotter.

Users can learn the ins and outs of the Graphics Maker in a few hours. The plotter writes or draws on either film or paper as instructions are keyed. Words appearing on a one-line display lead the user through the routine of constructing graphics. The machine stores data in memory for future updates.

The text and graphics are fine for "everyday meetings," which means they're suitable for presentations among one's peers. Available from 3M offices or dealers, Graphics Maker carries a suggested list price of $3,895.

It seems as if more and more suppliers are making it convenient to "paint" pictures of organizational activities. Nevertheless, business users have been slow in picking up on graphics because presentation quality has been rather low. That's one observation of Advanced Resources Development (ARD), a research organization in Medfield, MA.

According to a recent ARD report, resolution on displays will improve markedly, and resolutions of 1,025 by 1,025 pixels won't be uncommon in the near future. (Today, says the report, high-resolution displays are already showing up on specialized workstations such as Apple's Lisa, Xerox's Star, and Convergent Technologies' AWS Turbo.) Graphics processing on multi-function workstations and business micros will also show improvement in the next three years. In fact, by 1987, about half the $10 billion spent on business graphics will go for workstations, about one-fourth for microcomputers, and 18 percent for graphics terminals.

> "One out of every eight or 10 IBM Personal Computers is sold with a graphics-output device."
>
> *Paller, AUI Data Graphics*

Quality of presentation in all aspects has been a concern at Monsanto Co., producer of chemicals and related products in St. Louis. There, business graphics has been carried to a high level of sophistication.

"We said that there are better things we wanted to do," begins Dave Ackmann, interactive computing consultant in the Central MIS Group. By that he means going beyond the applications available on popular workhorse packages like Tell-A-Graf and Dissppla (both from ISSCO) and SAS/Graph (from SAS Institute Inc.). Ackmann wrote

CONTINENTAL RESOURCES
We deliver what you need.

We've got Subsystems!

Need a printer, disk drive, or data communication multiplexer? Continental Resources can deliver what you need. Continental specializes in **state-of-the-art plug-compatible peripherals** for nearly every mainframe environment. Products from industry leaders such as Data Products, Genicom, CDC, Emulex, and C.I.E. Terminals (C.ITOH).

Printers with speeds ranging from 45 Characters Per Second to 2000 Lines Per Minute. Disk drives with storage capacities of 80, 160, 300, and 600 megabytes. We can even supply interface cables, data transfer switches, and a host of other communication devices to assure you of a totally integrated system.

Continental's Subsystems group can provide you with the most up-to-date components available — **plus professional assistance** to ensure proper system integration. We also offer complete technical support and service, competitive pricing, and rapid order turnaround. We're certain to have what you need — when you need it.

Selection. Support. Service. That's what you get when you buy from Continental.

Products of almost every description from virtually every industry leader. Whatever your equipment requirements, we can deliver what you need.

But Continental doesn't just offer great selection. We provide a total support package unmatched in the industry. Our nine offices provide sales, technical, and service support backed by more than 20 years experience. You're assured of the most informative, professional assistance available — before and after your purchase. And Continental even supplies complete on-site service.

Not ready to buy? Continental offers a host of rental and leasing options. One is sure to meet your needs.

And, if you're not sure of what you need, our specialists will assist in evaluating your needs and recommend the right system for you — as well as compatible software and supplies. Ribbons, printwheels, and paper — even complete work stations.

So give us a call the next time you need computer equipment. Continental Resources. We deliver what you need.

CONTINENTAL RESOURCES, INC.

175 Middlesex Turnpike, Bedford, MA 01730 (617) 275-0850

Boston Area (617) 275-0850	New York, NY (212) 695-3206	Northern NJ Area (201) 654-6900
Philadelphia Area (609) 234-5100	Chicago Area (312) 860-5991	Baltimore-Washington DC (301) 948-4310
	San Francisco Area (408) 727-9870	Los Angeles Area (213) 638-0454

CIRCLE 105

(Continued from page 242)

a geometric package based on Disspla that he labeled Flow Chart. "I wanted to do something to interconnect geometric figures, like rectangles; something that wasn't really quantitative," he says.

With Flow Chart, Ackmann and others create rectangles easily. "If you want a rectangle 5-by-4 inches, you simply key in 'rectangle, 5, 4' and you can place it wherever you wish. We came up with a library of 150 shapes, including circles, standard dp symbols such as those for printer and card, and lines. We can put one on top of the other, too, to create pictographs."

Ackmann claims that, unlike many other systems, Flow Chart is predictable. It's attracted enough attention that Monsanto has sold a few copies to other companies using Disspla. A user can look at the manual for half an hour, says Ackmann, and make it work.

The first users were high-tech employees—like engineers and research scientists—but, increasingly, middle-level technical, paraprofessional, clerical, and manufacturing employees are getting into the act. "There are terminals all over headquarters, including IBM 3279 color machines," says Ackmann.

As for plotters, he reports, no corporate-wide standards existed at the start, so a lot of "onesies" and "twosies" appeared. But the most common machine is the Hewlett-Packard 7221T, an eight-pen flatbed plotter with automatic paper feeder. These cost about $8,000 each.

"We're looking into high-volume color-output devices, which you need if you're running off 100 to 200 charts a day," says Ackmann. "One of those is inkjet printers, though we were burned about a year-and-a-half ago with an inkjet machine that the vendor won't support."

To demonstrate the practicality of business graphics, Ackmann cites the experience of a design group, one of about 50 businesses within Monsanto. This group designs manufacturing facilities and uses charts in dealing with customers.

"The customer says, 'We want you to design a plant, and here are the constraints,'" says Ackmann. "Our designers come up with bar charts, such as one comparing energy costs versus yields. Then they can say, 'If you want 90 percent yield, this is the energy cost; if you want 92 percent yield, that's the cost.'" So the charts become sales tools.

The company is pioneering in yet another enterprise: making 35mm slides *in-house*. Just a few months

(Continued on page 262)

From the ridiculous to the sublime...

These days you can see just about everything on personal and home computer video screens. Pie-men. Pie-charts. Banks of alien invaders. And bank accounts.

Now you can display it all with a name your customers already know for great video: Panasonic Personal Computer Displays. They carry the same outstanding quality and reliability that have made Panasonic a household word. Not to mention a very tempting profit opportunity for you.

You can offer the high resolution (1100 lines typical) monochrome TR-120M1PA, with a 12″ (diagonal) direct-etched screen for minimized glare and sharp character/graphic displays. Or the dual-mode 10″ CT-160, switchable for full color games and graphics or sharp black & white data display, at the touch of a button . . . complete with audio for game sound effects or speech synthesizers.

We've also got 10″ RGB and 13″ RGB/composite displays with audio, that are compatible with IBM, NEC and APPLE III computers. Plus a new 45″ projection computer display with both RGB and composite color capabilities.

All Panasonic Displays are U.L. listed and carry FCC Class B certification. They're attractively priced for your customers, and profitably priced for you. Find out how easy it is to make them part of your line–write or call Panasonic Industrial Company, Information Systems Group, One Panasonic Way, Secaucus, N.J. 07094; (201) 348-5330.

Everything looks right on a Panasonic Personal Computer Display.

CIRCLE 107

Panasonic
Industrial Company

See us at Comdex
Show Booth #D406

Employee Appraisal

(Continued from page 196)

your might to make sure your subordinate is receiving your message, and don't stop delivering it until you are satisfied you got through.

The third L is "leave yourself out." It is very important to understand that the performance review is about and for your subordinate. So your own insecurities, anxieties, guilt, or whatever should be kept out of it. The subordinate's problems are the issue, not the supervisor's, and it is the subordinate's day in court.

Anyone called upon to assess the performance of another person is likely to have strong emotions before and during the review, just as actors have stage fright. You should work to control these emotions so that they don't affect your task, though they will well up no matter how many reviews you've given.

"On the one hand . . . on the other"

Most reviews probably fall into the "On the one hand . . . on the other" category, containing both positive and negative assessments. (See pages 194 and 195 for a sample appraisal.) Common problems of this type of review include superficiality, cliches, and laundry lists of unrelated observations. All of these will leave your subordinate bewildered and will hardly improve future performance, the review's basic purpose.

The key to successfully delivering this type of review is to recognize that your subordinate, like most people, has only a *finite capacity* to deal with facts, issues, and suggestions. You may know seven truths about an employee's performance, but if that employee has the capacity to absorb only four, you will, at best, waste your breath on the other three. At worst, you will have left your subordinate with a case of sensory overload; he or she will go away without getting anything out of the review.

The purpose of the review is not to cleanse *your* system of all the truths you may have observed, but to improve *your subordinate's* performance. So here, less may very well be more.

How can you target a few key points? First, consider as many aspects of your subordinate's performance as possible. You should scan progress reports, performance against quarterly objectives, and one-on-one meeting notes. Then sit down with a blank piece of paper, and as you consider your subordinate's performance, write everything down. Do *not* edit in your head. Include *everything*, knowing that doing so doesn't commit you to do *anything*. Factors major, minor, and trivial can be included in any order. When you have run out of items, you can put away all your supporting documentation.

Now, from your worksheet, look for relationships between the various items listed. You will probably begin to notice that certain items are different manifestations of the same phenomenon, and that there may be some indications *why* a certain strength or weakness exists. When you find such relationships, you can start calling them "messages" for the subordinate. At this point, your worksheet might look something like the one illustrated.

Again, from your worksheet, begin to draw conclusions and specific examples to support them. Once your list of messages has been compiled, ask yourself if your subordinate will be able to *remember* all of the messages you have chosen to deliver. If not, you must delete the less important ones. Remember, what you couldn't include in this review, you can probably take up in the next one.

If you have discharged your supervisory responsibilities adequately throughout the year, holding regular one-on-one meetings and providing guidance when needed, there should never be any surprises at a performance review, right? Wrong. Using the worksheet, you sometimes come up with a message that startles you. You're faced with either delivering the message or not. But since the purpose of the review is to improve your subordinate's performance, you must deliver it. Preferably, a review will not contain any surprises, but if you uncover one, swallow hard and bring it up.

With a little soul-searching, you may come to realize that you have a major performance problem on your

Performance-appraisal worksheet sample

Positives	Negatives
Planning process much better! (Quick start)	Spec process: zero!
Good report to Materials Council	Debating society meetings—all mushy
Helped on purchasing cost-analysis project	Poor kick-off for spec training
	Confused on computer use
	Doesn't listen to peers

Messages

1. Good results on planning system (analytical/financial background useful).
2. Hard time setting clear, crisp goals—satisfied with activities instead of driving results!
3. Computer knowledge (No—let's just concentrate on No. 2).

hands. You have a subordinate who, unless turned around, could be fired. To deal with the problem, you and your subordinate will likely go through stages commonly experienced in problem-solving of all kinds and particularly in conflict resolution. (See the illustration on page 196.) You'll find these occurring definitely during and possibly after the "blast" review, which is basically an exercise of resolving conflict about a big performance problem.

A poor performer has a strong tendency to *ignore* the problem. Because this is so, a manager needs facts and examples to demonstrate the reality. Progress of some sort is made when the subordinate *actively denies* the existence of a problem rather than ignoring it passively, as before. Evidence can overcome resistance here as well, and we enter the third stage, when the subordinate admits that there is a problem, but maintains it is "not *my* problem." Instead, he or she will *blame others*, a standard defense mechanism. Using this defense, the poor performer can continue to avoid the responsibility and burden of remedying the situation.

These three steps usually follow one another in fairly rapid succession. But matters tend to get stuck at the blame-others stage. If your subordinate does have a problem, there's no way of resolving it if he or she continues to blame others. The poor performer has to take the biggest step, namely, *assuming responsibility*. The poor performer has to say not only that there is a problem but, "If it is my problem, I have to do something about it. If I have to do something, it is likely to be unpleasant and will definitely mean a lot of work on my part." Once responsibility is assumed, however, *finding the solution* is relatively easy. This is because the move from blaming others to assuming responsibility constitutes an emotional step, while the move from assuming responsibility to finding the solution is an intellectual one. The first is harder to do.

It is the reviewer's job to get the

subordinate to move through all of the stages to that of assuming responsibility, though finding the solution should be a shared task. The supervisor should keep track of what stage matters are at. If the supervisor wants to go on to find the solution when the subordinate is still denying or blaming others, nothing can happen. Knowing where you are will help you both move through the stages *together*.

In the end, there are three possible outcomes. One, the subordinate accepts your assessment and your recommended cure, and commits to taking it. Two, the poor performer disagrees completely with your assessment, but still accepts your cure. Three, the employee disagrees with your assessment and does *not* commit to do what you've recommended. As the supervisor, which of these should you consider *acceptable* resolutions to the problem?

"It is very important to assess actual performance, not appearance; real output, not good form."

I feel very strongly that any outcome that includes a *commitment* to action is acceptable. Complex issues do not lend themselves easily to universal agreement. If your subordinate is committed to changing the situation, you have to assume he or she is sincere. It is certainly more desirable for you and your subordinate to agree about the problem and the solution, because that will make you feel that the employee will enthusiastically work toward remedying it. So, up to a point, you should try to get your subordinate to agree with you. But even if you can't, accept a commitment to change and go on.

Don't confuse emotional comfort with operational need. To make things work, you do not need people to side with you; you only need them to commit themselves to a course of action that has been decided upon. There seems to be something not quite nice about expecting people to walk down a path they'd rather not be on. But on the job, we are after a person's performance, not our psychological comfort.

I learned the distinction between the two during one of the first reviews I had to give. I was trying very hard to persuade my subordinate to see things my way. He simply would not go along with me and finally said to me, "Andy, you will never convince me, but why do you insist on wanting to convince me? I've already said I will do what you say." I shut up, embarrassed, not knowing why. It took me a long time before I realized I was embarrassed because my insistence had a lot to do with making me feel better and little to do with running a business.

If it becomes clear that you are not going to get your subordinate past the blame-others stage, you will have to assume the formal role of the supervisor, endowed with position power, and say, "This is what I, as your boss, am instructing you to do. I understand that you do not see it my way. You may be right or I may be right. But I am not only empowered, I am required by the organization for which we both work to give you instructions, and this is what I want you to do." Then proceed to secure your subordinate's *commitment* to the course of action you want and thereafter monitor his or her *performance* against that commitment.

Recently, one of my subordinates wrote a review that I considered

Employee Appraisal

(Continued from page 247)

superficial—lacking analysis and depth. After some discussion, my subordinate agreed with my assessment, but he considered the issue not important enough, as he put it, to spend time rewriting the review. After more spirited discussions, we still were deadlocked. Finally, I took a deep breath and said to him, "Look, I understand that you don't consider it worth your time to do it. But I *want* you to do it." Then I added, "I guess there is a basic difference between us. The integrity of the performance-review system is just more important to me than it is to you. That is why I have to insist." He looked back at me and, after a moment, simply said, "Okay." He thought I was out in left field and resented the fact that I made him spend time on something he thought was unimportant, but he committed himself to redo the review, and, in fact, did it well. His subordinate ended up getting the reworked, much more thorough and thoughtful review, and the fact that his review was rewritten without the agreement of *my* subordinate made no difference to him.

"When we promote our best, we are telling our subordinates that performance is what counts."

Reviewing the ace

After trying to establish the principles of performance appraisal with a group of about 20 middle managers, I asked them to take a review they had once received and to analyze it according to our new criteria. The results were not what I expected, but I did learn from them.

This group consisted of achievers, and their ratings were mostly very high. The reviews were exceptionally well written, much better than the average. However, in content, they tended to be retrospective assessments, analyses of what the subordinate had done in the course of the prior year. Even though their key purpose was to improve the subordinate's future performance, a majority of the reviews made little or no attempt to define what the subordinate needed to do to improve performance or even to maintain the current level.

It seems that, for achievers, the supervisor's effort goes into determining and justifying the judgment of the superior performance, while giving little attention to how they could do even better. But for poor performers, the supervisor tends to concentrate heavily on ways they can improve performance, providing detailed and elaborate "corrective-action programs," step-by-step affairs meant to ensure that these marginal employees can pull themselves up to meet minimum requirements.

I think we have our priorities reversed. Shouldn't we spend more time trying to improve the performance of our stars? After all, these people account for a disproportionately large share of the work in any organization. Put another way, concentrating on the stars is a high-leverage activity: If they get better, the impact on group output is very great indeed.

We all have a hard time saying things that are critical, whether we're talking to a superior employee or a marginal one. We must keep in mind, however, that no matter how stellar a person's performance level is, there is *always* room for improvement. Don't hesitate to use the 20/20 hindsight provided by the review to show anyone, even an ace, how he or she might have done better.

Other Practices

Is it a good idea to ask the subordinate to prepare some kind of self-review before the supervisor's review? Let me answer the question this way: Your own review is obviously important to you, and you really want to know how your supervisor assesses your year's work. If you prepare a review and give it to your supervisor, who simply changes the format, retypes it, gives you a superior rating, and then hands it back to you, how will you feel? Probably cheated. If you have to tell your supervisor about your accomplishments, he or she obviously doesn't pay much attention to what you are doing. Reviewing the performance of subordinates is a formal act of leadership. If supervisors permit themselves to be prompted in one way or another, their leadership and their capacity for it will begin to appear false. The integrity of the supervisors' judgment here must be preserved. They must commit themselves through an up-front judgment of their subordinates' performance if the health and vitality of the review process are to be maintained.

"Performance reviews should be part of managerial practice in organizations of any size and kind."

What about asking your subordinate to evaluate *your* performance as a supervisor? This might be a good idea. But you should make it clear that it's your job to assess your staff's performance, while their assessment of you has only advisory status. The point is, they are not your leader; you are theirs. And under no circumstances should you pretend that you and your subordinates are

(Continued on page 250)

For datacomm network monitoring and management,

there's only one...

AVANT-GARDE

If you have 24 lines, like **St. Paul Insurance**
Or 2000, like **Southern Bell Telephone...**
There's only one Avant-Garde.

If you are an insurance company,
like **Metropolitan Life**
A utility, like **PSE&G**
A bank, like **Connecticut Bank and Trust**
A retailer, like **Best Products**
A telephone company, like **New York Telephone**
An entertainment company, like **Disney**
A government organization,
like the **Library of Congress**
Or a manufacturer, like **BMW**...
There's only one Avant-Garde.

If you want performance monitoring only,
like **Westinghouse** and **Home Insurance**
Or electronic matrix switching integrated
with performance monitoring, like **GTE,**
Equitable, and **Shearson/American Express**...
There's only one Avant-Garde.

For **Net/*Alert*,** the performance monitoring and management system, *field-proven and continually enhanced since 1979.*
For **Net/*Switch*,** electronic matrix switching proven and integrated with **Net/*Alert*** *for over a year.*
For **Net/*Guard*,** the system to control and monitor PC access to networks.
For **Net/*Link*,** the network analysis and planning tool.
For **Tempo,** the response time monitor for individual terminals.
There's only one Avant-Garde.

If you want the software expertise and the proven technology to monitor individual applications or transactions, 56kb high-speed lines, and nearly 40 different protocols...
There's only one Avant-Garde.

For more information about Avant-Garde products to simplify network management... call Art Alberding at 609-778-7000.

Or write to:

AVANT-GARDE

8000 Commerce Parkway
Mt. Laurel, New Jersey 08054

If you want to save hundreds of thousands of dollars in network operations, improve services and manage growth,
there's only one Avant-Garde...
The pioneer and leader in network monitoring and management.

CIRCLE 108

Employee Appraisal

(Continued from page 248)

equal during performance reviews.

Should you deliver the written review before, during, or after the face-to-face discussion?

What happens if you have the review first and then give your subordinate what you've written later? Upon reading it, the subordinate may find a phrase not "heard" earlier and blow up over it.

What about delivering the written review *during* the discussion? One manager told me that he gives the subordinate a copy of the review with instructions to read the first several paragraphs, which they then discuss. Grouping the paragraphs, supervisor and subordinate work their way through the appraisal. I can see a problem with this. How can a supervisor ask subordinates to stop at paragraph three when they are so eager to read the rest of what they've got? Another manager told me that he reads the written review to his subordinate to try to control the session. But here, too, the subordinate is left eager to know what comes next and might not pay attention to what is really being said. Also, when subordinates are given a written review during the discussion, they won't have the time to think about what it says and are likely to walk away muttering, "I should have said this in response, and I should have said that." For a good meeting of minds, your subordinates should have time to work out their reactions to what's in the review.

In my experience, it's best to give subordinates the written review sometime *before* the face-to-face discussion. They can then read the whole document privately and digest it. They can react or overreact and then look at the "messages" again. By the time the two of you get together, the subordinate you're reviewing will be much better prepared.

Preparing and delivering a performance assessment is one of the hardest tasks you'll have to perform as a manager. The best way to learn how to do one is to think critically about the reviews you yourself have received. If you've been lucky, the tradition of good performance reviews has been handed down from supervisor to subordinate, which has helped to maintain the integrity of the system in your company. Nevertheless, people constantly need to be prodded into doing a good job of reviewing. Each year, I read something like 100 evaluations, all of those written by my own subordinates and a random selection from throughout Intel. I comment on them and send them back for rewrites or with a complimentary note. I do this with as much noise and visibility as I can, because I want to reiterate and reaffirm the significance the system has and should have for every Intel employee. Anything less would not be appropriate for the most important kind of task-relevant feedback we can give our subordinates. □

"The review process represents the most formal type of institutionalized leadership."

Andrew S. Grove is president and a founder of Intel Corp. This is the second and last article Computer Decisions *has excerpted and adapted from his book* High Output Management. *(The first, on meetings, appeared in the January issue.)*

Announcing a Remarkable Advancement in Financial Software:

It Works.

Finance and accounting managers at hundreds of major corporations have found they can rely on the financial software systems by Data Design.

Why? Our Financial Applications Software Packages—all of which are developed *by* Data Design—are given the most extensive reliability testing in the industry, guaranteeing ease of use and trouble-free installation.

We have enjoyed less than a five percent employee turnover rate in over a decade (industry average is 30%) so you can be confident that the person who developed the Data Design system you bought is still with the company. Ready to provide the responsive, knowledgeable support— through implementation and beyond—that is consistently rated the highest in the software industry in nationally recognized independent software surveys.

Follow-up maintenance (each customer is assigned their own personal Account Manager), telephone consultation and a 24 hour emergency hot-line service are included with the purchase of each system. So are full installation assistance and in-depth training (at Data Design or at your facility).

There are many reasons why we have attained a reputation for supplying the finest financial applications software packages and service available. Among them are the shared commitment of our employees to product quality and service (we are 100% employee owned) and their high level of data processing and accounting skills—40% have graduate degrees in business management.

Our reputation for excellence has been built on years of providing the highest quality mainframe software for:

- ☐ **General Ledger Financial Control**
- ☐ **Accounts Payable/Purchase Control**
- ☐ **Fixed Asset Accounting**
- ☐ **Capital Project Management System**

To learn how these systems work for a broad range of medium to large size companies on most major computer systems, call today at 800-556-5511 (408-730-0100 in California), or complete and mail the coupon below.

DATA DESIGN ASSOCIATES

1279 Oakmead Parkway, Sunnyvale, CA 94086

Please send me additional information on your:
☐ **General Ledger System**
☐ **Accounts Payable/ Purchase Control System**
☐ **Fixed Asset Accounting System**
☐ **Capital Project Management System**
My need is: ☐ Immediate ☐ Short Term ☐ Long Term
☐ I am interested in attending a free seminar on financial application software.

Name _____

Title _____

Company _____

Address _____

City, State, Zip _____

Telephone ( ) _____

Computer Brand _____ Model _____

CDS 2

CIRCLE 110

by Mary Miles, New England Editor

YOUR CAREER

Alleviating worker stress

Observe your employees as they pour out of work at lunch hour or the day's end. It could prove to be an enlightening experience. Are the workers animated and lively? Is there laughter and pleasant bantering? Or do the employees hightail it to the parking lot as if they were escaping from jail?

One young man found waiting for his fiancee outside the large Boston insurance carrier where she worked to be dangerous to life and limb. "The first couple of times I stood by the doors to wait for Nancy I nearly got killed," he says. "All the data-entry people are through for the day at 4:45, and by 4:46 it's as if a bunch of hornets are exploding out of a nest!

Quitting-time behavior tends to reveal the general emotional atmosphere of an office. According to Nancy, the turnover rate in her department is very high and job satisfaction is low. Workers are miserable about recent performance-monitoring requirements and poor job-advancement potential. The anxiety level is very high, Nancy says; she's renewed her old nailbiting habit and reports that arguments among operators, petty theft, and minor health complaints are becoming more common.

A certain amount of job stress seems inevitable in today's high-pressure world. It can be traced to anxiety regarding one's personal life, the future of the company, or potential cutbacks in production, salary, or jobs. Company growth may result in an increased workload, rapid influx of additional workers, overtime, and even lowered service standards.

Family support and understanding are considered traditional buffers against work-related stress. However, a recent study done at the University of Chicago indicates that a considerate boss can best protect employees against the physical and psychological ailments associated with job stress.

According to the results of the study, those workers who believed they did not have the support of their bosses had twice as many illnesses as those who felt their bosses were behind them. The researchers concluded that employees who don't believe their bosses are supportive turn to their families for understanding. This may encourage self-pity and bitterness, which are not conducive to anxiety reduction or better work performance.

Whether or not an employee's family is successfully supportive, there's little doubt that the boss is in the primary position to increase or decrease subordinates' stress. Skillful management can improve employee performance and productivity.

> If employees are treated as if they're inept and untrustworthy, many will fulfill these negative expectations.

Stress management

There are several guidelines that you, as a manager, can follow to reduce stress among your subordinates. The payoff will be a noticeable increase in commitment to corporate/departmental goals, positive reactions to challenge, and a feeling of organizational unity. Added dividends will be improved productivity, lowered absenteeism and turnover, better interpersonal relations, and—the biggest bonus for you—a coordinated group that does quality work and makes you look good.

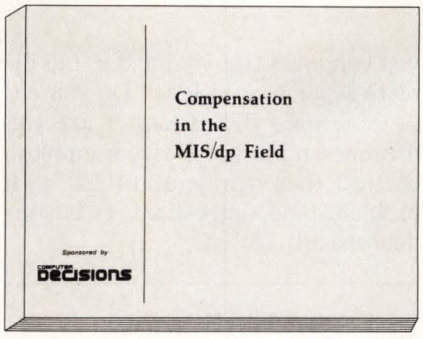
Try to be sensitive to the signs and symptoms of stress. Do any employees seem to have more colds, flu, or accidents than is normal? Any indication of drinking or drug-abuse problems? Do any of your subordinates work obsessively, staying late and coming in early and on weekends? Are there many arguments or bad feelings in the office? Do you have a large turnover rate? These are all signs that stress is sapping the effectiveness of your team (or does it seem more like a motley crew of discontented draftees?).

Consistent lack of communication between management and subordinates will eventually hurt the company in terms of loyalty and productivity. Put yourself in your clerk's position. Would *you* enjoy discovering via office gossip that the company was moving clear across the country within a few months? Or how about learning through the office grapevine that centralized dp will be phased out, leaving you in the lurch as to the status—or even the future—of your job?

Some researchers suggest it's unnecessary to "bother" workers with information about changes in top management or revisions of corporate policies or directions unless it is absolutely essential. What these researchers fail to take into account is the negative influence of the company grapevine. One person hears a rumor and, before long, inaccurate information has spread throughout the company, causing fear and suspicion. Only straightforward, accurate

New—Just Released! The Most Valuable MIS/dp Salary Study You Can Buy

Compensation in the MIS/dp Field



Sponsored by *Computer Decisions*, this tightly-packed, 346-page report provides the most intensive study of salaries, salary ranges, and bonuses ever attempted in the MIS/dp field. For 35 job functions, ranging from Junior Key Entry Operator to Top MIS/dp Officer, it reports all compensation data:

- By 16 levels of supervisory responsibility
- By geographical location—total U.S., U.S. by seven regions (including & excluding major metropolitan areas), and 25 metropolitan areas & states
- By 25 types of employer
- By total MIS/dp budget
- By number of employees
- By annual sales of manufacturing/extractive and non-manufacturing organizations and utilities
- By total assets of financial organizations
- By insurance policies in force
- By education, experience, & sex

An invaluable tool for determining the "right" salaries in the MIS/dp field. $195.00

Complete & mail today for your 15-day FREE Trial Copy—No Obligation!

Abbott, Langer & Associates • Dept. CD • 548 First Street • Crete, IL 60417

Yes! I certainly can use *Compensation in the MIS/dp Field* in my work. Please rush my copy to me immediately! (If I'm not satisfied, I'll return it within 15 days and not be charged for it.)

☐ Check No. _____ for $195.00 is enclosed.
(Ill. residents add 6¼ % sales tax.)

☐ Bill my employer, adding a small charge for shipping and handling.

Signature: _____ Name (type or print): _____

Title: _____ Employer: _____

Street Address of Employer: * _____

City: _____ State: _____ Zip: _____

*U.P.S. will not deliver to a P.O. Box number. Please give street address.

CIRCLE 111

updates from management will clear up such misinformation. In some cases, employee input and opinion may be sought.

Most smart decision-makers realize that employees have the right to know of any corporate changes that will affect their lives, career plans, and finances and make effective communication a top priority. They acknowledge that feeling a loss of control over one's life is a high stress producer while security, assured status, and open communication make for happier workers.

There are additional measures management can take to improve employee relations and reduce stress. The more obvious ones are: taking care not to demean or embarrass workers, being sensitive to anyone having personal problems, and making an effort to acknowledge a job well done.

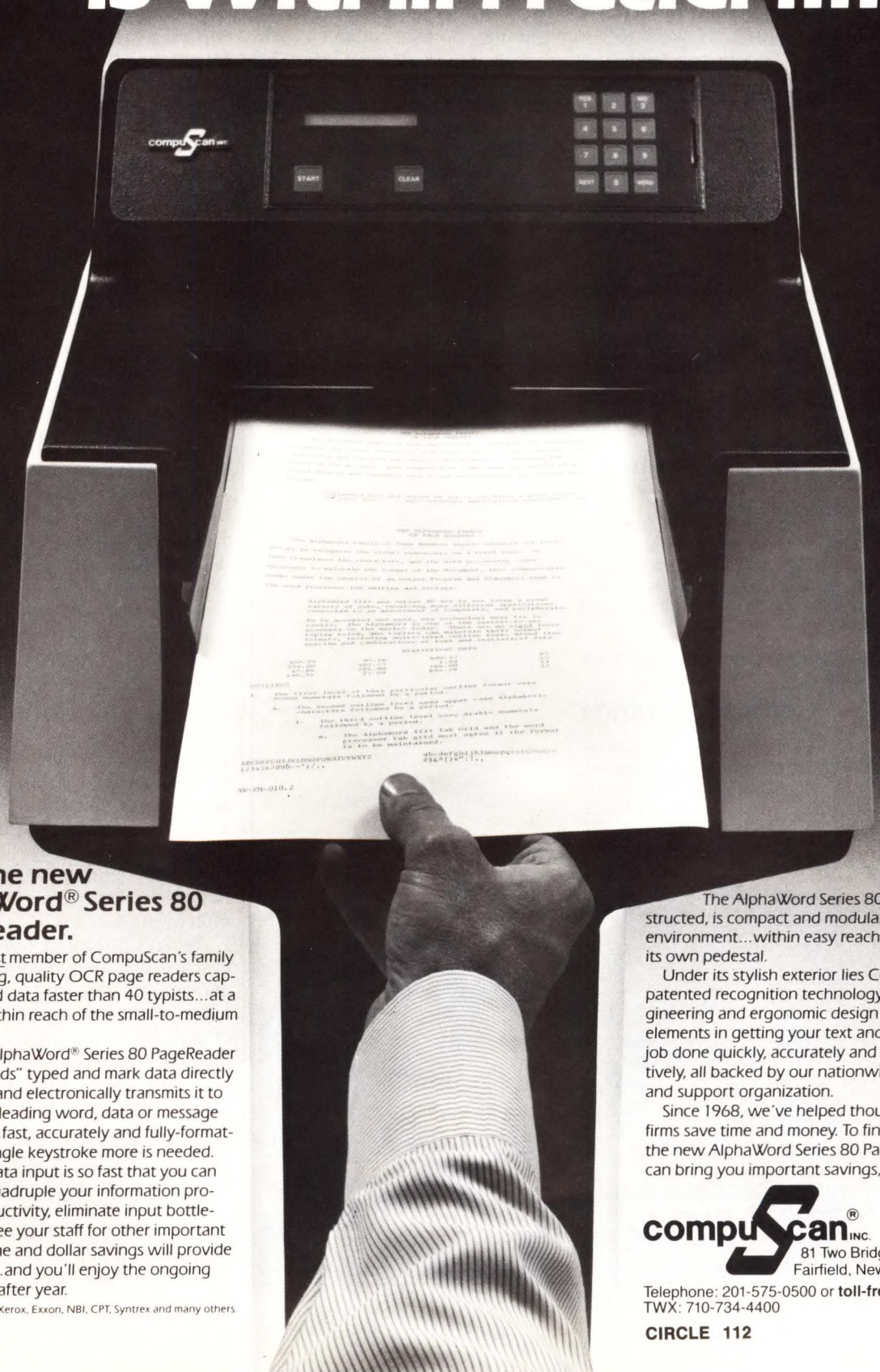
A sense of team work is also important for decreasing job stress. Do you communicate via memos and directives, or face-to-face? Do you encourage open discussion, or are you brusque and terse? Do your employees feel they can come to you with problems and suggestions, or is your door usually closed?

Let your staff know how they've done on any project—where they've succeeded and where they've failed.

If you are distant and unapproachable, subordinates will find it difficult to feel a part of the organization. This can generate frustration, diminish motivation, and increase anxiety. If employees are treated as if they are inept, untrustworthy, dependent, or unintelligent, many will fulfill these negative expectations. Let your workers know you trust them. The extension of common courtesies and inclusion in the decision-making process are the first steps toward building trust.

Conversely, rigid, inflexible bosses who play manipulative games with those under them often get negative results, creating a destructive, anxiety-ridden atmosphere. According to a 1983 publication of the Research Institute of America's *Personal Report,* many executives earn the reputation of being tough because "They criticize in public, make key decisions by themselves, have bad tempers, and use abrasive language. They foster insane competition, playing favorites but toppling those favorites to keep them insecure. They relieve subordinates of assignments at the first sign of trouble, fail to check whether people have understood their instructions, and then

Fast, low-cost text and data entry is within reach...



with the new AlphaWord® Series 80 PageReader.

The newest member of CompuScan's family of long lasting, quality OCR page readers captures text and data faster than 40 typists...at a price well within reach of the small-to-medium sized office.

The new AlphaWord® Series 80 PageReader optically "reads" typed and mark data directly from a page and electronically transmits it to virtually any leading word, data or message processor* ...fast, accurately and fully-formatted. Not a single keystroke more is needed.

Text and data input is so fast that you can effectively quadruple your information processing productivity, eliminate input bottlenecks, and free your staff for other important tasks. The time and dollar savings will provide a quick ROI...and you'll enjoy the ongoing savings year after year.

*IBM, Wang, DEC, Xerox, Exxon, NBI, CPT, Syntrex and many others.

The AlphaWord Series 80, quality constructed, is compact and modular to fit your environment...within easy reach on a desk or its own pedestal.

Under its stylish exterior lies CompuScan's patented recognition technology, reliable engineering and ergonomic design...necessary elements in getting your text and data entry job done quickly, accurately and cost effectively, all backed by our nationwide service and support organization.

Since 1968, we've helped thousands of firms save time and money. To find out how the new AlphaWord Series 80 PageReader can bring you important savings, contact:

compuScan® INC.
81 Two Bridges Road,
Fairfield, New Jersey 07006

Telephone: 201-575-0500 or **toll-free** 800-631-0951
TWX: 710-734-4400

CIRCLE 112

blame the workers for any resulting errors."

One way to prove your loyalty is to stick up for your employees. Do you ensure that recognition is paid to those who do well? Do you deal forthrightly and quickly with a manager who's making it tough on someone in your department? If employees view you as a fair, dependable leader who won't hesitate to take action on their behalf, not only will work stress be reduced; you'll be repaid with mutual respect and kindness.

Informing employees of the latest departmental codes and standards will keep them confident of your continued support and assistance. For individual projects, definite plans complete with target dates and required results will allow workers to feel more sure of themselves and better able to produce the goals you have outlined.

Feedback can be a crucial link to this communication chain. Let employees know how they have done on any particular project—where they have succeeded and where they have failed.

Do you have some workers who have the abilities but lack motivation, purpose, and enthusiasm? It may be that their career goals are unclear. A "what am I doing here, anyway?" attitude can engender stress in both you and the dissatisfied employee. If you can encourage and guide the formulation of career goals based upon abilities, interests, and performance, you're likely to end up with a valued worker with focus, motivation, discipline, and a future.

Helping subordinates develop their abilities and career goals may make you feel like a surrogate father—someone who nurtures, nudges, guides, advises. And as in parenthood, knowing when to let go can be a trying responsibility. There is always the temptation to do too much for your staff, robbing them of autonomy while generating a dependency that will hamper both your and their effectiveness.

Achieving desired results through others will reflect how successfully you manage subordinates. It takes a combination of many skills to lead people effectively. You must be able to communicate, observe, guide, and determine the appropriate strategies to achieve corporate goals.

So the next time a workshift ends, look out your window as employees flow from the building carrying the day's frustrations and rewards upon their faces. You just may discover how you're doing as a manager. □

SHOW PREVIEW

Advanced Manufacturing and Info/Soft shows

The 1984 Advanced Manufacturing Systems Exposition and Conference (AMS '84) holds a special attraction for manufacturing executives. The exhibits will showcase both information systems and automated-production systems specifically geared to the needs of manufacturing companies. The conference will be held at McCormick Place in Chicago June 12 through 14.

Photo by Ewing Galloway

AMS '84 is an amalgamation of the Information Management Exposition and Conference and the Conference for Manufacturing and Hi-Tech, which were held jointly last year. Because manufacturing executives are equally concerned with information and automated-production systems, the two events have been combined this year.

The information-related exhibits will include computers of all sizes, computer-aided design/computer-aided manufacturing systems, computer accessories and peripherals, data-collection devices, data-communications systems, distribution systems, micrographics and records-management systems, office automation products, and software for manufacturing functions.

Production-related exhibits will include those for designing, fabricating, inspecting, handling, and transferring manufactured products. They will include programmable controllers, flexible manufacturing systems, optical-measurement systems, automated-inspection equipment, and laser equipment.

There will be more than 60 sessions grouped in 10 topics of special interest to manufacturing executives. The largest number of sessions will be devoted to the technology of advanced manufacturing systems. Here are some sessions:

- Microcomputers invade the factory.
- Computer-integrated manufacturing: What's it all about?
- The new computer-age systems designed for users.
- Getting ready for the factory of the future.
- Linking micros to mainframes.
- Computer-assisted instruction: A better approach to manufacturing education.
- Production scheduling using artificial intelligence.
- Optical- and video-disk storage: an executive overview.
- Computer-integrated manufacturing: getting started.
- Establishing a framework for the analysis and justification of computer-integrated manufacturing.

Five workshops for manufacturing executives will also be offered. They are:

- MRP for executives: the new industrial revolution: John N. Petroff, Comserve Corp.
- Why manufacturing systems fail: A study of information and organization: Richard S. Erst, Informatics General Corp.

In addition to the program's regular sessions, there also will be four all-day intensive courses covering introductory and advanced information on personal-computer operation for managers.

The cost of both the exposition and conference is $295 for three days; $150 for one day; and $80 for half a day.

Running concurrently with AMS '84 will be the Information Management Exposition and Conference for Software. This will give executives the opportunity to attend both events in a single visit at no extra charge. Info/Software will also be held at McCormick Place. It will be an end-user show covering the entire range of software solutions and strategic-management issues.

For further information on both conferences call (212) 370-1100. □

Letters

Supplier list scrambled

Thank you for including our product in your article on database management systems ["DBMS: The more you get, the more you want"] in the February 1984 issue. However, there are some significant errors with respect to price and interface in the table for database-management machines. We would appreciate your correcting the information in your next issue.

Corem International

Editors' response: Unfortunately, the human proofreaders failed to detect the computerized typesetter's error that garbled most of the table on database-management machines. A corrected version appears below.

Hands-on report

I read *Computer Decisions* from cover to cover as soon as I get it. "Go-anywhere Computing" in the November issue was especially interesting and enlightening. The article mentioned the Tandy Portable Computer Model 100, which I am experienced in using. When I first bought the computer, I had to read the instructions three times and then ask the salesman for help, but I soon had the computer running. I found the keyboard easy to work with, and, with the press of a button, the printer hammered out the information I had in the machine. When I hooked up the CCR-81 cassette recorder, I had several pages of text transferred to the tape in less than 20 seconds. Tandy should be congratulated for creating a portable computer that is accessible to those of us who are less than full-time enthusiasts.

Anthony Marra Jr.
President
Marra International Enterprises
Cary, NC

Access given short shrift?

It's a rapidly moving world Jennifer Beaver entered with "Go-anywhere computing" [November]—the world of transportables. Some of her information was dated; some inaccurate.

The one machine she discussed that I know about is the Actrix (nee Access) Matrix "Access." Here's what your discussion of that machine overlooked:

Its price has been reduced to something in the neighborhood of $2,200 for the "basic" machine with 64 Kbytes of RAM and two single-sided double-density drives. The machine has a built-in printer (an Epson, I believe), which appears in your photo on page 160. It is, with an 8088/256-Kbyte RAM board, upgradable to IBM compatibility, although I am not certain that IBM compatibility is all that necessary, given the wealth of CP/M 2.n software available. The Access has an optional ($200+) UPS, which allows the system to be run off a 12-VDC source. It has an internal 300-baud modem (upgradable to 0-300/1,200 baud). Finally, it is one of the few machines with both an international sales/service organization *and* a 115/230 VAC user-strappable JT so that it may be used in both North America and Europe.

I concede that I have a personal interest in the Access machine, so I have followed it closely, but I feel that it got short shrift in your article. Still, the article was a good effort at covering the wide world of portable machines. It introduced me to machines I'd never heard about . . . Modcomp's Apollo, for example.

John Glenn
Sarasota, FL

Address letters to the editor to Computer Decisions, *10 Mulholland Dr., Hasbrouck Heights, NJ 07604.*

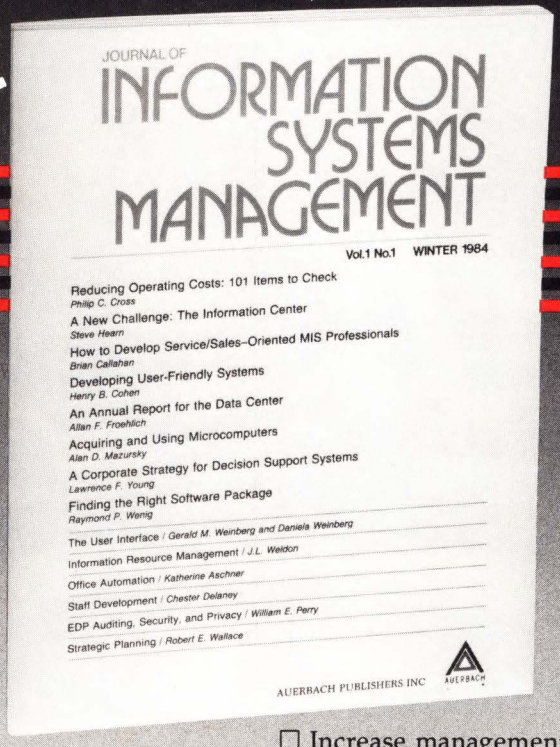
Database-management machines

(See first letter above)

Vendor	Package	Equipment	Price	Circle
Amperif (213) 998-7666	RDM 1100	Interfaces with Sperry 1100 series	$250,000	432
Britton Lee (408) 378-7000	IDM 500/0	Interfaces with IBM VM/CMS and PC; DEC VMS, RSX, and Unix	$45,000	433
	IDM 500/1 IDM 500/2		$69,500 $99,500	
Corem Int'l. (703) 473-8105	Synfobase	Interfaces with any micro or mini with RS-232C system	$7,900 to $9,200	434
HDR Syst. (402) 399-1400	Noah 500/0	Interfaces with IBM PC, Onyx, and Unix-based systems; DEC VAX VMS	$115,600	435
Intel (512) 258-5171	iDIS 86/735	Interfaces with IBM, Sperry, and Control Data	$19,500 to $40,000	436
Mega/Net (201) 825-7770	Mega/Net	Interfaces with IBM 360, 370, and 43XX; Ethernet and X.25	$68,000 to $997,000	437

The Only "How-to" Publication Designed just for MIS/DP Managers

NEW!



At last! A journal that will help you become a more efficient manager. No other publication provides in-depth articles that offer realistic and practical suggestions. Trade publications only skim the surface and academic journals don't offer practical solutions to your daily problems.

The Journal is a 96 page quarterly that effectively combines MIS Technology, sound management practices and the best MIS management techniques and tailors it to the unique needs of the MIS director.

Subscribers Will Find:

- ☐ Articles written by experts in the field
- ☐ Over 7 practical, in-depth, how-to articles in each issue
- ☐ 8 regular columns per issue devoted to today's issues
- ☐ Timely articles that analyze and solve problems

Information Systems Management has assembled top experts from those specific areas in which MIS/DP managers need more information and guidance. Dr. Lawrence F. Young, Associate Professor of Information Systems and Management Science at Drexel University, serves as Consulting Editor. He, along with an outstanding board of practioners from the corporate world, provide the most comprehensive information available.

CIRCLE 114

These experts will help you:

- ☐ Find proven, practical solutions to management problems
- ☐ Learn how to save time & run a cost-effective organization
- ☐ Solve high turnover rates among your technical staff
- ☐ Select the right software packages
- ☐ Increase management productivity and control
- ☐ And much more!

Discover for yourself the benefits of subscribing to the only journal of its kind.

Just clip the coupon to place your order today!

2031

The Journal of **Information Systems Management**

AUERBACH

Auerbach Publishers Inc.
6560 N. Park Drive
Pennsauken, NJ 08109
609-662-2070
800-257-8162

Start my subscription today. If I am not satisfied at any time I can cancel my order and receive a refund for the balance of my subscription.
One year (4 issues) $60.

☐ Payment Enclosed ☐ Bill Me ☐ Bill Company

NAME/TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

PHONE ( ) _____

SIGNATURE _____

SHOW PREVIEW

National Computer Conference

This year, the nation's largest computer show, The National Computer Conference, will be larger than ever with crowds exceeding 100,000. More than 650 exhibitors from around the world will display the latest developments in information technology. New product announcements will be made at every turn.

The conference is scheduled for July 9 through 12 at the Las Vegas Convention Center. John Akers, president and a director of IBM, will be the keynote speaker. He will launch the conference with an address. The show's theme, "Enhancing Creativity," focuses on the belief that advancements in computer technology will eventually lead to an enhancement of society's creative abilities.

Illustration by Dan Culhane

There will be over 90 technical sessions covering issues pertinent to information professionals. Whether it be an evaluation of a recent product announcement, information on how computers are being used in the office and factory, or an analysis of significant business developments, you're bound to find a session that will prove beneficial to you and your company.

Here is a partial listing of conference programs:

- The automated office: Michael Alsup, Arthur Andersen & Co.
- Information-processing management: Eugene Smith, Texas A&M University.
- Database management: Darrell Ward, Hypergraphics.
- Personal computers: Jean Yates, Yates Ventures. New developments in microcomputers for executives, small businesses, and Fortune 1,000 corporations will be discussed.
- Computer communication: Neal Laurance, Ford Motor. This session will cover local- and wide-area networks and their management.
- Software: Winsor Brown, Volition Systems. A discussion of software design, development, implementation, integration, delivery, and maintenance.
- Hardware and architecture: Faye Briggs, Rice University. A survey of new developments in microprocessors plus an update on fifth-generation computing.
- Artificial intelligence: James Miller, Computer Thought.

Other key topics will include: security, networks and data communications, human-interface issues, graphics, and personal computing. Each session will be chaired by a leading professional.

There will be 18 professional-development seminars for specialists, users, and managers. These programs will cover topics directly related to systems development, database technology, networking, planning, and cost-effective computer usage. Professional-development seminar costs are $75 for a full-day, and $45 for a half-day. Choose the program(s) that best suits your needs:

- Motivating and managing computer personnel: Daniel Couger, University of Colorado.
- Putting Unix to work on a micro: Jim Joyce, International Technical Seminars.
- Local networks: Harvey Freeman, Architecture Technology Corp.
- Project planning and control workshop: Lois Zells, Yourdon Inc.
- Introduction to computer graphics: Joel Orr, the CAD/CAM Institute.
- Super computers: Why are they needed and where are they useful: Vito Bonjiorno, Control Data Corp.

On-site registrants pay the full conference price of $125. For information regarding registration for NCC '84 call the sponsors, the American Federation of Information Processing Societies (AFIPS) at (703) 620-8926. □

The Philips 3000 Series. Future Included.

Building Blocks. The 3000 Series universal workstations. The vital building blocks in the Philips Information Systems Office Automation strategy. A strategy that assures you today's purchase won't become obsolete in the years ahead. We include the future by providing a migration path from electronic workstations, upward and outward to distributed processing, sophisticated local area networks, and beyond.

Versatility. The 3000 Series includes award-winning* word processing software recognized for ease of use and versatility. Each 3000 Series workstation functions as a word processor, a desktop computer using off-the-shelf programs, and a sophisticated telecommunications terminal including Miconet for Philips-to-Philips electronic mail, as well as asynch, bisynch, and 3276 emulation.

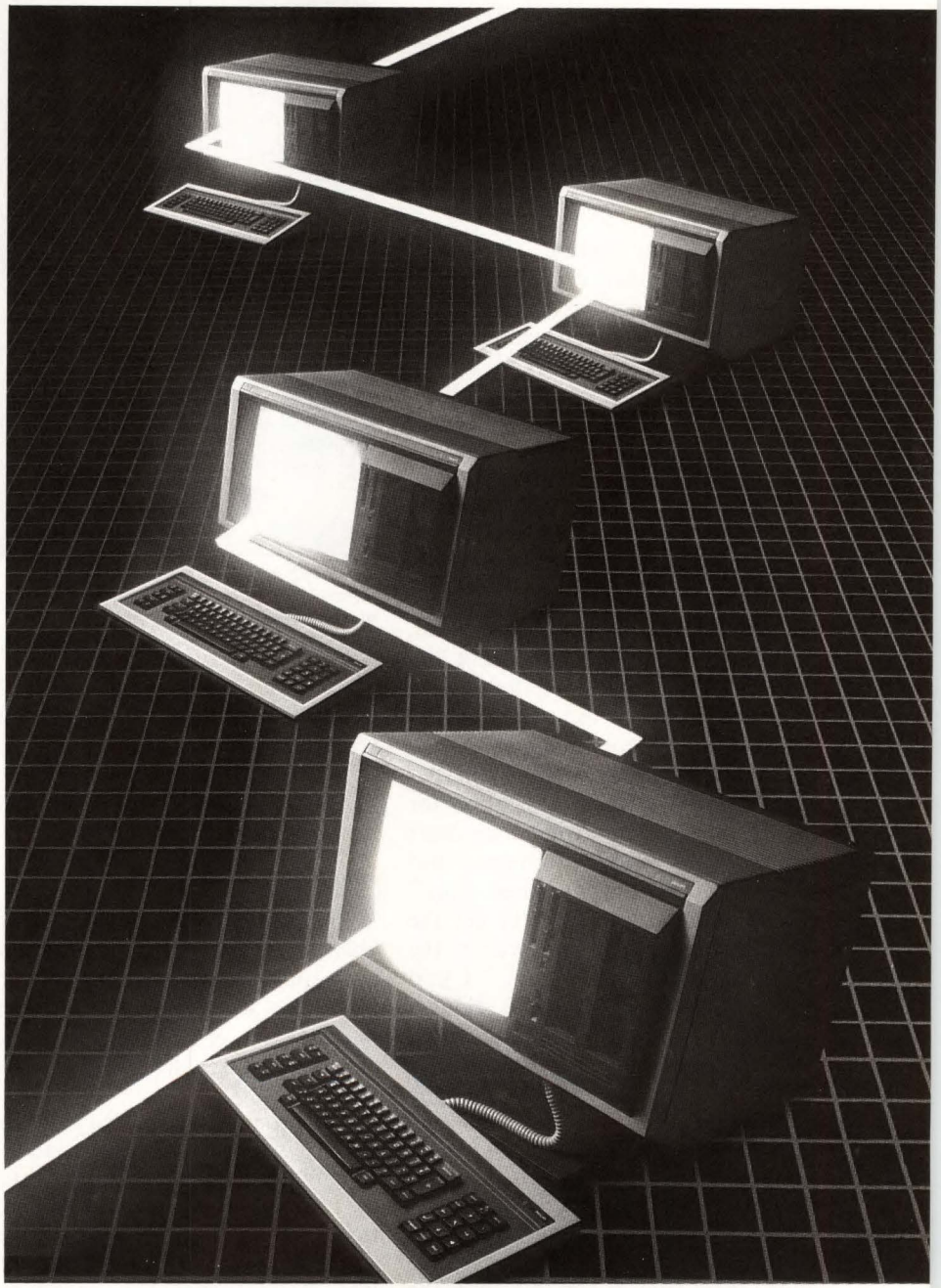
Resources. Our parent, N.V. Philips, a 16-billion-dollar multinational corporation, is the third largest corporation specializing in communications and electronics with 200 factories in over 100 countries and 300,000 employees worldwide.

We put the power of over one billion dollars in research behind our Office Automation systems. Technological firsts, from the original cassette recorder to the videodisc and digital optical recorder allow us to expand our Office Automation strategy in the future, while keeping compatibility intact.

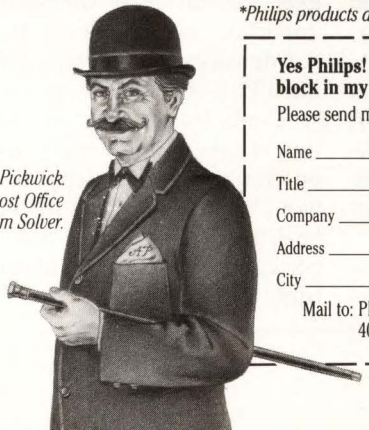
Support. All products in the Philips Office Automation strategy are backed with an extensive guarantee and comprehensive user training and service.

To find out more about making our 3000 Series the building block in your Office Automation future, call toll free 1-800-828-6211. In New York State 1-800-462-6432. Or, send the coupon below.

Helping you solve the mysteries of Office Automation.



*Philips products are consistently rated at the top of the DataPro User Survey.



Alexander Pickwick. The World's Foremost Office Automation Problem Solver.

Yes Philips! I want to make your 3000 Series the building block in my Office Automation future.

Please send me further information on your Office Automation strategy.

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Mail to: Philips Information Systems, Inc., Marketing Services, 4040 McEwen, Dallas, TX 75234

CD0584

PHILIPS INFORMATION SYSTEMS

PHILIPS

CIRCLE 115

Computer Graphics

(Continued from page 244)

ago, Monsanto installed Matrix Instruments' QCR color film recorder in such a way that the computer operating system thinks it's a printer. "Slides are becoming the medium of choice," maintains Ackmann. "Anyone who uses the CMS system, in our plant or in any Monsanto plant in the country, can route data to our slide maker."

To access the system, says Ackmann, you simply call up a slide graph on the display screen. When you get it the way you want it, you send it to the slide maker. If it's an "off-the-rack" slide, you can create it as fast as you can type. If you want something tailor-made, it may require 15 to 30 minutes. Two days later, the finished slide's in your mailbox.

Ackmann admits it wasn't easy to justify the $50,000 price tag. "Management knows little about graphics, because it's usually something the graphics department handles alone. And there, the staffers tell you that graphics isn't in your budget and they can't do the work in the time you specify. It takes a lot of education for management to know that computers can not only crunch numbers, but drive hardware that produces plots."

Ackmann had to fight to get the QCR, but he believes he's well on the way to providing a payback. "I said that if I could create 1,000 slides a month, I would pay for my unit in two years," he relates. "In January, I made 1,400 slides—and that usage developed entirely by word of mouth."

Ackmann is also exploring newer, less costly, faster output devices. "They'll probably be inkjet printers," he says. "But I know some vendor is going to come up with an electrostatic color plotter for less than the $100,000 Versatec machine introduced last year. [The Versatec plotter, the vendor claims, can produce a 34-by-44-inch plot, in up to 256 shades, in eight minutes. A black-and-white plot takes about one minute.] We should get something in the neighborhood of $10,000."

Regardless of the price advantages, Ackmann looks at business graphics as a great opportunity. "A lot of companies aren't into business graphics the way Monsanto is," he says. "But it will trickle down to smaller companies. It's just a question of when."

A new graphics plotter from Hewlett-Packard, with eight color pens and automatic cut-sheet paper feed, produces 11-by-17-inch hard copies.

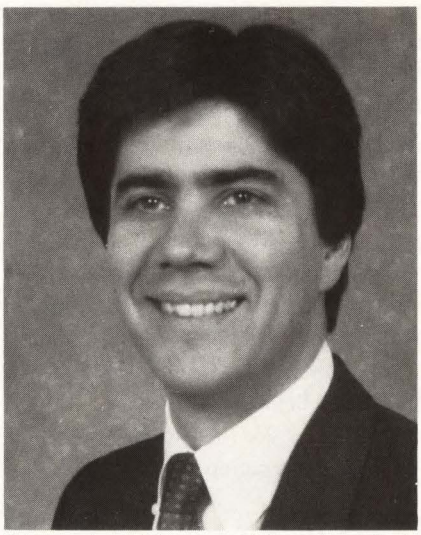
Jump in or wade?

ISSCO's Gary Laroff would probably advise against jumping in, however, and advocate wading. He contends that, when trying to decide on a monochrome or color hard-copy device, a purchaser should first consider five factors.

The number-one priority is image quality, which is subjective, and not synonymous with resolution. It has to do, rather, with line width and definition, uniform filling of areas between lines, roundness of pie charts, and the like. Resolution is the second most important consideration: It takes in dot density and overlap. Third, says Laroff, is speed. He contends that "the only truly important issue is the time it takes from when you push the button until the copy is in your hand." The fourth and fifth priorities he lists as equipment cost and cost per copy, the latter including paper, film, toner, and pens.

If you *do* decide to get into business graphics, you may benefit from more advice from others who have been there. Here are some tips:

- Do your homework if you wish to get into business graphics or expand the services you provide now. "You have to research it well or be prepared to spend big bucks," says Ackmann.
- "Educate management" is a cry voiced by several managers. That's because applying processors, terminals, printers, plotters, and in-house slide makers is a new notion for many executives, especially those in staid old manufacturing companies.
- Don't be dazzled by all the pretty pictures a graphics system produces, says Joan Wright. And don't become too involved with the competition to produce the greatest number of charts and graphs in a given time. Instead, she suggests, "Determine which of your company's problems or needs can be handled by your department, and then go find the system that does that best for you."
- Put the business-graphics operation in the hands of the users. "Some organizations set up graphics centers and put a graphics artist in charge," says Kenny Lint. "Sure, that person may be way ahead of the rest of us on quality. But then users find that they



"Users should be taught how to get at information by a dump into spreadsheet and graphics formats." *Mead, Bausch & Lomb*

can't get plots done at the 11th hour; besides, a backlog develops, just as with programming."

- Standardize equipment users are acquiring on their own, if that's within your power. "We try to tell folks to stick to devices that already work," says Dave Ackmann, "but we can't prevent them from going to Vendor XYZ and buying a Fireball 6."
- "Don't consider a piece of hardware unless the vendor will lend it for two weeks," recommends Ackmann. That's his own rule, at least, and his Fortune 50 company seems to have the clout to obtain this concession.
- Give advice or training on design of graphics as well as on how to operate the systems. New users too often clutter up graphs with words until they become unreadable.
- Consider chargebacks and rentals as a cost-effective means of controlling usage. "We do everything on a chargeback basis, though personal computers are rented out to users," observes Ted Mead at Bausch & Lomb. "It's been successful: We keep control, and users don't have to invest large amounts of capital."
- Don't overlook security, particularly in slide making. Unless you can get approval for the relatively large investment in an in-house unit, you'll have to transmit data to an outside service. In that case, you'll want to make certain that confidential business statistics aren't exposed to too many "foreign" eyes.
- Go to the graphics-industry shows, like Computer Graphics '84 (sponsored by the National Computer Graphics Association) and Siggraph '84 (sponsored by the special interest group on computer graphics of the ACM). Dave Ackmann also recommends getting involved with user groups. (This year, Computer Graphics '84 will be held in Anaheim, CA, May 13 through 17, and Siggraph '84 in Minneapolis, July 23 through 27.)

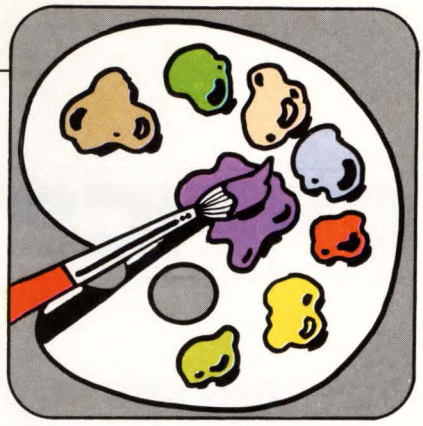
Being prepared

You may not be able to launch a business-graphics effort just yet, due to lack of management awareness or money. But that shouldn't prevent you from keeping up with trends and storing up knowledge for the day when you *can* implement graphics services. Several easily available publications can prepare you for that time.

The first is *The S. Klein Newsletter on Computer Graphics*. The twice-monthly publication of Technology & Business Communications Inc. carries condensed news of graphics developments. It's $155 yearly; write 730 Boston Post Rd. (P.O. Box 89), Sudbury, MA 01776.

"Don't consider a piece of hardware unless the vendor will lend it for two weeks," recommends Dave Ackmann, interactive computing consultant in the Central MIS Group at Monsanto.

"The only truly important speed issue [in hard-copy devices] is the time it takes from when you push the button until the copy is in your hand."
Laroff, ISSCO



Also published by Technology & Business Communications is the third edition (1984) of *The S. Klein Directory of Computer Graphics Supplies: Hardware, Software, Systems and Services*. The 224-page cross-indexed directory sells for $60 prepaid. It is available from the same address as the newsletter.

From vendors come two publications that can help you construct graphic documents for more effective meetings.

The first provides the nuts and bolts of putting together the elements on screen, paper, or transparency. It's called "Steps to Effective Business Graphics" and is available from a local sales representative of Hewlett-Packard, or call the company at (408) 738-4132. Price: $12.

The second, "How to Give the Best Presentation of Your Life," is a more general treatment. It deals with packaging a talk—fear, humor, coping with questions, and visual aids. The booklet can be obtained from ISSCO, 10505 Sorrento Valley Rd., San Diego, CA 92121, (619) 452-0170, for $3.95.

Whatever stage you're in, you haven't heard the last of business graphics. You'd be wise to become informed on the subject: You may have to field queries from the top managers and executives in your organization. And if those queries sound like "Why can't we turn out graphics like the ones I saw yesterday?" you may have already missed an opportunity. But you still have a chance to follow up on such an opening. And that is a chance to directly impress some of the most influential men and women in your organization with the way computer equipment can work for them. □

OFFICE EQUIPMENT

Paper handlers

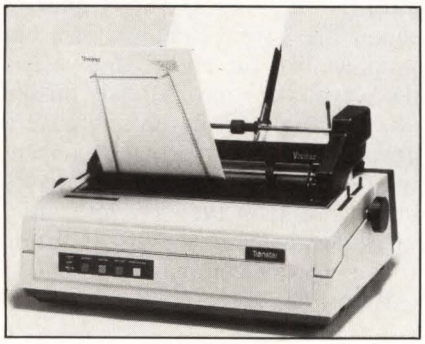
Three paper handlers from Datamarc are compatible with the most popular business daisywheel printers. The Marc 1000 bidirectional forms tractor (pictured) facilitates loading and eliminates paper-twisting and bowing. Price: $250. Datamarc 2000 word-processing peripheral feeds envelopes into an aligned typing position. It feeds up to 1,200 size-6 to size-10 envelopes

per hour, yet produces mailings that look like "real mail." Price: $1,495. The Marc 3000, costing $1,195, feeds both single sheets up to 14-by-14-inches and envelopes up to size 10. It's mechanically driven by a gear attached to the printer, requires no software, and clips easily to the top of the printer. An optional sensor stops printing when the bin is empty.

Datamarc, 10440 Markison Rd., Dallas, TX 75238.
(214) 340-7100. **CIRCLE 228**

Cut-sheet feeders

This line of cut-sheet feeders is compatible with many printer models including Transtar, NEC, Diablo, C. Itoh, Toshiba, and Silver-Reed. Price: under



$400. It features full form-handling capability and variable paper positioning from 7 to 14 inches. It feeds up to 200 sheets of paper by itself and attaches quickly without tools or electrical connections. Ribbons and printwheels can be changed, and envelopes or labels can be inserted manually, without removal of the sheet feeder.

Vivitar Computer Products Inc., P.O. Box C-96975, Bellevue, WA 98009.
(206) 454-9250. **CIRCLE 229**

Paper catcher

The Original Reformer Paper Catcher catches and refolds continuous-feed paper or labels as they are printed. It accommodates paper from 3 to 16 inches wide and up to 12 inches fold to fold, holding over 200 sheets. It costs $50 and comes in clear or smoky bronze acrylic and has no moving parts.

Kings Mountain Computer Products, 13716 Skyline Blvd., Woodside, CA 94062.
(415) 851-4219. **CIRCLE 230**

Writer system

Model 1980 Whisper Writer System, with 8-K keyboard memory, can be used for electronic messaging with

other systems or compatible terminals for: remote computing, database accessing and timesharing, interfacing with the TWX/Telex network, and printing for any crt with RS-232 interface. Price: $750. Six to eight pages of material can be typed offline and sent from memory for efficient use of online time. Other features include automatic dial and log-on, downline loading of the answerback, keyboard dialing of stored phone numbers and battery backup.

3M, Dept. BC83-26, P.O. Box 33600, St. Paul, MN 55133.
(612) 733-1110. **CIRCLE 231**

Komstar duplicator

A tabletop 16mm thermal film duplicator is for use with the Kodak Komstar laser-driven computer-output-microfilm (COM) devices. No chemicals are involved and no specialized training is required. This dupli-

cator, costing $13,450, produces film that is compatible with source-document film used in computer-assisted microimage retrieval systems. Both types of film can then be linked in the same retrieval system.

Eastman Kodak Co., 343 State St., Rochester, NY 14650.
(716) 724-4664. **CIRCLE 232**

Wp spacing pack

The Magicprint program provides true proportional spacing for word-processor output, preventing uneven gaps between words. It costs $195 and works with a text editor such as Wordstar and a Diablo 630/1650-compatible daisywheel printer or NEC Spinwriter. The Magicprint augments the capabilities of CP/M-based word-processing programs with over 60 formatting and other capabilities. Other features include text screening with page-break display, automatic footnotes, multicolumn printing, and free-form page heading and footing.

Computer Editype Systems, 509 Cathedral Pkwy., 10A, New York, NY 10025.
(212) 222-8148. **CIRCLE 233**

Displaywriter Basic

MS-DOS Version 2.0 expands the amount of software available for the IBM Displaywriter. Price: $400. Also available for the Displaywriter is the BI-286 Basic interpreter for the Business Basic II language. Price: $500.
Veritas Technology Inc., 2375 Zanker Rd., San Jose, CA 95131.
(408) 263-0646. **CIRCLE 234**

DG adds features

The Comprehensive Electronic Office (CEO) system has been enhanced with a multi-workstation office system, color-graphics support, and a list-processing capability. The workstation is the Eclipse C/30 microcomputer, which gives access to integrated data processing, data communications, and CEO office-automation functions. It can be used as a stand-alone or as part of a distributed network and works optimally with four to 10 users. The color-graphics software creates a variety of charts, graphs, and text on the Dasher G500 terminal, GDC/1000 Graphics Display Controller, and Desktop Generation Model 10SP Color Monitor. The CEO list-processing facility, which has been merged with Present graphics software, creates and edits records from the CEO Word Processing list file and generates reports and graphs. A C/30 system with 512 Kbytes of memory is $10,300. A system with micro BMC, Winchester disk, tape cartridge, workstation, cabinet, AOS license, and nine software entitlements is available for $33,770.
Data General, 4400 Computer Dr., Westboro, MA 01581.
(617) 366-8911. **CIRCLE 235**

Three packages for DEC Pro: ADR/Data is a relational data management system for the DEC Professional 300 Series. Also available from Applied Data Research (Princeton, NJ) are the ADR/Graph business-graphics pack and ADR/Stats for statistical analysis and forecasting. **CIRCLE 236**

Networked personal computer: The Hero personal computer can be integrated into IBM 3270 networks when connected to the MDS Communications Processor. Literature is available from Mohawk Data Sciences of Parsippany, NJ. **CIRCLE 237**

COST CUTTERS

Packet network link

Tymnet's asynchronous terminal concentrator (ATC) serves up to eight users simultaneously, reducing access cost to public and private packet datacomm networks. Purchase price is under $3,500, less than $450 per port. The ATC—small enough to sit on a desk—has two network ports supporting speeds from 2,400 to 9,600 bps and includes diagnostics.

Tymnet Inc., 2710 Orchard Pkwy., San Jose, CA 95134.
(408) 946-4900. **CIRCLE 238**

Desktop systems

Two personal-computer systems with color graphics, numeric keypad, and five user-programmable function keys are being offered at bundled prices, yielding savings of up to $1,664. The Smart Small Business 8-bit package, costing $1,999, has 64K RAM, dual-disk drive, and six 8-bit software packages. The Middle Manager package, costing $2,499, offers an 8-bit cpu/keyboard with 64K RAM, plus a 16-bit card with 128K RAM and the MS-DOS operating system, dual-disk drive, and identical software.

NEC Home Electronics Inc., 1401 Estes Ave., Elk Grove Village, IL 60007.
(312) 228-5900. **CIRCLE 239**

Honeywell systems

Prices have been reduced for several Honeywell DPS 8 large-scale computers, additional cpus, upgrades, and memory modules. DPS 8/62 central system has been cut from $680,000 to $550,000 and several other models have also been reduced an average of 20 percent. An additional cpu for the DPS 8/49 and 8/49C has been reduced $40,000, to $135,000. The cost of upgrading some DPS 8 systems to the next higher model has been lowered by 32 to 58 percent. Four-Mbyte memory modules for the DPS 8/20, 8/44, 8/47, and 8/49 have been decreased from $40,000 to $35,000. Other modules are cut approximately 20 percent.

Honeywell Inc., P.O. Box 8000/A-79, Phoenix, AZ 85066.
(602) 862-8000. **CIRCLE 240**

Memory trade-in

VAX-11/780 users ordering kits to upgrade 16K-memory subsystems to accommodate 64K-memory arrays will receive credits ranging from $1,500 to $2,400 per Mbyte. One such kit, consisting of controller boards, backplane, SBI interface, and 8 Mbytes of 64K memory, costs $62,900.

Digital Equipment Corp., Maynard, MA 01754.
(603) 884-7990. **CIRCLE 241**

PC/Apple software

DSS/F, a sophisticated financial-modeling package, has been reduced by about one-third. It costs $795 for the Apple version.

Addison-Wesley Publishing Co., Computer Software and Applications, Reading, MA 01867.
(617) 944-3700. **CIRCLE 242**

Scanning system

An intelligent scanning system has been reduced by over 50 percent and offers hardware and software enhancements. New prices start at $34,500. The Kurzweil 4000 converts typeset or typewritten material to computer codes. It can learn most fonts, make intelligent decisions about

character recognition with minimal operator intervention, provide a menu structure and interactive prompts, and has a menu-controlled communications package. Complicated formats, such as multiple columns and text cut around graphics, can be specified for quick input. An automatic feeder is optional.

Kurzweil Computer Products Inc., 185 Albany St., Cambridge, MA 02139.
(617) 864-4700. **CIRCLE 243**

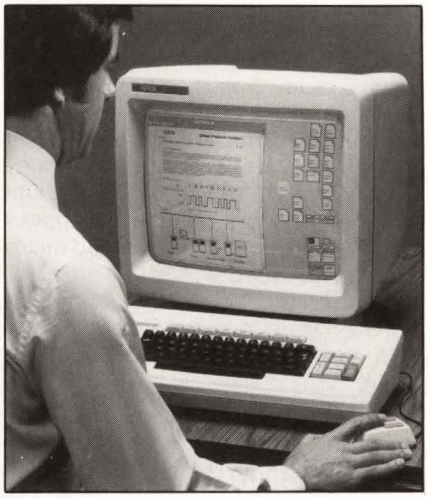
Handheld computers

Two Sharp handheld computers have increased resident memory. While the PC-1250A has doubled its memory to 4 Kbytes it's still only $110. The PC-1500A has quadrupled its memory to 8 Kbytes, and still costs $220.

Sharp Electronics Corp., 10 Sharp Plaza, P.O. Box 588, Paramus, NJ 07652.
(201) 265-5600. **CIRCLE 244**

Star models

The Xerox 8010 Star information system offers two low-cost models. A stand-alone workstation is $8,995. A remote workstation, which is $9,995, can transfer information to an Ethernet network through a PBX via an



RS-232C modem. The current Star network workstation has been reduced from $15,055 to $9,995. It integrates computing, text editing, graphics creation, and electronic mail all in one unit.

Xerox Corp., 3333 Coyote Hill Rd., Palo Alto, CA 94304.
(415) 494-4000. **CIRCLE 245**

ACCESSORIES

Cleaning kits

Twenty-one different Readright Kits remove dust, grease, and other contaminants from computer rooms and automated office equipment. They also control static electricity. Prices range from $15 to $40. There are kits for tape-transport systems, disk packs and disk drives, crt screens, and micro read/write heads. A dual-purpose diskette cleans both single- and dual-sided drives interchangeably.

The Texwipe Co., P.O. Box 308, Upper Saddle River, NJ 07458. (201) 327-9100. **CIRCLE 201**

Temperature monitor

The Dickson Model TH8 Recorder ($575) measures and records the temperature and humidity in computer rooms and other critical areas. It records temperatures from -20 to 120 degrees Fahrenheit and relative humidity from 0 to 100 percent. Both

portable and wall-mounted models are available.

The Dickson Company, 930 S. Westwood Dr., Addison, IL 60101. (312) 543-3747. **CIRCLE 202**

Crt cleaner

Falcon's Crt Screensafe system cleans both coated and uncoated screen surfaces without scratching. A $12.95 kit consists of a four-ounce spray bottle of cleaning solution, a pack of 100 6-by-6-inch wipes, and a three-ounce

introductory-size Pocket Dust-Off, which blows away dust and lint. Solution refills are $3.95 and wipes are $3.95 a packet.

Falcon Safety Products Inc., 1065 Bristol Rd., Mountainside, NJ 07092. (201) 233-5000. **CIRCLE 203**

Disk-drive filters

A manufacturer of disk-drive filters is selling replacement filters to users of major 8-inch and 14-inch disk-drive models. Prices range from $28 for the Control Data model 94301101 to $176 for the ISS drive model 9025527.
Cambridge Filter Corp., Box 4906, Syracuse, NY 13221.
(315) 457-1000. **CIRCLE 204**

Anti-static mat

The Limi-Stat anti-static chair mat prevents the static buildup that accumulates on automated office equipment. A 48-by-60-inch mat is $145, and a 48-by-96-inch mat is $225.
United Technical Products Inc., 32 Southwest Industrial Park, Westwood, MA 02090.
(617) 326-7611. **CIRCLE 205**

Office UPS

The compact Computersave Uninterruptible, at 13 inches high, 12 inches

wide and 20 inches deep, is ideal for office use. Prices begin at $1,450. The Computersave provides emergency run times of 25, 17, and 15 minutes for 500VA, 750VA and 100VA units.
Computer Power Inc., 124 W. Main St., High Bridge, NJ 08829.
(201) 735-8000. **CIRCLE 206**

Crt cleaner

Data Vu Cleaning Mist removes smudges, dust, and other surface contaminants from crt screens and micrographic equipment and dries without

streaking. Price: $45 per carton of 12.
Eye Communications Systems Inc., 117 Hill Street., Hartland, WI 53029.
(414) 367-3080. **CIRCLE 207**

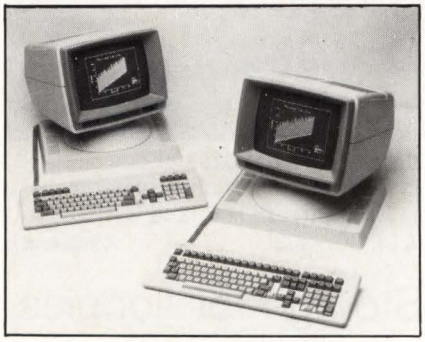
Storage for floppies

Fenco's floppy-disk storage cabinets feature arc-welded construction, a gang-locking system, and a five-year warranty. Price: $487 for five levels; $785 for nine levels.
Fenco Security Systems, P.O. Box 1238, Burlington, NJ 08016.
(609) 387-7580. **CIRCLE 208**

PERIPHERALS

Four terminals

Two video-display terminals with expanded vector-drawing graphics capabilities are compatible with Tektronix Plot 10 and 4010 and Digital Engineering RG512. Conversational Model



ADM 11G is $1,995 and Model ADM 12G, with block mode as well, is $2,195. Two other terminals interface with IBM mainframes and are 3278 keyboard-compatible. The ADM 1178 conversational terminal handles up to 19.2 Kbaud without handshaking and costs $995. Model ADM 1278 adds block mode, variable-format memory, and other features. Price is $1,075. The company also has the Versaprint Model 530 top-of-the-line dot-matrix printer. It offers seven-color printing, both cut-sheet and tractor feeder, three print modes, and dot-addressable graphics. Price: $2,495.

Lear Siegler Inc., 714 N. Brookhurst St., Anaheim, CA 92803.
(714) 774-1010. **CIRCLE 209**

Desk-top networking

Plan 3000 File Server is a midrange networking system that allows any combination of Apple, IBM Personal Computer, and compatible computers to share information and peripherals. Stations may be placed up to 22,000 feet apart. Price for a system with 10-Mbyte capacity and tape streamer for backup is under $10,000 for a maximum of 255 workstations and servers. A 3270 Emulator Server and 3770 and 3780 Emulators allow the workstations to interface with mainframes.

Nestar Systems Inc., 2585 E. Bayshore Rd., Palo Alto, CA 94303.
(415) 493-2223. **CIRCLE 210**

Hand-held terminal

Data can be transmitted from Pinetree's DP 2502 hand-held communication terminal through an ordinary telephone to a distant microcomputer. The $850 terminal works in conjunction with Pinetree's Data Receivers, which act as auto-answer modems, protocol converters, and front-end record processors. The preprogrammed DP 2502 can be used for sales orders, status reports, field-service reports, inventory control, or whenever company representatives must send information to a home office or other location.

Pinetree Computer Systems Inc., 8600 Freeport Pkwy., Dallas, TX 75261.
(214) 659-9510. **CIRCLE 211**

TRAINING AIDS

Rames instruction

Twenty hours of computer-based instruction on Rames II, release 83.2, is available for presentation systems such as IBM's IIS/IIPS, Goal Systems' Phoenix, or Boeing Computer Service's Scholar/Teach 3. Price: $3,750 for a one-year lease. "Using Rames II" describes Mathematician Products Group's fourth-generation language which lets users generate reports, create files, and manipulate data.

Crwth Computer Coursewares, 613 Wilshire Blvd., Santa Monica, CA 90401.
(213) 391-6788. **CIRCLE 212**

Executive intro

"Personal Computers: An Executive Self-Study Program" was designed for the busy executive. Price: $275. Twenty-minute cassettes provide information on key subjects.

Dialogue Systems Inc., 770 Broadway, New York, NY 10003.
(213) 391-6788. **CIRCLE 213**

Self-teaching Lotus

"Teach Yourself Lotus 1-2-3" is an interactive, menu-driven program that simulates the Lotus package. Price: $75. The software is available to run under PC-DOS, MS-DOS, Apple IIe DOS, CP/M, CP/M-86, and Xenix.

American Training International Inc., 3770 Highland Ave., Manhattan Beach, CA 90266.
(213) 546-4725. **CIRCLE 214**

PC introduction

PC Plus, an interactive course that runs on the IBM Personal Computer, provides instruction on the operation of the IBM PC, computing fundamentals, and the major applications of personal computers. Price: $60.

Q.E.D. Information Sciences Inc., P.O. Box 181, Wellesley, MA 02181.
(213) 237-5656. **CIRCLE 215**

Videotape courses

New videotape-course titles from ASI include "I/S Project Management: Life Cycle Management," "I/S Project Management: Project Control and Monitoring," "Technology Perspective: Features and Differences of IMS/VS Release 1.3," and "MVS/SP: Sort/Merge Program." All videotape courses can be leased for $50 to $100 per month. Tapes offered under the Technology Management Curricula (about 100 courses in all) are organized under the categories of Technology Management, Personal Computing, Information Center, Systems Development Management, Emerging Technologies, and Computing Literacy.

Advanced Systems Inc., 2340 S. Arlington Heights Rd., Arlington Heights, IL 60005.
(312) 981-4260. **CIRCLE 216**

ADVERTISER INDEX

services

Electronic mail

Businessnet electronic-mail service can be tailored to a company's needs. The service is accessed via the Telenet network with any brand or type of equipment. Features include public and private bulletin boards, mailing lists, order-entry forms, and sales-force itineraries. Cost for an average user is under $50 a month. Changes in options can be made at any time at no extra charge.

Omnet Inc., 70 Tonawanda St., Boston, MA 02124. (617) 265-9230. **CIRCLE 217**

IBM/Telenet link

The GTE Telenet Interface Program enables IBM 3270 terminal users to access asynchronous hosts connected to the Telenet public data network. It's available for IBM 370, 43XX, 303X, and 308X mainframes with MVS operating systems. It functions with both BSC and SDLC terminals and is compatible with SNA and non-SNA systems. Charge is $300 per month above the rate for a leased line connection between host and Telenet.

GTE Telenet Communications Corp., 8229 Boone Blvd., Vienna, VA 22180. (703) 442-1000. **CIRCLE 218**

PC support features

BCS RIM is a relational database management system that is Fortran-based and supported by VAX VMS, CDC NOS, IBM VM/CMS, and Cray COS. Data can be transferred within a computer or between mainframes, minis, and micros. Version 6.0 features several enhancements and offers an optional Report Writer, which allows users to format data to meet specific requirements. One-time purchase price is $7,500 for the base system, $2,500 for the Report Writer. EIS Microworkstations are financial-planning PC-based services providing the capabilities of Boeing Computer Services' EIS decision-support system. A bundled, distributed version extends the processing power of Mainstream remote service to the PC or XT. A second workstation, for the IBM PC XT/370, provides modeling and forecasting capabilities of the host-based EIS command language for batch or interactive desk-top processing. The workstation with IBM PC with 128 Kbytes of memory, two floppy-disk drives, color display monitor, graphics printer, DOS 2.0 diskette, and EIS software is $6,600. An enhanced version with IBM PC XT with 10-Mbyte fixed-disk drive is $8,700.

Boeing Computer Services, 7980 Gallows Court, Vienna, VA 22180. (703) 556-3700. **CIRCLE 219**

Air transport

Mainframes and personal computers, terminals, printers, and software can be shipped by air via Computer Express. This customized service operates worldwide 24 hours a day, 365 days a year. Special care is taken with materials sensitive to jarring and to temperature, humidity, and magnetic changes. Charges for the service average about $2 per pound.

Sureway Air Traffic Corp., 36-14 32nd St., Long Island City, NY 11106. (212) 937-7601. **CIRCLE 220**

services

Informatics link

Execustation is a remote-computing service linking personal computers to Informatics mainframes. The micro emulates a low-speed ASCII asynchronous terminal and files can be transferred in either direction. Features include menu-selected functions, automatic log-on through Telenet, auto-dial support, and intelligent-terminal capabilities. Price: $300 monthly minimum for mainframe processing, $200 per copy for Execustation software, and $50 per connect hour for file transfer.

Informatics General Corp., 21031 Ventura Blvd., Woodland Hills, CA 91364. (213) 887-9040. **CIRCLE 221**

Sales-order system

A Sales Order Management (SOM) system is available to subscribers to GE Information Services' MIMS MFG Application Systems for manufacturing planning and control. SOM tracks sales orders from order entry through shipment and closing, and increases the users' control over the processing. It provides data on the status of orders, maintains multiple shipping addresses, implements automatic price changes, and generates a variety of reports, such as sales-order history, over a two-year period. Price for Sales Order Management is $10,000, in addition to the $200,000 MIMS license.

GE Information Services, 401 N. Washington St., Rockville, MD 20850. (301) 340-4387. **CIRCLE 222**

System 34/36 software guide: Pac-finder System 34/36 Software Directory provides information on third-party software for IBM S/34 and S/36. It has more than 600 descriptive listings in 20 applications sections, giving vendor, price, source language, functions, and unique features. Pac-finder is published by Elsevier Science Publishing Co., New York, NY. **CIRCLE 223**

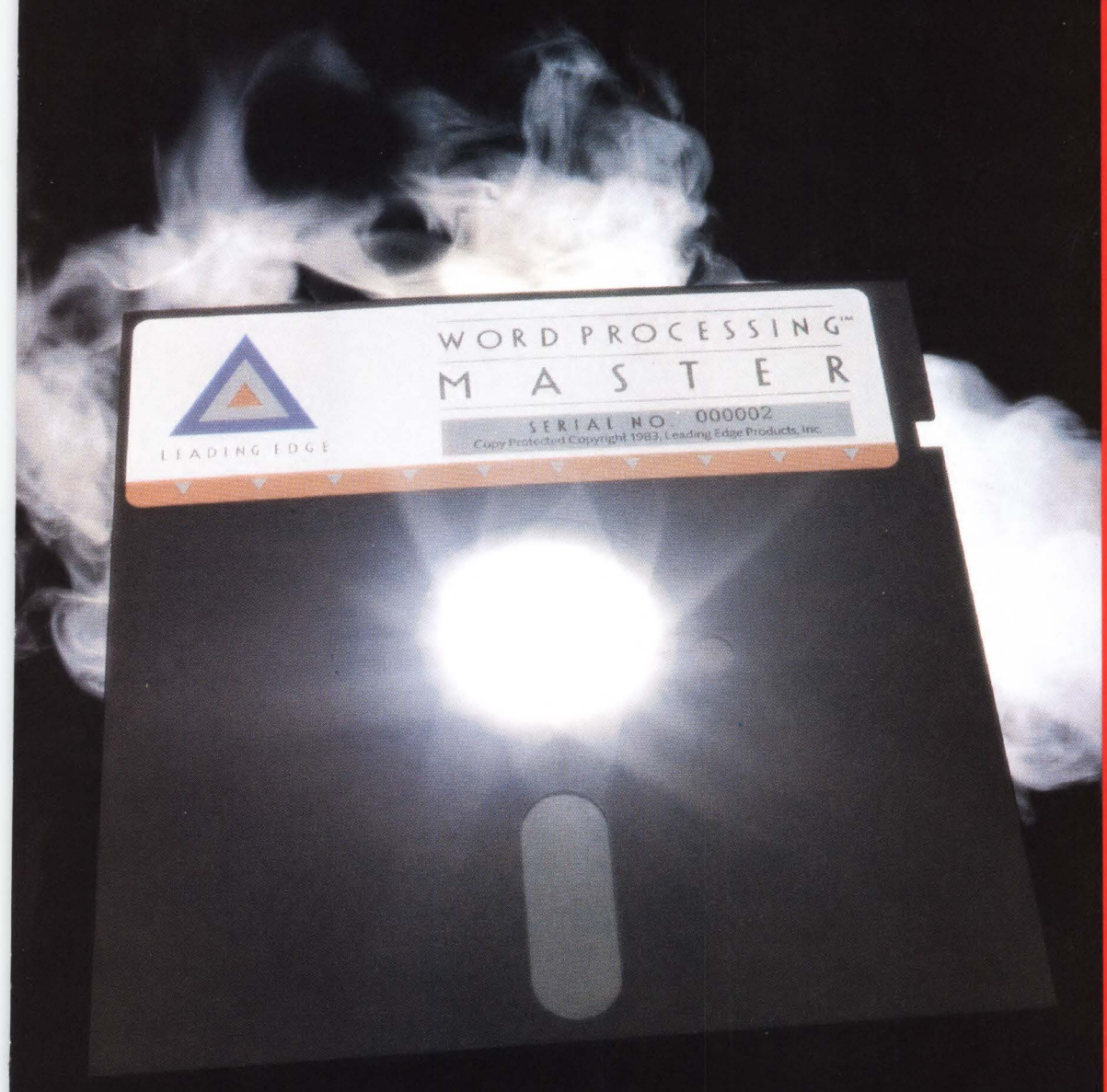
Communications for Compaq: A family of Microtam data communications for the Compaq portable are available from IE Systems of Newmarket, NH. These include asynchronous and binary synchronous communications and terminal emulators, as well as compilers. **CIRCLE 224**

Mixing drives on PDP-11: The SC72 Disk Controller from Emulex (Costa Mesa, CA) allows any four industry-compatible disk drives to operate on the DEC PDP-11/70. **CIRCLE 225**

High-speed printer: The Perkin-Elmer (Oceanport, NJ) LP1200 Band Printer is compatible with the company's 32-bit superminis. It prints on single-page or up to 6-copy fanfold paper and has many features to reduce setup time and maximize operation. **CIRCLE 226**

Printer communications: A 300-lpm printer system from Innovative Electronics of Miami has a programmable controller that implements complex communications. The Innovator 202-FC has interfaces for IBM 2780 and 3780 RJE emulation, for ASCII serial asynchronous communications, and for compatibility with Burroughs, Wang, DEC, and other systems. **CIRCLE 227**

COMMAND OF THE LANGUAGE.



Quite simply, Leading Edge® is the simplest, yet most powerful word processing program ever created for sophisticated Personal Computers like the IBM® (or the even more-powerful Leading Edge PC).

You can learn the basics of the system in a matter of minutes, master it in a matter of hours, and never outgrow it in a lifetime.

Thanks to the system itself, even the most complex functions are typically reduced to just one or two keystrokes with Leading Edge. And thanks to an impeccably logical and easy-to-reference Operator's Manual, you can quickly flip to any function you want to perform, and immediately start performing it.

So you can hunt and peck your way into the future, or (if you're already a good typist)...you can fly.

It's backed by a lifetime warranty, available at around a thousand stores across the country, and comes standard with a toll-free Technical Help Hot Line that connects you directly with a highly trained human being to walk you through, talk you through, any questions you may ever have. For more information, or for the name of the nearest dealer, just give us a call, toll free 1-800-423-0300. In Mass., call collect (617) 828-8150.

Leading Edge®.. Big word processing for the small computer.

LEADING EDGE®

LEADING EDGE PRODUCTS, INC., SOFTWARE SALES DIVISION, 55 PROVIDENCE HIGHWAY, NORWOOD, MA 02062. HELP HOTLINE 1-800-523-HELP OR (617) 449-6060

CIRCLE 134

Yes, you can multidrop "dumb" terminals.

Don't believe that "dumb" minicomputer terminals can't be multidropped. They can—without changing any hardware or software—and you can save a bundle on telephone lines and modems by doing it.

MICOM's Micro900 Multidrop Concentrator was the first product to be able to do the job, and the new Micro900/2 does even more. Remote terminals at up to 16 sites can share the same telephone line that otherwise would support only a single terminal. And the Micro900/2's Command Port allows for controlling all of the node units from the central site.

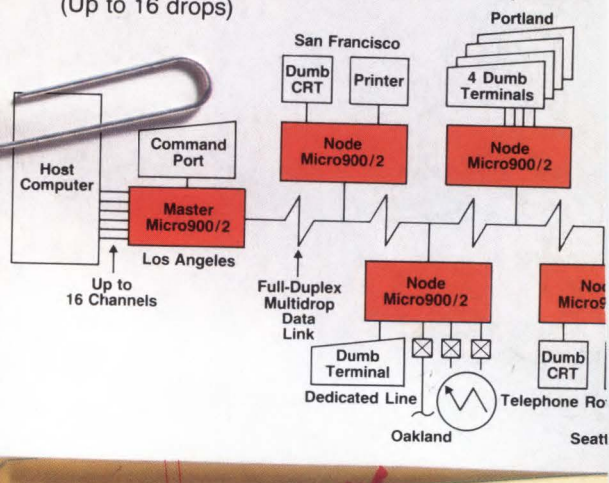
Optionally available with matched LSI modems, prices start at only $900 for a small node unit, $2050 for a master site concentrator.

To make it even easier, both the point-to-

Roger:

Why don't we put the diagram in the ad when we introduce the Micro900/2?

Typical Micro900/2 Concentrator Configuration
Six Remote Offices Served by One Telephone L
(Up to 16 drops)



Because it's dull! Roger

MICOM®

MICOM SYSTEMS, Inc. • 20151 Nordhoff Street • Chatsworth, CA 91311 • Telephone (805) 583-8600 • TWX 910/494-4910
Regional Sales/Service • Atlanta, GA • (404) 435-2999 • Boston, MA • (617) 527-4010 • Chicago, IL • (312) 789-2430
Dallas, TX • (214) 258-0774 • St. Louis, MO • (314) 576-7626 • Teaneck, NJ • (201) 836-4000
MICOM-BORER Ltd. • Bel Court • 15 Cradock Road • Reading, Berkshire RG20JT, England • (0734) 866801 • Telex 847135

For literature please call: (800) "MICOM U.S."

AVAILABLE NOW FROM THESE STOCKING REPS... AK: Anchorage (907) 561-1776 / Juneau (907) 789-4101 ● **AL:** (800) 327-6600 ● **AR:** (214) 620-1551 ● **AZ:** (602) 994-5400
CA: Anaheim (714) 635-7600 / Lodi (209) 334-1961 / San Diego (619) 565-1557 / San Jose (408) 298-7290 ● **CO:** Colorado Springs (303) 594-0880 / Denver (303) 777-8070
CT: (617) 235-5520 ● **DE:** (609) 779-0200 ● **FL:** (800) 432-4480 ● **GA:** (800) 327-6600 ● **HI:** (808) 537-9758 ● **IA:** (402) 895-5850 ● **ID:** (801) 466-6522 ● **IL:** (312) 255-4820
IN: (317) 846-2591 ● **KS:** (816) 252-3700 ● **KY:** (502) 228-5401 ● **LA:** (800) 327-6600 ● **MA:** (617) 235-5520 ● **MD:** (301) 340-0600 ● **ME:** (617) 235-5520 ● **MI:** (313) 588-2300
MN: (612) 425-4455 ● **MO:** Independence (816) 252-3700 / St. Louis (314) 721-0401 ● **MS:** (800) 327-6600 ● **MT:** (801) 466-6522 ● **NC:** (800) 327-6600 ● **ND:** (612) 425-4455
NE: (402) 895-5850 ● **NH:** (617) 235-5520 ● **NJ:** North (201) 569-2353 / South (609) 779-0200 ● **NM:** Albuquerque (505) 292-1212 / Las Cruces (505) 524-9693
NV: (714) 635-7600 ● **NY:** Albany (518) 459-5891 / Buffalo (716) 662-4568 / New York City (201) 569-2353 / Rochester (716) 442-5631 / Syracuse (315) 638-2042 ● **OH:** Cleveland
(216) 524-5930 / Dayton (513) 434-7500 ● **OK:** (405) 478-5000 ● **OR:** (503) 224-3145 ● **PA:** East (609) 779-0200 / West (412) 892-2953 ● **RI:** (617) 235-5520 ● **SC:** (800) 327-6600
SD: (612) 425-4455 ● **TN:** (800) 327-6600 ● **TX:** Dallas (214) 620-1551 / Austin (512) 327-8600 / El Paso (915) 542-1762 / Houston (713) 353-7728 ● **UT:** (801) 466-6522
VA: (301) 340-0600 ● **VT:** (617) 235-5520 ● **WA:** (206) 454-2383 ● **WI:** (414) 784-9379 ● **WV:** East (301) 261-4344 / West (412) 892-2953 ● **WY:** (303) 777-8070
Washington, DC: (301) 340-0600 ● **Puerto Rico:** (809) 723-9689